POLICY LEARNING THROUGH STRATEGIC INTELLIGENCE

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POLICY LEARNING THROUGH STRATEGIC INTELLIGENCE:

*THE AMERICAN SMALL BUSINESS INNOVATION RESEARCH PROGRAM (SBIR)
AND BRITISH SMALL BUSINESS RESEARCH INITIATIVE (SBRI)*

DISSERTATION

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CONTENTS

Foreword	19
The setting	19
Acknowledgements	19
1. Introduction	21
1/ A quick overview of the present thesis	21
1.1 What this dissertation is about: a summary of this thesis	21
1.2 A few definitions	26
1.3 Guide to the reader and structure of this dissertation	27
2. Policy Learning and Strategic Intelligence: toward an instrumental approach	29
1/ Organisation of this Chapter	30
2/ Cross-temporal and transnational policy learning	32
2.1 Identification of the drivers and knowledge gaps in the literature	32
2.2 Policy innovation and cross-temporal policy learning	33
2.3 Diffusion and policy transfer studies as a ground for transnational policy learning	38
2.4 Approaching policy learning	53
2.5 Conclusion	72
3/ Strategic Intelligence and Policy Change: the notion of a government (procedural) instrument	73
3.1 Developing an instrumental approach to Strategic Intelligence	73
3.2 Knowledge in policy learning: the issue of knowledge-based policy making	74
3.3 Beyond “Espionage”: Strategic Intelligence as a source of knowledge for policy making	83
3.4 The concept of instrument: deconstructing what seems neutral	87
3.5 Understanding Strategic Intelligence as a procedural policy instrument	100
3.6 Conclusion	109

4/	Defining the scope of the research	114
4.1	Introduction and argument of this thesis	114
4.2	Eye on: the demand side of innovation policy	115
4.3	Innovation-oriented procurement: from PPI to PCP	120
4.4	The scope of this thesis: the SBIR model and its transfer	124
3.	Approach and methods	132
1/	General approach to this research	133
1.1	From theory to the research framework: setting up the stage	133
1.2	Formulation of the Research Questions and analytical model	134
1.3	Conceptual framework: main components	137
2/	Methodological framework	142
2.1	Research questions	142
2.2	An abductive process tracking approach...	143
2.3	...through two case studies	145
2.4	Case studies: selection and analytical framework	146
2.5	From design to practice: case study protocol	148
4.	Analysis	158
1/	Overview of the case studies: Strategic Intelligence as a vector of policy learning for SBIR and SBRI	159
1.1	Synthesis of Case Study 1 – The Small Business Innovation Research Program (SBIR)	159
1.2	Synthesis of Case Study 2 – The Small Business Research Initiative (SBRI)	172
1.3	Synthesis of the case studies: an informative overview	188
2/	Analysing cross-temporal and Transnational Policy learning through Strategic Intelligence: a cross-case analysis	191
2.1	Guiding the reader through the analysis of policy learning through Strategic Intelligence	191
2.2	Strategic Intelligence as a vector of cross-temporal policy learning	192
2.3	Strategic Intelligence as a vector of transnational policy learning	224

5.	Conclusions	256
1/	Deriving conclusions from the analysis	257
1.1	Repositioning the present contribution	257
1.2	Answering the research question and underlying theory	259
2/	Theoretical implications	263
2.1	Theoretical developments	263
2.2	A way forward?	265
3/	Policy implications	269
ANNEX 1 – Case 1 - Policy Structuring and repository constitution through Strategic Intelligence: the US SBIR case		273
1/	The Small Business Innovation Research Program	274
1.1	Rationale and paradigmatic/social components of the programme	274
1.2	Technical components of the programme	281
1.3	Rules and governance: formal and informal sides of a same coin	290
2/	Understanding the role of Strategic Intelligence in an SBIR context: cross-temporal learning along the policy process	299
2.1	Defining Strategic Intelligence in the SBIR context	299
2.2	Strategic Intelligence and the SBIR Policy Process over time: more than 30 years of interaction	315
2.3	Argumentative use of Strategic Intelligence in SBIR decision process: eye on three key controversies	335
3/	Strategic Intelligence as a frame for perception and export resource: the American ‘Outward Perspective’ and limited ‘learning from abroad’	354
3.1	Positioning embedded learning processes: linking intertemporal and Transnational Policy learning through Strategic Intelligence	354
3.2	Foreign Strategic Intelligence and the repository shaping function: internal legitimation and perception building	362
3.3	Strategic Intelligence and Transnational Policy learning dynamics in the case of the American SBIR	368
Annex 2 – CASE 2 - Positioning the role of Strategic Intelligence in transnational policy learning: the UK SBRI		380
1/	The case of the UK SBRI in context	381
1.1	A British version of SBIR: the Small Business Research Initiative (SBRI)	381
1.2	Common blocks and key different features	387

2/	A decade of emulative interactions between Strategic Intelligence and SBRI	401
2.1	Strategic Intelligence in the SBRI context	401
2.2	SBRI and Strategic Intelligence: co-construction over time	407
2.3	Strategic Intelligence and SBIR/SBRI integration: 15 years of (difficult) cross-temporal learning	442
3/	Role of Strategic Intelligence in transnational policy learning: understanding the UK SBRI “emulation” process of SBIR	446
3.1	Strategic Intelligence and transnational uptake of SBIR in the UK: forms and conditions for the uptake	446
3.2	Perspective on the role of supra-national organisations	459
	ANNEX 3 – Correspondence table: claims, questions and conclusions	479
	ANNEX 4 – Other annexes	487
1/	Bibliography and references	488
2/	List of interviewees	531
3/	Organisation categories associated to the interviewees	536
4/	Indicative topics of discussion for the interviews	539
4.1	Policy makers - politics	539
4.2	Policy makers - officials	541
4.3	Experts and consultants	543
4.4	Stakeholders (incl. target groups and beneficiaries)	545
5/	The NAS Evaluation described by the 2012 SBIR Directive	548
6/	SBIR and SBRI material	550
6.1	Comparing DoD SBIR technology areas over time	550
6.2	Example of one of the SBIR certification for SBCs majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms(Source: 2012 SBIR Directive, SBA)	551
7/	SBRI: Value of Departmental SBRI Contracts and Treasury Commitments	552
8/	Agencies and Department’s codes (USA)	553
9/	Strategic Intelligence ITEMS (USA)	554
10/	Strategic Intelligence ITEMS (UK)	555
11/	US as a Global Technology Competitor	556

INDEX

TABLES

Table 1: Overview of key concepts used along this dissertation	26
Table 2: Synthesis of policy circulation dimensions	49
Table 3: Highlighting the links between the literature review and the research questions ...	111
Table 4: Key features of demand-side policy instruments	119
Table 5: Procurement types and possible effects of public sector interventions on innovation	122
Table 6: Comparing PCP to public procurement policies	124
Table 7: Thinking the transferability of the SBIR model: practical example.....	128
Table 8: Overview of the interviews conducted for this thesis.....	152
Table 9: Evidence highlighting the role of strategic intelligence in policy learning	189
Table 10: Relations between analytical findings and research questions	191
Table 11: Overview of the uses of Strategic Intelligence as a result of SBIR negotiation processes	212
Table 12: Strategic Intelligence influence and its “resource” value for transnational policy learning	233
Table 13: Non-exhaustive list of publicly led initiatives complementary to SBIR	285
Table 14: SBIR repartition among departments: an overview	287
Table 15: Repository of Strategic Intelligence considered in the SBIR case study.....	309
Table 16: SBIR benchmarks applied to the Departments.....	314
Table 17: SBIR set aside rates in 1985	336
Table 18: Amounts allocated to SMEs through SBIR - A time perspective.....	339
Table 19: SBIR/SBRI - A comparative perspective.....	395
Table 20: Technology areas - A time comparison.....	550

FIGURES

Figure 1: Structure of the dissertation	28
Figure 2: Rationale underlying this first part of the literature review	33
Figure 3: Policy change results from internal and external factors	35
Figure 4: Policy learning in the diffusion literature	39

Figure 5: Policy diffusion is made of multiple transfers	44
Figure 6: Policy transfer pathways	45
Figure 7: Policy learning as part of the diffusion literature	54
Figure 8: two dimensions to differentiate between main learning approaches.....	63
Figure 9: Issues and challenges encountered in the literature guided this research	67
Figure 10: Tentative Enumeration of Representative Policy Instruments and Design Criteria.	91
Figure 11: Typology of Policy Instruments	93
Figure 12: Synthesis of the RQs - Strategic Intelligence as a vector of cross-temporal and transnational policy learning.....	110
Figure 13: Taxonomy of innovation policy tools	116
Figure 14: Distinguishing between public and private demand dynamics.....	118
Figure 15: The SBIR program	127
Figure 16: Evidence acknowledging the role of Strategic Intelligence in policy learning in the UK	130
Figure 17: Evidence acknowledging the diffusion of SBIR world-wide.....	131
Figure 18: Strategic Intelligence as a vector of new policy ideas	135
Figure 19: Theory underlying the approach of this thesis.....	136
Figure 20: The process level.....	138
Figure 21: Illustrating passive and active policy learning dynamics	139
Figure 22: Characterizing Strategic Intelligence	140
Figure 23: Path from Strategic Intelligence to policy learning.....	141
Figure 24: Analytical Framework	148
Figure 25: Atlas T.I main classification structure	155
Figure 26: SBIR as a process involving multiple instruments	160
Figure 27: Reminder of the Research Questions	259
Figure 28: Illustrations – the Valley of Death.....	279
Figure 29: Estimated distribution of funding sources for early-stage technology development diffused by NIST in 2002	280
Figure 30: Breakdown of US venture capital by stage of development in 2004.....	281
Figure 31: SBIR as a process involving multiple instruments	283
Figure 32: SBIR Phase II projects and their commercialisation – the example of DoD.....	289

Figure 33: Share of SBIR spending per department – a time perspective	293
Figure 34: Extract from the 2012 directive – SBIR databases	303
Figure 35: Confirmation of the allocation increase by the National Defense Reauthorization Act	338
Figure 36: The innovation process according to the NAS evaluation of SBIR	358
Figure 37: Using Strategic Intelligence to promote SBIR internationally and using international copying as a way to legitimization	377
Figure 38: Overview status of implementation of PCP across Europe	386
Figure 39: SBRI process	394
Figure 40: Total SBRI contract (£M).....	396
Figure 41: Institutional leadership of the SBRI over its first 15 years.....	397
Figure 42: Share of all SBRI contracts awarded by government agency 2009 to 2013 (£M)..	399
Figure 43: Monitoring data - extract from the 2014 SBRI healthcare review	403
Figure 44: Technology Strategy Board Monitoring Management System and framework.....	404
Figure 45: Emulating SBIR through Strategic Intelligence – illustration	416
Figure 46: Extract from Connell (2006)	423
Figure 47: The European PCP framework	464

BOXES

Box 1: Main goals of the literature review	31
Box 2: Example of the knowledge-government relationships in Manchester by the 19th century	77
Box 3: Connecting tools to ideology	94
Box 4: Missing Strategic Intelligence? An illustration of its absence in instrumental approaches	100
Box 5: SII (Strategic Intelligence Instrument) contours	108
Box 6: Scoping through a review of the literature	115
Box 7: Note on the SBIR model and the definition of PCP	125
Box 8: The example of Forska & Väx	131
Box 9: "Repository"?.....	135
Box 10: More details how the analysis was performed in practice	150
Box 11: Atlas T.I codes used in the context of this thesis.....	156

Box 12: Transnational Policy learning entrepreneurship as the corner stone of SBRI	184
Box 13: Policy competition – an illustration.....	194
Box 14: Using the American SBIR as a benchmark for SBRI	198
Box 15: The “procurement” identity of SBIR and SBRI in Europe	201
Box 16: Introduction of the notion of valley of death to the SBIR repository.....	202
Box 17: Political support grounded into win-win opportunities.....	208
Box 18: Four dimensions of policy learning readiness	221
Box 19: Convergence through Strategic Intelligence – presentation of the “what” is being learnt through SI.....	224
Box 20: Intervention of the SBIR lead evaluator in Westminster Committee – nuancing the “myths” about US procurement	226
Box 21: NAS as the main part of the SBIR repository mobilized in the SBRI context.....	235
Box 22: SBIR-related performance indicators viewed by the European Commission	238
Box 23: PLEs as a sub-category of policy entrepreneurs made by SI	244
Box 24: (Self-) acknowledgment of the British policy learning entrepreneur.....	245
Box 25: Extract from the foreword by Ian Leslie in Connell (2010)	247
Box 26: Leading by Strategic Intelligence example.....	251
Box 27: Supra-national policy learning from sub-national experiences	253
Box 28: Linking back to the literature review	260
Box 29: Strategic Intelligence as a structural vector of policy learning.....	262
Box 30: Reminder – utilisation concepts.....	266
Box 31: Policy Learning through Strategic Intelligence contextualized.....	267
Box 32: The “a posteriori” added notion of Valley of Death.....	278
Box 33: The three phases of the SBIR program	282
Box 34: The DMEA SBIR phase II enhancement program	284
Box 35: Institutional complexity – illustrations of the decentralized management of SBIR ...	296
Box 36: Extract from the 2012 National Defence reauthorization act	300
Box 37: Research on SBIR – academic contributions.....	301
Box 38: SEC. 5137 – continued evaluation by the National Academy of Sciences	302
Box 39: From intelligence to intelligence – evaluation introducing itself on the agenda.....	306
Box 40: Measuring SBIR commercialisation success at the agency level	312

Box 41: The roots of SBIR seen in a broader context	318
Box 42: Illustration of SBIR growth: a 1983/2009 comparison	319
Box 43: An “Increased support for commercialisation”	325
Box 44: Framing through Strategic Intelligence: the instrumental perspective	327
Box 45: Reauthorisation of SBIR through the 2012 National Defence Authorization Act	329
Box 46: Successive extensions of the SBIR	330
Box 47: Political context of the reauthorisation	332
Box 48: Linking controversies to Strategic Intelligence - congress hearings	333
Box 49: Introducing the "VC issue"	344
Box 50: Making up evidence	347
Box 51: Conclusions and recommendations from NAS on the role of VC-backed firms in NIH SBIR	348
Box 52: Allowing limited participation of VC-backed firms to SBIR	350
Box 53: Responding by setting up conditions for Strategic Intelligence	352
Box 54: Reference the international competitive pressure - 4 examples	364
Box 55: 1.5.1 SBIR around the world	366
Box 56: (Not) looking for foreign experience?	370
Box 57: Informing on SBIR - a DoE perspective	372
Box 58: SBIR promoted as a best practice - an active “Push” approach illustration	376
Box 59: Active SBIR souring - eye on the Netherlands	382
Box 60: NESTA evidence on SBIR timeline and the original model (US SBIR) - emulation references	383
Box 61: The particularity of SBIR healthcare	400
Box 62: Independent Strategic Intelligence? The example of NESTA	405
Box 63: SBIR Campaign - first steps	410
Box 64: The edge between expertise and advocacy	412
Box 65: Political enquiry about foreign SI	417
Box 66: Failure of the emulation process	418
Box 67: Extract from Connell (2006) 'secrets report'	419
Box 68: TSB and SBIR leadership	424
Box 69: Learning from the US	425

Box 70: SBRI described by the Sainsbury review - extracts.....	427
Box 71: The Sainsbury review guiding international emulation of SBIR.....	428
Box 72: Strategic Intelligence to flag a new SBRI failure	430
Box 73: From Strategic Intelligence to policy.....	431
Box 74: Strategic Intelligence as a tool for lobbying - the example of the institution of engineering and technology	434
Box 75: When experts define the needs and references to be addressed and taken up by policy	435
Box 76: Extract from Connell’s submission to the House of Lords Select Committee on Science and Technology	436
Box 77: Committee as relays of Strategic Intelligence - pointing to organisational resistance to change.....	438
Box 78: MoD proposal to further adapt SBRI.....	439
Box 79: SBIR targets in 2013-14 for selected departments	440
Box 80: TSB SBRI targets for 2014-2015.....	442
Box 81: Learning from monitoring.....	443
Box 82: Pushing towards market uptake at NHS	444
Box 83: "Why has it been so difficult" - expert vision on the barriers to SBIR/SBRI learning..	445
Box 84: Eye on Wales	446
Box 85: Strategic Intelligence rolling down from the Secrets Report to Northern Ireland	448
Box 86: EU state aid rules and organisational resistance combined - example of Wales	452
Box 87: U.S. - U.K. Cooperation on innovation policy	454
Box 88: Limited learning from other countries than the US	455
Box 89: Transnational Policy learning entrepreneurship	457
Box 90: Interfacing: active promoters at an intermediary level	458
Box 91: The start of EU discussions over PCP	465
Box 92: From US to EU - SBIR (NL) and SBRI (UK) on the EU agenda	466
Box 93: EU regulation as a constraint or resource of organisational resistance to change....	467
Box 94: Multiple influences of the EC	468
Box 95: EC projects as a source of US inspiration for SBRI - converging features	470
Box 96: Connectivity to the outside system and vulgarisation through international conferencing	472

Box 97: Emulation of SBIR at the EU level - the SME instrument of the EC	473
Box 98: Origins of the SME-instrument.....	474
Box 99: Pushing the EU version of SBIR - from Strategic Intelligence to influence	476
Box 100: Presenting the Dutch SBIR experience to a European audience.....	477

LIST OF ACRONYMS

- ▶ ACF: Advocacy Coalition Framework
- ▶ AIRTO: *Association for Innovation, Research and Technology Organisations (UK)*
- ▶ BIO: Biotechnology Industry Organization (US)
- ▶ BIS: Department for Business, Innovation & Skills (UK)
- ▶ CBR: Centre for Business Research (UK)
- ▶ CTA: Constructive Technology Assessment
- ▶ DARPA: Defense Advanced Research Projects Agency (US)
- ▶ DCMS: Department for Culture, Media & Sport (UK)
- ▶ DECC: Department of Energy & Climate Change (UK)
- ▶ DEFRA: Department for Environment, Food & Rural Affairs (UK)
- ▶ DETI: Department of Enterprise, Trade and Investment (UK, NI)
- ▶ DfT: Department for Transport (UK)
- ▶ DG CONNECT: European Commission Directorate General for Communications Networks, Content & Technology (EU)
- ▶ DG ENTR: European Commission Directorate General Enterprise and Industry (EU)
- ▶ DG INFSO: European Commission Directorate General for Information Society & Media (EU)
- ▶ DG JLS: European Commission Directorate General for Justice, Freedom and Security (EU)
- ▶ DG RTD: European Commission Directorate General for Research and Innovation (EU)
- ▶ DG: Directorate General
- ▶ DIUS: Department for Innovation, Universities and Skills (UK)
- ▶ DMEA: Defense Microelectronics Activity (US)
- ▶ DoD: Department of Defense (US)
- ▶ DoE: Department of Energy (US)
- ▶ DTI: Department of Trade and Industry (UK)

- ▶ EC: European Commission (EU)
- ▶ ERDF: European Regional Development Fund (EU)
- ▶ EU: European Union (EU)
- ▶ FBI: Federal Bureau of Investigation (US)
- ▶ FCP: Forward Commitment Procurement (UK)
- ▶ FP: Framework Programme (EU)
- ▶ FY: Fiscal Year (US)
- ▶ GAO: General Accountability Office (US)
- ▶ GDP: Gross Domestic Product
- ▶ H2020: Horizon 2020 (EU)
- ▶ HHS: Department of Health and Human Services (US)
- ▶ HMT: Her Majesty's Treasury (UK)
- ▶ HO: Home Office (UK)
- ▶ House SBC: House Small Business Committee (US)
- ▶ House STC: House Science and Technology Committee (US)
- ▶ HR: Human Resources
- ▶ ICT: Information and Communication Technologies
- ▶ IET: The Institution of Engineering and Technology (UK)
- ▶ IP: Intellectual Property
- ▶ IPR: Intellectual Property Rights
- ▶ KETs: Key Enabling Technologies (EU)
- ▶ KTN: Knowledge Transfer Network (UK)
- ▶ MEP: Member of the European Parliament (EU)
- ▶ MoD: Ministry of Defence (UK)
- ▶ MoT: Ministry of Transport (UK)
- ▶ MP: Member of the Parliament (UK)
- ▶ MP: Member of the Parliament (UK)
- ▶ NAS: National Academy of Science (US)
- ▶ NASA: National Aeronautics and Space Administration (US)
- ▶ NESTA: National Endowment for Science Technology and the Arts (UK)

- ▶ NGO: Non-Governmental Organisation
- ▶ NHS: National Health Services (UK)
- ▶ NI: Northern Ireland (UK, NI)
- ▶ NIH: National Institutes of Health (US)
- ▶ NIST: National Institute of Standards and Technology (US)
- ▶ NL: Netherlands
- ▶ NPM: New Public Management
- ▶ NSBA: National Small Business Association (US)
- ▶ NSF: National Science Foundation (US)
- ▶ NVCA: National Venture Capital Association (US)
- ▶ ODI: Overseas Development Institute (UK)
- ▶ OECD: Organisation for Economic Co-operation and Development
- ▶ OGC: Office of Government Commerce (UK)
- ▶ OIG: Office of Inspector General (US)
- ▶ OMB: Office of Management and Budget (US)
- ▶ OMC: Open Method of Coordination
- ▶ OSTP: Office of Science and Technology Policy (US)
- ▶ PCP: Pre-Commercial Procurement
- ▶ PL: Policy Learning
- ▶ PLE: Policy Learning Entrepreneur
- ▶ PLR: Policy Learning Readiness
- ▶ PPI: Public Procurement for/of Innovation
- ▶ PSI: Professional Social Inquiry
- ▶ R&D&I: Research, Development and Innovation
- ▶ R&D: Research and Development
- ▶ RCs: Research Councils (UK)
- ▶ RIA: Regulatory Impact Assessment
- ▶ RQ: Research Question
- ▶ RTD: Research and Technology Development
- ▶ RTDI: Research, Technology Development and Innovation

- ▶ S&T: Science and Technology
- ▶ S3: Smart Specialisation Strategy (EU)
- ▶ SBA: Small Business Administration (US)
- ▶ SBC: Small Business Concern
- ▶ SBIR: Small Business Innovation Research Program (US)
- ▶ SBRI: Small Business Research Initiative (UK)
- ▶ SBTC: Small Business Technology Council (US)
- ▶ SIRE: Science-Industry Relationships
- ▶ SME: Small and Medium Enterprise
- ▶ STI: Science, Technology and Innovation
- ▶ STTR: Small Business Technology Transfer (US)
- ▶ SWOT: Strengths, Weaknesses, Opportunities and Threats
- ▶ TRL: Technology Readiness Level
- ▶ TSB: Technology Strategy Board
- ▶ UK: United Kingdom
- ▶ UKRC UKRC: Research Councils UK
- ▶ US / USA: United States of America
- ▶ USSR: Union of Soviet Socialist Republics
- ▶ VC analysis: Value Chain analysis
- ▶ VC: Venture Capital
- ▶ VCOC: Venture Capital-Owner Companies
- ▶ WWII: World War II

Foreword

1/ The setting

I was able to jump at the chance to explore the issues of Strategic Intelligence and Policy Learning thanks to an agreement between my home company, IDEA Consult (Brussels) and the STEPS Department of the University of Twente. This public-private format, less normal in social sciences than engineering or technology, conferred a more applied dimension to my PhD Research. It was an honour to benefit in this context from the great experience of my UT PhD board members Hector Gonzalo Ordoñez Matamoros, Erik Arnold and Stefan Kuhlmann; and of course from my IDEA PhD referees, Arnold Verbeek and Geert Steurs as well as Wim van der Beken.

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Everything obviously started with Christine Convers more than 10 years ago and the seeds of a new world growing around my new self. She opened the doors of the Universe and made everything Possible. Doing a PhD suddenly turned into a real option for a street kid who had until then thought little about such a possibility. Words will never be enough to express my gratitude and feelings in her respect. After years of hard work and tough times both studying and working I then crossed paths with Arnold Verbeek to whom I owe this Doctoral experience in the first place, and without whom none of this would have happened. I would have gone nowhere without his guidance and above all his friendship. Þakka þér vinur minn.

And as with any long-distance runner, one needs to be encouraged, especially in hard times. It would have been impossible to go on without the support of my Friends and Family (I was the only Fool in this story) who have been kind enough to provide me with unconditional love and care during these years. They offered me their ears and smiles, their understanding, and even holidays when I needed to recharge my batteries together with my beloved one after years of tiring work.

Every piece of this dissertation is linked to a particular person, and it would be too lengthy to set out the entire list. My sister Gwendoline whom I love more than one could ever imagine, designed the cover of this dissertation. My parents covered me with warm clothes while I was freezing in D.C. without a penny. My Friend and Brother Mehdi together with Sarah brought me happiness giving birth to Liham while I was struggling with various parts of my life. My sweet Angie brought me peace while I was burning out. Cam, Tim, Jo, Fiofio, Mimon, Quent' and Medmed sent me on 'Swiss&Thai breaks' to rest when I could not sleep anymore. My colleagues from IDEA Ariane, Vincent, Jessie, Eveline, Isabelle and Els provided me with fresh views, ideas and support. Solenne challenged me when I needed to be shaken up. My colleagues Alejandro, Junwen and Peter from the University of Twente brought me new insights and a friendly research life. Evelien proved to be a wonderful sparring partner and Twente would have never been so great without her. I wish to thank them all, mentioned or not. Thank you.

1. Introduction

1/ A quick overview of the present thesis

1.1 What this dissertation is about: a summary of this thesis

1.1.1 Research ground

“Despite the importance attached to “strategic policy intelligence” in recent innovation policy analysis, little empirical attention has been devoted to actual processes of policy learning. A much greater empirical effort is needed to investigate actual, as opposed to idealised, processes of policy learning, and to better understand the roles experts, analysts and evaluators play in those processes vis a vis other actors.”

(Flanagan et Al., 2011)

Innovation policy involves using policy instruments to achieve societal goals. In order to learn from both past and foreign experiences, scholars and practitioners very often value sources of knowledge about these instruments. This dissertation deals with the role of Strategic Intelligence in both cross-temporal and transnational policy learning. It aims to understand how Strategic Intelligence enables and/or fosters policy learning. It is grounded in policy research, with the ambition of advancing knowledge on Strategic Intelligence and innovation policy learning as well as on the relations between the two. The entire thesis was driven by a main research question from which two lead sub-questions were derived: How does Strategic Intelligence enable and/or facilitate cross-temporal and transnational policy learning?

In policy research, the introduction of policy ideas or practices perceived as “new” can be grounded in past/internal and exogenous factors. The endogenous factors usually connect to a “cross-temporal” vision of the policy process, in which perceptions and cognitive frames play a role for instance through policy learning and in particular “learning from the past”. With regard to exogenous factors, policy diffusion and in broader terms “circulation” have been explored in various fields of research. The circulation of policy models across space and time has mainly been addressed by researchers studying policy diffusion and transfers. The policy studies literature shows that some policy models indeed circulate from one location to another and from one system to another. Scholars have established taxonomies of diffusion factors (causes leading to such diffusion processes), and explored individual transfers between systems. Many of the latter were interested in convergence phenomena, where policies take on similar shapes in two or more different policy systems.

Network analysts and cognitivists (cognitive scientists) eventually introduced the notion of policy learning to refer to a specific type of policy change and policy transfer, highlighting the cognitive dimension of transfers at different levels.

Among sources of policy learning, networks and communities have mainly been considered by social scientists analysing the adoption of ideas, instruments, and behaviours from “*somewhere else*”. Researchers have also dealt with policy research and policy evaluation and how these were used in different ways and influenced the direction of policy cycles. In that sense, learning from the past which will be referred to as “vertical learning” has been explored for instance through the use of notions such as research or evaluation “use” but remained rather focused on the idea that change results from competition among interests and focused on adoption. The literature on policy learning has mainly focused on the design of new taxonomies and input-output analyses, paying less attention to processes and system differences. There has been little integration between the different forms of learning. New perspectives were opened by the policy entrepreneurship literature but no or little dynamic analysis has been done to consider policy learning from that perspective.

A major gap in policy learning research has remained, concerning the conditions and causal mechanisms underlying policy learning. Even less attention has been paid to how learning from other systems - “*horizontal learning*” – occurs or to the role of knowledge sources other than research or evaluation studies in learning. Instruments falling within the “Strategic Intelligence” category have not or been considered or have been little considered. By Strategic Intelligence is understood here all methods and approaches of normative knowledge production and diffusion aiming to influence policy, or as defined later in the present dissertation: “*Strategic Intelligence refers to a formalized way of producing, transmitting and using knowledge, characterized by normative objectives (and thus excluding fundamental research or learning by doing) and being driven by normative principles such as the one of usefulness*”. This definition encompasses evaluation, foresight, audits, monitoring, socio-economic studies, metrics, self-initiated studies, etc. Defined as a procedural instrument¹, Strategic Intelligence was foreseen as a vector of policy learning through different mechanisms such as instrumentation by entrepreneurs and cognitive filtering.

1.1.2 Empirical approach

Over the past 15 years the field of innovation policy studies has paid growing attention to the demand side of innovation, and related policy measures have gained in importance in Europe as the European Commission and Member States looked into such measures in a more formalized way.

¹ While substantive instruments usually deal with the “*substance*” (allocation of goods and services to society) of policy, procedural instruments deal with policy modalities (processes).

The current research is anchored in this trend, which seems to have diffused through different channels, and focuses on one specific measure that would be used in field research. Among the sub-categories of demand-oriented instruments is pre-commercial procurement (PCP). The main PCP scheme world-wide is known as the Small Business Innovation Research Program (SBIR, USA) which was emulated in many countries as a result of *“learning from abroad”* and this was selected to be the object of study in this thesis.

This thesis made use of an abductive process-tracking approach relying on a case study method, which studied the SBIR and its diffusion through Strategic Intelligence. A second case study was selected to complement the analysis: it consisted in the Small Business Research Initiative (SBRI, UK). The case study methodology developed for this research was preferred to other methodological options as case studies are best-suited to understanding causal mechanisms and to undertaking process-embedded analyses. It made use of desk research, semi-structured interviews, participatory observation and analysis using the Atlas T.I software. The methodological approach was therefore guided by the main research question, *“How does Strategic Intelligence enable and/or facilitate cross-temporal and transnational policy learning?”*, and was programme-oriented and geographically located in two different national states: the United States of America (USA) and the United Kingdom (UK). Analytical levels and dimensions were set up as to allow the analysis catch soft, hard and instrumental dimensions of policy learning through Strategic Intelligence at both instrument and case levels. Calling upon the instrumental approach of Lascousmes and Le Galès (2004) and in order to add analytical value, the analytical concept of procedural instrument was applied to Strategic Intelligence as to better analyse its political and policy dimensions in an integrated way. The notion of Strategic Intelligence *“uptake”* approached through the concept of *“use”* (because of the need for a focus in the empirical approach) was made central to the methodological approach in order to make the link between Strategic Intelligence as a procedural instrument and its impacts on policy in terms of both cross-temporal and transnational learning.

1.1.3 Results

This thesis shows that Strategic Intelligence can effectively foster policy learning, from both a cross-temporal and transnational point of view. It shows that Strategic Intelligence is a vector of policy learning that is enabled by contextual conditions that are both competitive and institutional, and fosters learning structurally while it can be empowered or hampered by the political strategies of the actors involved. It has both a contingent and structural nature, and different forms of Strategic Intelligence will be most likely to influence different levels of policy making.

Eight main conclusions were derived from the fieldwork that support this view:

- ▶ Policy Learning through Strategic Intelligence requires external and competitive conditions co-defined by Strategic Intelligence
- ▶ Strategic Intelligence greatly contributes to policy conceptualisation and problematisation
- ▶ Policy Learning happens through the political instrumentation of Strategic Intelligence (use of the results of strategic intelligence by the actors of the policy process to achieve their own goals)
- ▶ Policy learning through Strategic Intelligence requires some degree of policy learning readiness to overcome resistance to change
- ▶ Strategic Intelligence plays different roles in different national systems and leads to policy adaptation
- ▶ Technical features of Strategic Intelligence foster policy learning
- ▶ While passive Transnational Policy learning was also observed, active Transnational Policy learning dynamics are embodied by Policy Learning Entrepreneurs active transnationally
- ▶ Complex sets of relationships result in diffuse Policy Learning spill-overs enabled by Strategic Intelligence

This research shows that Strategic Intelligence enables cross-temporal and Transnational Policy learning as a result of competitive and critical conditions perceived by the actors (for instance the perception of threatening economic competition coming from other countries). Strategic Intelligence operates as a communication medium filtering and shaping perceptions, and allowing the introduction of ideas and concepts into policy repositories². The techniques mobilized by Strategic Intelligence also constitute a framework to approach the policy under its scope (in the case of this research, the SBIR and SBRI schemes). Strategic Intelligence appears particularly to influence policy when a combination of social demand and policy opportunity arises. As a power resource, Strategic Intelligence is also instrumented by the actors active in both policy and political spheres and can have a role of control instrument (tool used by an organisation to keep control over another) at the institutional level, a role that is particularly visible in conflictual situations and negotiations but also when there is resistance to learning. Here, Strategic Intelligence can be used as a resource to overcome resistance but its effectiveness in doing so will depend on the level of “Policy Learning Readiness” of resisting entities and the possible use of accountability mechanisms.

² Although one could expect a repository to be a physical location where items can be stored, it is referred to it as a 1) virtual location where 2) policy-relevant knowledge is stored, 3) can be sourced and 4) is not systematically ordered in a rational fashion (see Box 9).

This research confirms the embedded nature of cross-temporal and transnational policy learning, the latter being a sub-type of the first. Transnational Policy learning through Strategic Intelligence depends heavily on the domestic context, which turns emulation into policy tailoring. “Comprehensive intelligence” (usually evaluations making an extensive use of case studies) was the most impactful from a transnational learning perspective, and Strategic Intelligence as a whole contributed to the definition of a transnational knowledge accessible to all and allowing the diffusion of technical Strategic Intelligence features such as indicators which contribute to convergence across policy systems. From a technical viewpoint, case studies and especially “success stories”, particularly contributed to influence decision-makers and to a considerable extent “*learning resistant*” administrators. During this research, both “*push*” and “*pull*” but also “*active*” and “*passive*” dynamics of policy learning were analysed. “Policy Learning Entrepreneurs” were identified who played both expert and advocate roles in the proactive diffusion of SBIR and SBRI across time and space, and had a crucial position in the policy learning processes observed. Their powerful intervention contributed to the nature of the dynamics observed, which took place in complex and interconnected settings involving a multiplicity of actors and governance levels making learning loops non-linear and to some extent structured by Strategic Intelligence.

The contribution claimed by this dissertation relates of course to both policy learning understanding and advanced knowledge on the role of Strategic Intelligence in policy making from that perspective. It shows that Strategic Intelligence has both contingent and structural roles. It also shows that specific forms of intelligence (comprehensive, normative, platform) have impacts at different levels (respectively at the instrument, organisation and system levels). The introduction of the concepts of “*Policy Learning Readiness*” and “*Policy Learning Entrepreneur*” along with aforementioned analytical findings are of course not without limitations, such as the ones related to the generalisation of the role of Policy Learning Entrepreneurs. However, on the basis of the argument according to which the relevance of individualistic approaches to policy making should be re-assessed and combined into holistic ones, and that knowledge, politics and policy analyses should be further integrated, another contribution of importance is related to the concept of “*uptake*”. Going beyond static approaches to knowledge production and diffusion, this thesis shows the importance of dynamic tracking through an integrative perspective.

1.2 A few definitions

Innovation policy and policy studies have developed large amounts of technical jargon over the past century. In order to help the reader tackle this barrier, a few (summarized) definitions of key concepts are provided here.

Table 1: Overview of key concepts used along this dissertation

Concept	Definition
Policy Learning	Policy learning is a form of policy change that is concerned with cognitive factors and mainly the integration of knowledge from the past or “somewhere else” into a policy or policy system.
Decision making	This concept refers to the process(es) by which policy decisions are taken, usually involving administrative and political bodies after problems were set to a so-called “agenda” to be addressed by public entities.
Policy making	Policy making is the broader process by which a policy is being initiated, designed, implemented, evaluated and possibly terminated or put on hold.
Policy adoption	Policy adoption is a specific decision taken by one or more political bodies and according to which a policy is to be implemented (usually by an administrative body) to address a specific demand for policy change.
Policy innovation	Policy innovation can be understood as the “ <i>adoption by governments of new ideas and practices and their diffusion, even internationally</i> ” (Merritt and Merritt, 1985). However, “new” in such context means “new to the innovative body” or to the system, and not “new to the world”.
Policy implementation	Coming after a policy was designed and adopted, this phase refers to the process through which the activities comprised under a specific policy are being put into action.
Policy diffusion	This concept refers to a policy feature or policy model spreading from a system (organisation, local community, region, country, etc.) to other systems. Policy diffusion involves by definition more than one policy transfer.

Policy transfer	Policy transfer refers to the individual transfer process by which a policy feature and/or model is transferred from one entity or system to another. A policy transfer is not always unidirectional: it can be non-linear and involve bilateral spill-overs.
Policy Convergence	Convergence here refers to two (or more) policies taking a similar shape.
Policy change	Policy change refers to one or more radical and/or incremental change(s) in a policy trajectory or a change or alteration in a given policy framework.
Policy instrument	The concept of “ <i>instrument</i> ” applied to policy refers to the methods and tools used by governments to achieve specific outcomes.
Procedural instrument	Among the categories of policy instruments, is the one of procedural instrument: while substantive instruments usually deal with the “substance” (allocation of goods and services to society) of policy, procedural instruments deal with policy modalities (processes)
Strategic Intelligence	Strategic Intelligence refers to a formalized way of producing, transmitting and using knowledge, characterized by normative objectives (and thus excluding fundamental research or learning by doing) and being driven by normative principles such as the one of usefulness.

1.3 Guide to the reader and structure of this dissertation

The **first part** (Chapter 2) of this dissertation will be dedicated to a review of the academic literature. First, several fields will be investigated in order to better approach policy learning, including policy innovation and change, policy diffusion, policy transfer, policy convergence and policy learning literatures. Second, the notion of government instrument will be approached through a review of its uses in the policy literature and will be applied to Strategic Intelligence characterized as procedural instrument. Eventually, this part will contribute to the definition of the research scope and more precisely of the case to be studied.

It will be followed by a **second part** (Chapter 3) dedicated to the conceptual framework and methodological approach developed for this thesis.

The **third part** (Chapter 4) which starts with the core analysis of this PhD thesis. This analysis will be introduced by a synthetic presentation of the two case studies complemented by an in-depth analysis of the role of Strategic Intelligence in both cross-temporal and transnational policy learning.

The core thesis will end with a **fourth part** setting out the conclusions (Chapter 5) and including theoretical and operational (policy) implications. This chapter will end the core dissertation and will be followed by the annexes among which the first two are the detailed case studies used for this thesis.

The **overall structure** of this dissertation can be illustrated as follows (see Figure 1). In order to guide the reader through the chapters, this figure will appear at the beginning of each section, highlighting which part of the dissertation is being introduced.

Figure 1: Structure of the dissertation

But structure is not everything: in order to provide the reader with a clear view on this dissertation, the next sub-sections will also depict the content of the thesis in line with the figure above.

2. Policy Learning and Strategic Intelligence: toward an instrumental approach

1/ Organisation of this Chapter

In order to address the role of Strategic Intelligence in policy learning, the first step is to look at what the relevant literature has to say. This first part of this dissertation – **the literature review** – is organized in three sections:

First (section 0), an overview of both cross-temporal and Transnational Policy learning as well as related academic streams of literature will be given to present relevant state of the art research and key **gaps** in the literature. In particular, **drivers** and other factors (conditions, etc.) influencing policy learning will be identified to better understand where research stands in terms of understanding policy learning processes.

- ▶ The research areas in scope (policy innovation, diffusion, transfer, convergence and learning) led to taxonomies and the identification of external conditions and drivers of policy change but still face common issues and challenges. One of these is “*how*” policy learning takes place. In addition, a review of the literature shows that not much attention is paid to Strategic Intelligence as a source of strategic knowledge for policy learning to take place.

Then a **second** section (3/) will introduce the notions of Strategic Intelligence and procedural instruments in order to offer a **conceptual basis** for the research to be presented. By using the concept of government (procedural) instruments to link Strategic Intelligence and policy learning (through their *uptake* and *impacts*), the second part of the literature review will lead to a re-conceptualisation of Strategic Intelligence that constitutes the basis of this dissertation.

- ▶ Building blocks will be identified to conceptualise the instrumental approach to Strategic Intelligence.

The **third** and last section of this literature review (4/), a “**scoping**” chapter, will make the link between the components of the research framework pinpointed during the first two chapters in the form of knowledge gaps and claims, questions and conceptual components in order to underpin their integration in next section on the research approach and methods.

- ▶ Bridging theoretical developments and practice, this section will make use of the literature to present the definition of the scope of the practical research.

Overall, the literature review will allow conceptualizing the research framework as explained in Box 1.

Box 1: Main goals of the literature review

The Literature Review will pursue four main objectives:

- ▶ It will first position the research in the broader academic literature while setting out a current state of play and identifying particular **knowledge gaps** to be addressed;
- ▶ It will also have an **explanatory value**, calling upon definitions and clarifications of the **concepts** and **drivers** to be used or referred to in the context of this dissertation;
- ▶ It will be used as to **acknowledge the building blocks** of the theoretical and conceptual models to be used for the research (which can be seen as initially being an empty shell as illustrated by the figure on the right-hand side) in order to understand how Strategic Intelligence enables or fosters policy learning.
- ▶ Finally, it will generate a **scope** for the upcoming research approach by orienting it towards a natural definition of the case study unit, which will be the Small Business Innovation Research Program (SBIR).

2/ Cross-temporal and transnational policy learning

“... all of these studies are concerned with a similar process in which knowledge about policies, administrative arrangements, institutions and ideas in one political setting (past or present) is used in the development of policies administrative arrangements, institutions and ideas in another political setting” (Dolowitz and Marsh, 2000)

2.1 Identification of the drivers and knowledge gaps in the literature

This short introduction is concerned with the first part of the literature review (Section 0) from which the reader will understand that most **drivers of policy learning** are to be found in four major streams of policy literature. These are the fields of policy innovation, diffusion, transfer and learning studies.

The reason is simple: while cross-temporal policy learning is only partially covered by the other explanatory frameworks (see section 2.2), policy learning (as a generic concept) has long been seen as a sub-stream of policy transfer and therefore policy diffusion literature, with as a major ambition to understand exogenous factors driving policy change. In the field of policy innovation research, scholars aimed indeed at understanding both endogenous and exogenous drivers of policy change. This led to the development of many explanatory frameworks that only partially addressed the learning dimension of policy change over time. Focusing more on exogenous factors, two streams of policy literature (among others) led to further work on the drivers underlying policy learning, namely policy diffusion and policy transfer studies, which were both complemented by research on the phenomenon of policy convergence (see section 2.3). Mainly developed in policy science, this literature has chiefly (but not only) been concerned with what will be referred to as “policy circulation”. Policy learning (see Section 2.4) is therefore strongly anchored in policy diffusion and transfer literatures, from which it is hard to dissociate it.

This section sets the stage by positioning the field of policy learning research. This area of investigation has been little dealt with from a cross-temporal perspective. However, policy researchers have addressed it as a sub-field of the policy diffusion and policy transfer literatures. It not only considers the circulation of policy ideas and practices across entities or locations but also – albeit implicitly – over time. It will present the main literature streams in which this dissertation is grounded from a policy learning perspective, covering both cross-temporal and transnational policy learning. The ambition of this first part of the literature review is not to review developments chronologically but to access the main streams of scientific literature that impacted policy learning and their contributions to its understanding (taxonomies, influencing factors, conditions in which it takes place, etc.).

This piece is therefore not oriented towards an exhaustive or historical approach to policy learning but rather towards the identification of the **main building blocks** of the dominant approaches in the field. The overall rationale of this first section of the literature review is presented in the figure below (this is of course illustrative and has no explanatory value.) The rationale underlying the structure follows the two main building blocks of the thesis, which are cross-temporal and transnational policy learning.

The scope progressively becomes narrower in this first section. It starts with a quick introduction to the concept of policy innovation which is essentially about internal and external drivers of policy change. It then focuses on cross-temporal policy learning which has not been much explored *in se* by the academic community. The text introduces then the external dimension with diffusion which is about the spread of policy models and practices to several systems, before getting to policy transfers (which mainly emphasize individual transfers) while convergence research mainly deals with the results of transfer(s)/diffusion. Policy learning eventually reappears but this time as one of the possible types of transfer, both bringing conceptual strengths and facing challenges. The core literature review (first two chapters on policy learning and strategic intelligence conceptualised as an instrument) lead straight to the scoping section that will introduce the case unit researched in the context of this thesis.

Figure 2: Rationale underlying this first part of the literature review

2.2 Policy innovation and cross-temporal policy learning

2.2.1 Factors underlying policy innovation

Policy learning is seen as a form of process driving policy change and policy innovation in particular. In order to better understand its position, one has to get back to the definition and fundamental drivers of policy change, among which policy learning figures as a key cognitive component.

Note: In the literature review, key **claims** will be formulated from which key words are highlighted in **bold and blue** in the text.

What is policy innovation? With the intention to approach it in pragmatic terms, Merritt and Merritt (1985) viewed innovation as *“the introduction of a new idea, method, or device”* regardless of its invention. They referred here to Rogers whose words on this issue have been widely quoted in the literature: *“an innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behaviour is concerned, whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery”* (Rogers, 1995).

The implication of such perspective for Merritt and Merritt's understanding of policy innovation is quite straightforward: policy innovation can be understood as the *"adoption by governments of new ideas and practices and their diffusion, even internationally"*.

This suggests that policy ideas and practices can be introduced (or perceived as newly introduced) as practices from the past but also from abroad. Policy approaches developed in two main directions:

- ▶ Cross-temporal visions of policy making were developed mainly through historical approaches. The literature on path dependency for instance extensively depicts the historical pathways of policy and how a policy can evolve over time, towards mutation or termination (since Lasswell and Lerner, 1951). Ideas from the past can be the source of "new" policies, such as illustrated by the history of innovation vouchers which emerged decades ago and were somehow forgotten until becoming fashionable again over the past decade. A number of approaches developed historical views of the policy process, emphasizing different aspects such as competition or political oppositions, but also more cognitive approaches such as policy learning as knowledge are usually seen as a resource piling up in an environment for actors to make use of it for policy purposes. They however provided limited contributions to the conceptual understanding of learning (see Section 2.2).
- ▶ The origin of policy ideas and practices has long been an open question in many research fields, and especially when trying to understand the diffusion of ideas and models among the units of different systems (Gray, 1973). The ideas of transfer, diffusion, convergence and learning in that context were explored to better apprehend the inter-dependencies linking policy systems world-wide and across borders (see Section 2.3 which will highlight the importance of diffusion to approach policy learning). In his study of innovation diffusion, Rogers (1995) identified the presence and evolution of a *"diffusion paradigm"* in many social science fields, from anthropology to sociology and economics, including psychology, marketing, communication, or education. His reference book *"Diffusion of Innovations"* (1995) provides us with a simple definition of diffusion: *"Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas"*³ (Rogers, 1995). Such a definition implies human construction of meaning and understanding, as well as a resulting orientation that can take the form of convergence or divergence. This is an element of importance when considering policy change: change can be triggered externally and result from changes in human cognition, and can also tend to uniformity or dissociation. Rogers underlines that information exchange processes are non-linear and involve uncertainty.

³ Conceptual note: Rogers distinguishes diffusion and dissemination as the concept of dissemination refers to a voluntary management of diffusion.

But diffusion as such is already a “*kind of social change*” as it alters the structure and function of the social system in which it takes place. In that sense, it is understood that whatever the result, a change occurs.

Some of the **sources for policy ideas and practices can therefore be endogenous but also be exogenous**: in that sense, the concept of policy learning appears to be relevant as it links to both cross-temporal factors (in a same system) but also to the diffusion of ideas which appear to be relevant and even go beyond the field of policy studies and its related disciplines.

Figure 3: Policy change results from internal and external factors

Source: The author, 2012

Policy innovation can therefore be the result of past or external influences (Berry and Berry, 2014), the latter being classically approached through the idea of diffusion. Since the 1990s, policy diffusion research developed and went through different pathways. The various traditions were quite dependent on the themes and objects under study.

2.2.2 A cross-temporal view on policy change: policy learning as “*learning from the past*”

Section 2.2.1 highlighted the importance of endogenous and exogenous drivers of policy innovation. The endogenous factors are usually seen from a cross-temporal perspective (looking at the evolution of a policy sub-system over time). Exogenous factors were in their turn dealt with by policy researchers paying attention to phenomena such as policy diffusion. In both, cognition appeared of importance as ideas would circulate across time or (virtual) space.

There are many theories to approach policy change highlighting specific ranges of key factors, but the one in which this dissertation is grounded is the **Policy Learning Theory**. Initiated by Heclo (1974) and developed by authors such as Hall (1993) and Bennett and Howlett (1992), policy learning refers to the integration and processing of knowledge towards action. It should in principle encompass both endogenous and exogenous drivers of policy innovation, although it seems that the literature on policy learning was mainly developed in the diffusion area and was less oriented towards understanding “*cross-temporal*” policy learning. The cross-temporal learning component of policy making was however dealt with in different occasions, either as part of other explanatory frameworks or through the development of some normative concepts in other research fields.

A number of explanatory frameworks were designed to explain endogenous factors, usually trying to take into account the complexity of multi-actor settings (for instance through the existence of cross-system communities). In policy studies, a number of such theories have emerged since the 1960s that correlated with the rise of the cognitivist researchers. Some new concepts achieved considerable attention. Although they cannot all be referred to in this thesis, some are too relevant to be avoided as they connect to the subject of this thesis. Three examples were selected here that are somehow connected to the area of learning in that sense. When they do not do it explicitly, most of these theories implicitly assume learning as being part of the process of policy change. This comes as a mix between a cross-temporal vision (view of the policy process as the sum of changes observed over time) and the importance of cognition in the form of images and perceptions but also flows of information to be processed for action or inaction. These explanatory frameworks bring credit to a **cross-temporal approach but also show the value of cognitive processes**.

Already in the Lasswellian sequential approach (see Lasswell and Lerner, 1951) the cognitive perception of the actors involved in the policy process is relevant as problems have to be perceived by those who will put them into the policy agenda.

Moving on from Lasswell, two authors developed a key theory: in the **Punctuated Equilibrium Theory**, Baumgartner and Jones (1993) described the policy process as the result of past step which can be incremental and lead to sudden radical changes. They stressed the temporal issue as stable periods can be punctuated by important changes, which according to Baumgartner, Jones and Mortensen in Sabatier and Weible (2014) should be replaced in a community context in which experts play a role and where players act with a bounded rationality and according to “*images*” (associated to certain perceptions). Such bounded rationality would imply that not all information can be absorbed and processed by the actors of the system. Parallel and linear processes would therefore take place, in which decision-makers would themselves “*process information in a parallel way through subsystems, policy monopolies, iron triangles, and issue networks*” (Baumgartner et Al. in Sabatier and Weible, 2014). In this broad game, feedback appears to be a key element, implicitly implying learning (which in the sense of Baumgartner et Al. could be understood as the reception and processing of strategic information). This is where information processing comes about: information processing would take place at system and organisational levels and would lead to disproportionate reactions from policy making because of disproportionate processing, explaining to the “*punctuation*” of policy processes.

Another key approach is the **Advocacy Coalition Framework (ACF)**, to which this thesis will get back when discussing social learning (see Section 2.4.2) and that seeks to explain coalitions and policy change but also to some extent learning in a policy context. Sabatier (1988) who initiated this approach considered policy-oriented learning in the context of a sub-system where coalitions compete to further their objectives. This approach recognises several levels of beliefs and positions coalitions in function of their accordance to certain beliefs.

The development of the Advocacy Coalition Framework contributed to the development of an understanding of policies as the result of value confrontations: policies would be the products of beliefs, and more specifically the products of compromises between beliefs systems belonging to confronting coalitions. This approach has been one of the most outstanding in policy studies and constitutes one of the bases for the development of social learning theories.

More recently (although this theory is rooted in the 1980s), the idea of policy feedback was promoted by authors such as Mettler and Mallory who highlighted the contours of **Policy Feedback Theory**: by impacting different groups and aspects of policy (meaning of citizenship, form of governance, power of groups, political agendas and definition of policy problems), a policy in Time 1 would have its pathway altered and might take a different trajectory in Time 2 (see Mettler and Mallory, 2014). This theory is based on the idea that effects can also be causes of other changes, and that every change is rooted in interpretations that are result from a diversity of sources. Policies can therefore shape politics and even promote political learning (the authors referred here to Heclo, 1974) or a certain view of what is or is not a legitimate subject of public action. To use their terminology, one could say that feedback mechanisms can have resource and/or interpretive effects that would impact policy making and related communities in their turn. Here the recommendations for future research underline the difficulty of distinguishing between endogenous and exogenous influences over policy.

Other fields or research areas than policy studies also address the concept of “*learning*” in a policy context. However, they conceptualise the concept to a lesser extent or in a normative way: in the context of RTDI policy **evaluation** for instance, the notion of policy learning refers (too often) to what is learnt about the evaluand⁴ in the context of a policy cycle. In that sense, policy learning is mainly seen from the point of view of the utilisation and usefulness of the evaluation process (see for instance the perspective adopted by the PRO INNO Appraisal report, 2010). This is also the case for other policy areas where policy learning refers to the uptake (or absence thereof) of evaluation outcomes (see for instance Botcheva et Al. (2002). These studies allowed a better understanding of the critical (and often organisational or cultural) ability of organisations to take evaluation results into consideration.

As explained in the beginning of this sub-section, these approaches deal to some extent with the issue of learning either implicitly or explicitly. They usually consider learning at both organizational and systemic levels and over time, and usually focus on explaining policy change within one single (central, not federal) country. They remain relevant to the understanding of policy change over time and although they can account for part of the influencing factors driving policy change (essentially endogenous factors), some conceptualisation but also empirical evidence appear to be missing on the very topic of learning and how it works. Moreover, a better link between change as resulting from the past, and change seen as a result from external influences.

⁴ Policy or organisation under evaluation.

The Policy Learning Theory appears relevant to address this challenge and is in need of supporting evidence and empirical grounding. It remains however to be further conceptualised as to better differentiate between learning sources: as will be explained in Section 2.4.4, rather generic definitions currently apply to “*learning from the past*” which is not differentiated from “*learning from somewhere else*”.

The field in which policy learning approaches developed the most is the one of diffusion studies, covering itself other sub-streams such as policy transfer or policy convergence research. Mettler and Sorelle (2014) stated themselves that “*the most obvious and well-documented example of [policy creation that is deeply influenced by already existing policies] involved the processes of policy diffusion*”. Here the **innovation and diffusion approach from Berry and Berry** (see Berry and Berry, 2014) plays a crucial role in consolidating the concept of diffusion mechanism: they saw learning, imitation, normative pressure, competition and coercion as mechanisms of diffusion. The history of policy diffusion research originates in the sub-area of intra-national state policy diffusion research, which is key to understand in order to get a grasp of the broader field and these differing traditions. The main contribution of the research produced was related to the identification of causes of policy diffusion but also visible types of diffusion in a national context.

2.3 Diffusion and policy transfer studies as a ground for transnational policy learning

2.3.1 Diffusion in a national context

In order to approach policy learning, one has to consider that most of the dominant conceptual developments that took place in the academic community are strongly anchored in the policy diffusion and related policy transfer studies. These streams contributed to the development of policy learning approaches and share similar concepts and approaches to policy change, with an implicit rather than explicit reference to the fact that learning happens over time and is in that sense cross-temporal (see Section 2.2.2). To understand their commonalities and the drivers they commonly developed and shared, one has to get back to what the streams of 1) diffusion 2) transfers and 3) convergence are before focusing on 4) what policy learning is. Figure 4 depicts the position of policy learning in the field of diffusion studies: following the most consensual approach to learning in that context, one could consider that policy diffusion is the result of several individual transfers which can result in convergence, while policy learning is a type of transfer. Along with the identification of the drivers and knowledge gaps, the current chapter will seek to make this position clearer to the reader.

Figure 4: Policy learning in the diffusion literature

Research on public policy is concerned with this issue of diffusion. One of the challenges to understanding policy diffusion is that it has been studied in different political science subfields such as international relations, public policy analysis, etc. Political scientists have therefore tackled the diffusion issue over the past decades from different points of view: diffusion studies (Sabatier et Al., 2005) mainly considered policy transfer phenomena and dissemination dynamics in a US context (see Clark, 1985; and analyses by Sabatier et Al., 2005 as well as Graham et Al., 2013). Another stream emphasized policy transfers and policy learning issues at a broader scale (Dolowitz and Marsh, 1996; Simmons et Al., 2006), including in the context of Europeanisation observed through regional integration and other perspectives (see Radaelli, 2000; Radaelli, 2003; Howell, 2005).

The diffusion would be the result of individual transfers that could be driven by actors voluntarily promoting a model (Behn, 2008) on the basis of tacit or codified knowledge (see Polanyi, 1967). Three main types of diffusion research strategy were identified by Berry and Berry (1990) in their study of **innovation and diffusion models** in the field of policy studies:

1. The first one relates to Walker (1969) and his clustering approach, where clusters of states adopting similar policies are analysed;
2. The second one came from Crain (1966) in which the relationships between adopting states and their neighbours were assessed;
3. The last one, linked to the work of various researchers such as Freeman (1985) or Menzel and Feller (1977) emphasized officials as information sources on the origins of policy adoptions.

If the **roots of diffusion research** have to be found in the 1920s (or even before⁵) as well as in Gabriel Tarde's sociology of imitation (Rogers, 1995), one of the main streams that can be associated with the modern study of policy diffusion has emerged in the United States with the concept of "*laboratories of democracy*" (see Volden, 2006; Baumgartner et Al., 2008⁶). The concept of diffusion of policy innovations in the United States came up as a challenge to the classical idea that the federal configuration of the country would be pressuring American states in a conservative way⁷. However, the spread of measures (such as prohibition, sex-offender registries, re-enactment of the death penalty, term limits etc.⁸) to various States clearly involved a diffusion of policy models over the country (Boushey, 2010). The diffusion of those measures has been attributed to learning effects as well as pressures emanating from different sources often leading to incremental changes in policy. Emphasizing the agenda setting and decision making phases of the policy cycle, Boushey (2012) integrated the punctuated equilibrium theory and the policy diffusion focus, with the assumption that "*gradual policy diffusion [is] driven by incremental policy emulation, rapid state-to-state diffusion [is] driven by policy imitation and mimicking, and nearly immediate policy diffusion [is] driven by state-level responses to a common exogenous shock*"⁹.

Among the main diffusion conditions, the "*federal effect*" (see Common, 2001) has been identified as a key to learning in the context of Federal States. Learning would emanate from the interrelationships between State units and the federal Government. The diffusion of policies across American states has been attributed to mutual observations by policy makers but also interstate competition (Berry and Baybeck, 2005). Referring to Walker (1969), Mc Lendon et Al. (2005) remind us that interstate competition can have emulation effects on policy adoption, but can also lead to the "*interstate migration of policy ideas*".

⁵ Meseguer and Gilardi (2009) refer to the year 1889 as one of the first known origins of policy diffusion as a clear research topic.

⁶ They show however that there is little evidence that decisions at the federal level are influenced by states' agendas, while Temenos and McCann (2012) show that federal influence can be found on states' decisions (in relative ways though, not all states reacting in the same way regarding attention drawn by the federal state). Both researches call upon the concept of "attention" (attention has to be drawn before a solution can be considered by a government entity).

⁷ Boushey (2010) even associated diffusion with a metaphor of "*contagion*" borrowed from epidemiology.

⁸ Source: Boushey, 2010.

⁹ The difference between imitation and emulation should be understood here in terms of their level of information processing: while imitation refers to a simple attitude of reproducing what is observed, emulation relates to a process by which the observation leads to information processing and decision making, in line with specific goals.

As explained by the authors, those phenomena have been observed in the United States in many policy fields, from criminal policy to education policy, in a context of “*competitive federalism*” leading to the so-called “*race to the bottom*”¹⁰ (Volden, 2002; Berry et Al., 2003). The importance of the role of the Federal State in the United States has been noted in the context of diffusion research associated with the study of the “*laboratories of democracy*” but also in other fields. Researchers pointed out that diffusion can also happen through vertical channels in the United States (Daley and Garand, 2005) as well as in other national contexts, such as shown by the mixed-model elaborated by Sugiyama (2011) to approach the Brazilian conditional cash transfer program and considering among others bottom-up and top-down diffusion dynamics.

Driving factors (conditions and causes) influencing diffusion could be described as being mainly “*learning, competition, user demands or vertical influence from higher levels of authority*” (Walker et Al., 2007) as well as *ideology*¹¹ (Grossback et Al., 2004; Berman, 2012). Geography could also be an interesting lens: Volden (2006) showed that evidence of success comes first as a vector for a policy model adoption in other states, producing an emulation effect. He also finds little evidence that the geographic locations would play a role in that process, while programmes’ properties can be identified that are more easy to adopt than others (measures leading to costs reductions being more likely to be adopted than measures implying additional costs for instance). But proximity remains a variable that can play a role when combined with success (one example here comes from Meseguer [2006]), also when taking into account cultural or linguistic proximity (Asare et Al., 2009). Another interesting variable is innovativeness which should however be considered carefully (Menzel and Feller [1977] show innovativeness is in general not as an influence).

A number of reasons for diffusion can be identified: competition (when externalities can be produced by a State produce a reaction of the others), coercion, emulation (also synonym of imitation), and (rational versus bounded) learning (Simmons et Al., 2006; Volden et Al., 2008).

¹⁰ The controversial “*race to the bottom*” theory described in simple terms emphasizes the migration of poor people; it “suggests that welfare benefit levels play a significant role in the residential choices of the poor”, who will most likely migrate from low-level welfare states to states with higher benefits. Such a mechanism would lead to a “*magnet effect*” avoided by state policy makers who would therefore low down the level of assistance provided in order to limit their poverty rate, in competition with the other states (see Berry et Al., 2003).

¹¹ Still considered from a learning perspective –according to the authors, ideological proximity would facilitate mutual learning from a state to another and would ease the adoption of similar policies.

But if conditions¹² and drivers of diffusion have been well explored, the process dimension remains quite under-studied. Graham et Al. (2013) analysed the spread of policy diffusion studies in the field of political science, concluding that “*when*” and “*how*” policy diffusion takes place are questions to be further explored.

In summary, intra-national **diffusion students identified causes and meta-conditions of policy diffusion** that ranged from competition to federal coercion. Note that the change triggered in the States (state level) still originates from an external source although it happens in a similar framework (the federal context). In their attempt to understand the circulation of policy models¹³ and the multiple directions it can take, they also highlighted the importance of the geographical and institutional context in which policy diffusion (and in particular emulation) take place. However, understanding of the process of diffusion and its results remained limited. Also, one can note some confusion between causes and types of diffusion. Further nuancing was to be made possible with the development of diffusion research at the international level, and especially through the development of policy transfer studies.

2.3.2 From diffusion to policy transfer and convergence

The **policy transfer** perspective by itself allows some clarification of different concepts such as policy diffusion, transfer, convergence and learning. While scholars also considered diffusion at different policy levels¹⁴, state governments remained a dominant focus in the literature. Diffusion reached a new level when considered not only in an interstate context but also from an international standpoint (Collier and Messick, 1975). The diffusion of policies worldwide has been quickly explained by similar mechanisms to those presented in USA-centred diffusion studies.

Dobbin et Al. (2007) proposed in that regard four main explanatory explanations derived from the literature: constructivism, coercion, competition and learning (these are very close to the mechanisms identified in the US-focused literature as depicted in the previous sub-section). Those mechanisms would involve interplays between internal and external factors.

¹² Including the institutional context, covering in the case of the United States the venue shopping (see also Rouillard et Al., 2012) facilitated by the American federal structure (stakeholders in the policy sphere bringing new ideas and interest).

¹³ When models and practices from “somewhere” are taken up “*somewhere else*”: circulation is about the flow of a policy or policy components from an initial location (whether physical or administrative) to another.

¹⁴ See Crain (1966) who studied the diffused adoption of fluoridation among municipal governments in the United States as well as Bingham 1977) who also focused on diffusion among local governments. European integration studies as well paid attention to the influence of the European Union on the regional level. Ito (2001) also considered law diffusion at the level of regional prefectures; considering another type of system, an interesting perspective is given by McAdam and Rucht (1993) on the diffusion of movement ideas, emphasizing the diffusion of ideas about social mobilizations cross-nationally.

These factors would interact in policy contexts, shaping the orientation of the overall path (or process) of a specific programme or policy. Boehmke and Witmer (2004) interestingly noted that influences could be found in mixed ways. When analysing some of these mechanisms they indeed found out that social learning diffusion¹⁵ influenced adoption but not the policy expansion (referring here to subsequent changes in the extent of the policy under the scope), while economic competition is most likely to influence both policy adoption and policy expansion (when a policy is strengthened/reinforced or enlarged to other target groups, policy fields, etc.).

Diffusion studies expanded to various policy fields; Jones and Newburn (2007) studied for instance the “*Americanization*” of British criminal justice that would be partly (but not only) due to many connections between the USA and the UK. They used as a basis for their research the specific notions of policy transfer and policy convergence. The real growth of the policy transfer literature took place at the end of the 20th century. By the end of the 1990s, the literature on policy transfers focused on the exogenous dimensions of public policy design, with attention paid to the role of ideas, contents, frames (Jachtenfuchs, 1996) and institutional patterns (Dolowitz and Marsh, 1996). Policy transfer students assumed that policy diffusion consists in a process “*whereby policy choices are interdependent*” (Simmons et Al. 2006). This suggests an inherent tension and intertwined nature of the relation between internal and external drivers of policy change. The decisions made in a policy system would therefore be linked not only to what happens in this system but also to what happens outside it. Common (2001) identified 4 main processes of cross-national policy change that can be associated with diffusion and vary in terms of their dynamics and impacts: globalisation, convergence, diffusion and transfer. Each of these processes is distinct from the three others in logic and scope. An interesting perspective is here the one of policy transfers. Bulmer et Al. (2007) defined policy transfers as “*the exchange of ideas, policies and policy instruments between different political systems across the world*”. Policy transfers can therefore be understood as individual processes¹⁶ while diffusion mainly refers to the spread of a policy model or feature from a country to one (or more) other country(ies). As an example, one could quote European scholars who focused on the role of the European Union institutions in the transfer of policies and rules across national borders.

¹⁵ To which we can refer to –in a simplistic fashion- as the diffusion of values and norms at the level of society (at a more abstract level).

¹⁶ Those processes can however involve several actors and complicated or complex relationships.

Europeanisation (Suurna and Kattel, 2010) and especially European integration (Radaelli, 2000; Radaelli, 2003) research was partly stimulated by the changing role of the state in relative terms and the rise of supra-national, sub-national and non-state actors in public policy making (see Sissenich, 2007¹⁷) who are sometimes involved in policy transfer(s).

Figure 5: Policy diffusion is made of multiple transfers

Source: The author, 2012

The main idea underlying these theories is that contents and forms of public action can cross the classical national borders. Putting the emphasis on transfer agents, the literature sought to explain different forms of transfer (such as translations, transcoding, and convergence - see Freeman, 2008) of public actions in different countries. Quite some scholars have referred to prerequisites for policy transfer and in particular to items identified by Rogers (1995) as “*attributes of innovations*”, which are the following:

- ▶ Relative advantage
- ▶ Compatibility
- ▶ Complexity
- ▶ Trialability
- ▶ Observability
- ▶ To some extent when considering transfers, some also referred to past policy

Policy transfers are also considered from an institutional perspective as changes that can potentially be promoted by some countries in other countries (see for instance the concept of institutional transplantation and the experiences of policy transfer analysed by De Jong et al., 2002). According to De Jong et al., **models** can therefore be partially imposed on some countries under certain conditions.

But whatever the mechanism, an interesting fact is that policy features can move from an area to another, from an institutional level to another, as shown in the next figure:

¹⁷ Sissenich approached the concept and impact of conditionality fixed by European institutions over Poland and Hungary as well as its implications in terms of social learning.

Figure 6: Policy transfer pathways

Source: Evans and Davies, 1999

A number of factors leading to policy transfer(s) can be identified that remain similar to the ones identified in diffusion studies: competition (when externalities produced by a State produce a reaction in others), coercion, emulation (also synonym of imitation), and (rational versus bounded) learning (Meseguer, 2005 and 2006; Simmons et Al., 2006; Volden et Al., 2008). Prerequisites and driving factors for diffusion and transfer have therefore been observed in different ways but remain common to both fields of investigation. Some nuances were contributed by the study of policy transfers which have been proved to be triggered by different sources that can involve soft or hard power relationships.

Although some confusion can remain between the causes and types of policy transfers due to their complex embeddedness and in line with the confusions observed in the policy diffusion literature, **policy transfer scholars contributed to a better understanding of the directions of policy circulation**. They also contributed to the refinement of existing typologies, and by considering policy circulation and its actors internationally, they made clearer the distinction between the phenomenon of general diffusion (which can easily be illustrated by a “rolling snowball” metaphor) and individual processes of transfer from one entity to another. Doing so, they also highlighted the influence of foreign policy decisions over domestic policymaking. However, many questions remained regarding the results of policy transfers. On the basis of this sub-stream of literature, one of the policy transfer/diffusion results has particularly caught the attention of policy scholars: policy convergence.

Convergence refers to two policies taking the same form/contents in two different national frameworks. The sub-field of convergence research completed the diffusion and transfer approaches as it added to the understanding of the **outcomes of transfers and diffusion**.

Although two policies or systems can converge (take a similar shape) independently of each other, most of the cases presented in the literature show that convergence is often linked to external influences. Positioning transfer agents and ideas¹⁸, policy transfer students explored key governance issues (Bulmer et Al., 2007). Taxonomies of policy transfers this time related to their outcomes were developed¹⁹ (Freeman, 2008; Lemola, 2002; Bennett, 1991). Convergence as a result of policy transfer especially attracted the attention of researchers seeking to understand how different entities and/or countries could adopt similar policies in different contexts (Delpeuch, 2009; Bulmer et Al., 2007) and identifying many influencing internal and external factors and attitudes influencing observable transfers. Convergence can be the result of different processes²⁰ and can mainly be observed through 5 dimensions: policy goals, policy instruments, policy content, policy outcomes and policy style²¹ (Bennett, 1991). The concept of convergence (for an example, see Clavier, 2010) is especially interesting when analysing national policymaking trends: it can basically be defined as a “*natural*” copy of a foreign policy considered successful and legitimate (Lemola, 2002). Convergence refers to the adoption of similar policies in different countries, which would result from (and be a factor of) globalisation. **Convergence would therefore mainly result from diffusion²², diffusion being itself the result of transfer processes (Knill, 2006).** Holzinger and Knill (in Knill, 2006) derive the concepts of *degree of convergence*, *direction of convergence* and *scope of convergence* to understand the extent to which similar policies from different countries can follow a similar or different path.

¹⁸ For an interesting study of the role of research institutes as transfer agents, see Ladi (2005).

¹⁹ See again transcoding, translation, and convergence as depicted in the previous sub-section on policy transfers.

²⁰ It is interesting to note the following: “*Convergence implies a pattern of development over time. The comparative reference point is not another country, but a condition of divergence or variability from some former stage*” (Bennett, 1991); the author therefore sought to overcome the static understanding of convergence and made clear the need to consider it as a process.

²¹ In addition, convergence is usually observed as the result from four types of processes: emulation, elite networking and policy communities, harmonization, or penetration.

²² It is important to underline that convergence is not always the result of a policy transfer and that a policy transfer does not lead automatically to policy convergence (source: Stone, 1999; Jones and Newburn, 2007).

They identify different causes to policy convergence:

- ▶ Imposition
- ▶ International harmonisation
- ▶ Regulatory competition
- ▶ Transnational communication
 - Lesson-drawing
 - Transnational problem-solving
 - Emulation of policies
 - International policy promotion
- ▶ Independent problem-solving²³

Harmonisation, competition, diffusion, imposition and globalisation can be presented as sources and process factors of policy convergence (Drezner; Busch and Jörgens; in Knill, 2006). In general terms, convergence can also be related to coercive and voluntary transfers that are inherent to globalisation (Dolowitz and Marsh, 1996; Common, 2001; Levi-Faur and Vigoda-Gadot, 2004). American, European, but also Asian (Common, 2001; Shih-Jiunn Shi, 2012²⁴) as well as ex-Communist (Hough et Al., 2006) countries undertake policy transfers²⁵. Research on Europeanisation of the ICT sector contributed to the understanding of transfers in a multi-level governance context (Bulmer et Al., 2007). Regulation in this sector has indeed often been understood as resulting from a sum of adjustments between Member States in order to correct for market failures at a European scale.

The notion of convergence became a main preoccupation for some policy analysts (Bennett, 1991) motivating new comparative studies in the past two decades. Two convergence dimensions are now at the centre of policy transfer studies dealing with the European Union (see Bulmer and Padgett, 2005): the first dimension is about market liberalisation²⁶, the second about regional integration and its homogenising effects (Delpeuch, 2009; Bulmer et Al., 2007).

²³ Here, independent problem-solving can be considered as an “internal” factor of policy change not necessarily linked to external elements; it could be disconnected from external developments and therefore not be linked to policy transfer(s) or diffusion.

²⁴ Though transfers in this Chinese case occur between local and national authorities.

²⁵ Zaborowski (2006) refers to a process of “*Westernizing the East*” when describing the changes in post-communist eastern and central European countries under the influence of Western States (mainly United States and Germany).

²⁶ Also tackled by Way (2005) as being itself a result from global diffusion pushed by politically insecure leaders eager to learn in the sense of liberalization.

A number of other convergence dimensions have also been covered by policy transfer studies, from cultural to technological factors; they nonetheless **mainly focused on the definition of taxonomies and typologies of transfers, without devoting enough attention to “why” and “how” these transfers take place** (Delpeuch, 2009; Meseguer and Gilardi, 2009). Graham et Al. (2013) stated on the basis of their review of the diffusion of diffusion studies that *“although a few studies have specified the mechanisms through which the authors contend diffusion is occurring, most rely on vague or implicit causal stories”*. This also applies to policy transfer and convergence research streams. Convergence remains a difficult concept: Molas-Gallart (forthcoming) shows that common visible measures may not be a sufficient indicator of policy convergence. Some researchers (like Walker [1969] or Evans [2009b]) suggested **approaches based on policy adoption**. Such a perspective would allow a more comprehensive understanding of the content factors leading to the convergence, but would probably not be sufficient to understand how policy diffused²⁷. Flanagan and Al. (2011) also explain that policy rationale is one part of the picture that can differ from the real implementation of a policy.

Convergence research added to policy transfer and diffusion studies by linking causal factors of transfers to transfer results. As for the other research areas previously analysed, the study of convergence has reached some limits. The first one is obvious and consists in an a priori bias towards a homogenisation focus while researchers somehow disregarded non-converging policies and systems. These mechanistic approaches also paid **little attention to the processes underlying convergence**. Although the direction of convergence remains interesting, the differences in policy systems most likely imply that it is limited by factors that limit convergence to policy outputs tailored to (sub-) national contexts.

2.3.3 Limits of the mainstream diffusion and transfer approaches: towards policy learning

It is interesting at this stage to note that the fields of diffusion, transfer and convergence research present **commonalities** in terms of the dimensions they identify. In order to make clearer the aspects found across these streams of literature, the table below seeks to further clarify the dimensions underlying the circulation of policy ideas and practices (see Table 2):

²⁷ This also applies to policy modifications: one could easily imagine that new ideas feeding policy managers during policy implementation could affect their choices in terms of re-orienting the policy under the scope, so under external influence. As recommended by Molas-Gallart (2002).

Table 2: Synthesis of policy circulation dimensions

Causes	Nature of the interaction	Factors influencing inter-system connectivity/receptivity	Process level	Type of process	Result
<ul style="list-style-type: none"> -Competitive risk/advantage factor -Exogenous shock -External pressure -Internal pressure (including "user demand") 	<ul style="list-style-type: none"> -Competitive -Collaborative -Coercive/Authoritative -Mimetic -Reward-based 	<ul style="list-style-type: none"> -Geographical proximity -Cultural proximity (including linguistic) -Context-dependent factors, conditions and events (domestic/international) -Socio-technical features of the object transferred (costs, compatibility, complexity, past experience, etc.) -Timing - Domestic/international context and conditions 	<ul style="list-style-type: none"> -One-to-one (transfer) -Multiple (diffusion) 	<ul style="list-style-type: none"> -Emulation -Adjustment -Copying/imitation -Adaptation/tailoring -Learning (bounded/rational) 	<ul style="list-style-type: none"> -Convergence -Divergence -Harmonisation -Mixed

Note: the circulation can involve entities at any level and can therefore be international, transnational, etc.; it can also relate to different aspects of the object circulated (policy, idea, etc.) and stage(s) of the policy cycle. The reader can also understand here that convergence not linked to the circulation of policy ideas and practices was not considered in the above table.

Source: the author, 2015

As explained in the introduction to this section, the three research areas also face common issues and challenges when trying to explain exogenous factors driving policy change. These can be associated to **knowledge gaps** or needs for **conceptual adjustments**. One can note from the table above (Table 2) that in line with the criticisms that exist in the current literature, the key characteristics identified by researchers are limited by their natural focus on policy adoption and their static nature. Another criticism could also be that the focus on exogenous aspects (external factors mainly) leads to underestimation of the importance of internal drivers, as well as of the possible interactions and synergies between external and internal factors that should be related to each other.

It is also to be noted that academics have paid attention to the starting point and the outcomes of the transfers, but not really to the policy transfer process itself. It can be argued that the conditions and modalities as well as the historical dimension of policy transfers are not fully taken into account today. Pointing out this concern, some researchers (Dumoulin and Saurugger, 2010) called for a new orientation of public policy analysis with a focus on the policy learning processes: the question to be asked is *“how”* the outcomes of policy transfers (the reproduction of practices for instance or the implementation of a same programme, etc.) are produced. It seems of utmost **importance to further analyse how policy circulation takes place**. This implies some further **integration** of two dimensions of policy change that are rather artificially separated in the literature: *“change as a result from the circulation of policy”* and *“change as a result from the past”*. Although some authors recognise the importance of the correspondence of past experience and current trajectories for policy absorption, not many of them consider the embedded nature of vertical and horizontal factors influencing policy change as one could expect when considering policy adaptation for instance.

In addition, the mechanistic nature of the approaches adopted by the authors willing to design taxonomies led to **under-consider the role of knowledge and other cognitive factors²⁸ in policy circulation** processes, leaving a central role to competitive approaches to policy making:

²⁸ Cognitive factors are referred to as immaterial drivers and consequences linked to Human cognition. Usually, researchers refer to individual perceptions as approached by psychology.

- ▶ Diffusion and policy transfer studies remained **limited** from different viewpoints: focused on policy adoption (Evans, 2009b), most of them did not consider the potential difference between decision and implementation (Molas-Gallart, forthcoming [2012]). For valid reasons, a lot of scholars (such as in the rationalist policy learning model developed by Raffe and Spours, 2007) did not include policy implementation and followed a policy cycle approach with an emphasis on the role of communities. As it remains relevant and important to take national entities into account when performing comparisons, methodologists acted that the new transnational approaches had to be combined with classical international comparison methods (Lascousmes, 1996; Hassenteufel, 2005). It is necessary to reconcile all dimensions of policy change, **overcoming the existing dominant focus on policy adoption** and broadening the analysis to other forms of change such as re-design.
- ▶ Various authors in the field of S&T studies referred to the **role of knowledge** in transnational policy transfers and is a field that needs to be further explored (Lemola, 2002; Malik and Cunningham, 2006; Borrás 2011). Lemola (2002) underlined the importance of a transfer channel constituted by the interactions between people from science and policy. A second channel according to Lemola would be the use of committees and working groups. Finally, Lemola underlines the role of international experts in R&D&I policy-making, creating a platform for policy learning through exchanges of information, and thus for policy convergence. Coercive versus voluntary transfers were explored (Dolowitz and Marsh, 2000) which made clearer the border between coercive transfers and lesson-drawing phenomena. In any convergence case, policy innovation whatever its nature is not generic and implies an “*Imperative of Adaptation*” (Behn, 2008) when adopted by a government as a result of a transfer. Paasi (2005) showed in that respect that collective benchmarking can be useful for adaptive²⁹ innovation policy making. Benchmarking would allow policy makers facing uncertainty to learn from best practices issued from various sources and presenting some high performance (effectiveness). Adaptation is therefore a key element to be kept in mind when working on transfer issues, as it is closely linked to knowledge-related factors. **Cognitive factors, knowledge and especially intelligence-based knowledge such as explained above seem to play a role** that is not much explored in the literature.

More recent transfer research paid greater attention to what seems to constitute a more complex type of transfer: policy transfers resulting from “*learning*”, or policy learning. While Malik and Cunningham (2006) as well as Borrás (2011) noted an overlap between the notions of policy transfer and policy learning, it seems more appropriate to say that many researchers approached policy learning as a “*sub-stream*” of research of policy transfer studies.

²⁹ The notion of adaptive policy making is associated to learning and collaboration (Rouillard et Al., 2012).

Political science and policy studies have increasingly emphasized policy learning and a research community emerged in the past two decades.

In the field of S&T policy studies, learning-related concepts are mainly derived from economics and only recent contributions show the interest of policy learning studies for RTDI policy analysis (see for instance the contribution of Braun and Benninghoff, 2003). The contribution of policy analysis (to the traditional fields feeding science and innovation studies) seems not to be underestimated. In the field of policy studies, the research community studying social networks took a crucial step towards research on policy learning. Scholars active in the theoretical stream of cognitive network analysis made a major theoretical contribution, which proved relevant in mapping and analysing the transnational dimensions and cognitive relations of and between policies and programmes at different levels (see Evans and Davies, 1999³⁰).

The **policy learning research stream emerged** through confrontation with the classical “*conflictual*” visions of policy, which consider the content of policies as being the result of confrontations between different groups of people pursuing different goals. It developed in the field of diffusion studies as a generic concept or as a main way to understand how policy ideas and practices transfer from one system to another. This is why these areas appear to be closely connected in the literature: conceptual overlaps are therefore recurrent and commonalities can be found in many instances as shown in Table 2. Some researchers pointed out that contemporary transfer studies were too focused on inputs and outputs, and not on the processes themselves, their mechanisms and historical dimensions (Marsh and Sharman, 2009; Dumoulin and Saurugger, 2010). A cognitive perspective such as the one offered by policy learning was therefore welcomed by many. The “*how*” question seemed to be further explored in order to understand how policy diffusion takes place, while taking into account the changes in the “*what*” is transferred (under-considered by most of diffusion researchers [Dolowitz and Marsh, 1996]). But the conditions of the transfers and learning processes were still to be investigated. Great research potential still remains to be exploited in the policy learning field from that point of view. In order to distinguish policy transfer and policy learning in a transnational context, some explained that policy transfers can be coercive (see Stone, 2001) or voluntary, while policy learning results from “*free choices*” (Randma-Liiv, 2007) and is therefore a voluntary act (Meseguer, 2005³¹) in nature. It remains however unclear to which extent choices can be considered as free or constrained. Such statement would tend to undermine the role of competitive factors.

³⁰ The authors made the distinction between different levels starting from the global, international and transnational level; the domestic level (state organizations); the interorganizational level; and the policy level. Their model distinguished between 4 final levels: the interorganizational level policy transfer network; the competition state; the macro structure; as well as the global, international and transnational structures.

³¹ See Common, 2001; Raffe and Spours, 2007; but it is to be underlined as Common (2001) does that voluntary never means “entirely ‘voluntary’”.

However, a better distinction should be made here between the reasons for policy circulation (which can be competitive and linked to external factors) and the type of policy circulation, which can be policy learning. One could assume that if transfer is about circulation, **policy learning relates to the type of circulation process in scope while competition relates to both the causes (as implying the existence of a competitive risk factor) and nature of a policy learning relationship**. This underlines the necessity to take account of human-based dynamics (social relationships) to understand how actors interact and eventually learn.

2.4 Approaching policy learning

2.4.1 Approaching policy learning

Policy learning has therefore been considered by many as a sub-stream of transfer (and therefore diffusion) research, while other explanatory frameworks brought some insights related to its cross-temporal nature. Both should be acknowledged, whether transnational (across borders³²) or cross-temporal policy learning as they are intrinsically embedded. This is a key strength of policy learning: although a fuzzy concept, it touches upon both **past** and **external** factors that influence policy making. But it is in the diffusion studies that policy learning was mostly conceptually advanced and that empirical material was the most developed over the past four decades. This section will aim at describing the main types of policy learning that arise from the literature in this field but also taking into account the cross-temporal dimension inherent to policy learning.

As the cross-temporal analysis of policy learning remains rather limited, this sub-section will essentially draw on the lessons derived from the policy learning literature that relates to policy diffusion. First one should understand that policy learning is one category of policy change, which can be understood across time (learning from the past) but was mainly analysed in policy studies as learning from “*somewhere else*” or learning in a general fashion (whether from the past or from somewhere else). In order to make more explicit the position of policy learning compared to the diffusion, transfer and convergence literatures, the scheme below illustrates the topics dealt with in this section (see Figure 7):

³² The **time dimension** for both vertical and horizontal policy learning is essential. What Hugham and Yeomans (2007) pointed out as “policy amnesia” or the “absence of policy memory” is an interesting phenomenon is linked to very pragmatic factors related to the pathways of individuals in the policy sphere (a policy champion might retire, etc.) and clearly depends on this notion of timing. Organization is also a main factor (restructuring for instance can play a dramatic role in terms of policy paths).

Figure 7: Policy learning as part of the diffusion literature

Note 1: as Meseguer (2006) noticed, diffusion happens when “*policy choices of one country affect the choices of others*”; the related mechanisms can vary, learning being one of them and covering different possibilities/types. However, policy learning is also to be considered in a **cross-temporal** perspective (along the steps of the so-called policy cycle, whether sequential or not)

Note 2: emulation has been included in the above scheme though it remains quite difficult to dissociate it from learning (indeed, a government would have to integrate information about another state’s success in order for the emulation to take place);

Note 3: It is interesting to note that mixes of the aforementioned mechanisms can be found in reality. The example of Smart Specialisation Strategies (S3)³³ is interesting in that regard: while the European Commission imposed the design of S3 as a condition for every European region to receive Structural Funds³⁴, regional actors overcome the sole conditionality and try to learn from best practices beyond the outward-looking analyses recommended by the S3 guiding principles³⁵.

Source: The author, 2012

³³ Smart Specialization is a concept defined in a European guideline drafted by experts on behalf of the European Commission (EC)-and presented as the guiding rationale for new forms of European regional innovation strategy to be adopted and implemented by regional governments under the guidance and support of the EC. This concept was made a condition for regions to receive European Structural Funds and is strongly pushed by the Commission in its attempt to harmonize the European regional systems and influence regional development strategies.

³⁴ European funds distributed to EU regions to support them in their regional development.

³⁵ See <http://s3platform.jrc.ec.europa.eu/home>.

Growing attention to the role of ideas and perceptions in policy making allowed the rise of more cognition-oriented approaches to policy (see for instance Grossback et Al., 2004, on the importance of ideas in policy diffusion-related communication). Cognitive approaches especially questioned the use of science in policy-making and insisted on policy learning dimensions (Sabatier and Schlager, 2000). Policy learning remains difficult to explain, especially because of “*definitional ambiguities*” (Bennett and Howlett, 1992), but it is widely accepted that it refers to a change in actors’ cognitive frameworks.

Developed first by H. Hecho in 1974, learning has always been a **fuzzy concept** that still needs further clarification (for instance to explain why and how actors learn, let alone how groups or organisations learn). The basic idea of policy learning comes from the US diffusion tradition³⁶ and the idea of state laboratories: policy makers in a state observe the policies implemented in other states/at other government levels and their success, in order to use them as a source of inspiration. Bennett and Howlett (1992) defined learning as the “*tendency for some policy decisions to be made on the basis of knowledge and past experiences and knowledge based judgments as to future expectations*”. Hall’s (1993) definition is probably the most consensual, referring to information (and experience) assimilation by agents and application to their subsequent actions. Learning is a process that can lead to “*failure*” (Raffe and Spours, 2007) and requires the analyst to pay attention to the contextual environment in which it takes place. Conceptually, such broad definitions of learning already suggest the existence of vertical (learning from the past) and horizontal (learning from somewhere else) forms of policy learning. It is however unclear to what extent a distinction is made between the two, and much of the growing attention to policy learning was directed to “*learning from abroad*”. Therefore it mainly developed in the field of comparative policy analysis and international relations. As further explained in Section 2.4.4, generic approaches to learning and few distinctions between “*learning from the past*” and “*learning from external sources*” exist but remain to be further developed.

The concept of policy learning developed the most in the field of policy sciences where it was (as explained in the previous sections) mainly associated to the circulation of policies internationally or even transnationally³⁷. Studying the effects of internationalisation on policy, Howlett and Ramesh (2002) identified policy learning as a key channel for new ideas to feed in policy making. The concept of learning can therefore be extended to an international and even transnational perspective. One key consideration remains that cognitive frameworks play a key role in this type of research. Those can change and evolve in function of the environment in which they evolve.

³⁶ See for instance Matisoff, 2008 as well as the diffusion chapter of this dissertation.

³⁷ While “*international*” refers to inter-state relationships, “*transnational*” is about applies to units at the sub-national level and related across national borders.

Synthesizing the process dimensions as treated in the academic literature, Busenberg (2011) observes that *“the process of learning and policy change often occurs (1) within networks of multiple organizations and individuals active in a given policy domain, (2) over periods of many years, (3) both through incremental discussions within policy networks, and through responses to political events, and (4) through the diffusion of innovations and experiences between different jurisdictions and policy domains. Furthermore, the literature suggests that this process is shaped by institutional context (Sabatier, 1999)”*.

Policy learning studies are useful to understand the use of knowledge in policy, and show potential for reconciling vertical (time) and horizontal (space) perspectives: it is possible to learn from the past, and to learn from somewhere else. Therefore both their **cross-temporal** and cross-cutting dimensions will be used by referring to another notion that has been developed beyond the scope of national frameworks. Policy studies very often used the notion of policy learning in a sense closer to Malik and Cunningham (2006) who talk about *“transnational policy learning”* (emphasis added). It is of course important to highlight that any form of Transnational Policy learning takes place in a chronological context, making it –in principle- also a form of cross-temporal policy learning. **This is the position this thesis should support in this dissertation, combining both transnational and cross-temporal policy learning.** The temporal dimension was indeed rather assumed than studied in the transnational policy learning literature (policy learning literature encompassing international policy learning and other forms of learning in a transfer or diffusion context).

Policy learning studies contributed to highlight the importance of **cognitive frames** which are one of the central pillars of learning. Jachtenfuchs (1996) proposed the notion of *“frame”* to highlight the importance of the cognitive dimension of policy making, and to distinguish between interpretative³⁸ and action³⁹ frames: *“Frames serve the purpose of making sense of any kind of social situation. They are the cognitive tool used by the actor to select, group and interpret events, facts, symbols, etc. In the language of systems theory, one could say that they constitute the cognitive filter used by the system to reduce environmental complexity”* (Jachtenfuchs, 1996). Cognitive approaches were indeed quite dominant in the study of policy learning (Heclo, 1974; Sabatier and Schlager, 2000; Matisoff, 2008) and especially from a transnational perspective – considering learning as a specific type of transfer (Evans, 2009; Evans, 2009a; Fügalister, 2012). Referring to Hall (1993), Stone (2000) clearly stated that *“the emphasis is on cognition and the redefinition of interests on the basis of new knowledge which affects the fundamental beliefs and ideas behind policy approaches”*.

³⁸ *“Criteria, namely their normative, cognitive and symbolic dimension (...) referring to three basic elements, namely to the objective, the social and the subjective world.”* (Jachtenfuchs, 1996).

³⁹ Action frames concern the output dimension, i.e. *“how a system acts upon its environment”* (Jachtenfuchs, 1996).

Learning can be understood in the context of a single policy loop (when adopting the sequential approach to public policy, one could consider learning as part of a same policy cycle but including feedback loops).

To make the focus of this thesis clear, **both concepts of “transnational policy learning” (Malik and Cunningham, 2006) and cross-temporal policy learning will be used**, positioning learning in a transnational perspective and making possible the distinction between learning from the past and learning transnationally. Policy learning will be considered from a cross-temporal perspective, assuming that domestic learning effects combine with external influence, which also matters when analysing policy change. The implication for this thesis is that it should include “*learning from abroad*” (Dolowitz and Marsh, 2000) as an additional focus to “*learning from the past*” as a combination of both perspectives is necessary to understand how policy learning works in practice. When considering the transnational aspects learning can be characterized with, an additional implication is that some knowledge should have been moved from an entity to another, a system to another, an individual to another. This means that the relationships between the actors involved in policy learning processes should be identified and thoroughly analysed. According to Raffe and Spours (2007), three main learning relationships can be identified

- ▶ Between government and practitioners
- ▶ Between government and researchers
- ▶ Within the government/policy community

Capturing those relationships makes possible a certain understanding of the role of political contestation, the circulation of knowledge (see Common, 2001; Raffe and Spours, 2007) as well as the horizontal communications in policy making and implementation. **The conditions of the production and transfer of the knowledge about policy ideas and practices remains to be questioned**: Transnational Policy learning happens, but is still a black box to be opened.

2.4.2 Main types of policy learning

In policy studies, policy learning is partly dealt with by other explanatory frameworks, and partly (and even more) integrated into the policy transfer studies and constitutes one of the possible types of transfer (Evans, 2004 and 2009; Evans, 2009a). It is to be underlined that from a transnational perspective, policy learning is one of the possible drivers for policy diffusion, and has to be distinguished from others (Fügalister, 2012) as suggested by Figure 7. Some authors aimed to understand the relationship between policy success (or failure) and policy learning (see Raffe and Spours, 2007). But most of the scholars who worked on the topic focused on the conceptual definition of policy learning and its dissociation from other overlapping concepts (diffusion, transfer, etc.).

Taking into account both possibilities for transnational and cross-temporal policy learning, it is possible so far to distinguish three main approaches⁴⁰ of policy learning, even if it is possible to notice some “*clear overlapping definitional contours*” (Borrás, 2011). All three are of main importance as they relate to specific forms and levels of policy learning:

Lesson-Drawing and instrumental learning. Developed by Richard Rose, lesson-drawing is expected to happen at the level of policy networks and is about knowledge applied to policy instruments. Rose (1991) considered that “*lesson-drawing is about whether programmes can transfer from one place to another*”. This would imply that the lesson is not about “*big ideas*” but about programmes and measures. The notion of lesson-drawing is indeed often assimilated to the one of instrumental learning that Rose (2005) opposes to the idea of “*learning for its own sake*”⁴¹. For Rose (1993), practical lessons drawn from experience are “*tools for action*”. In that sense, instrumental learning refers to normative lesson-drawing as policy makers would go beyond learning from the past (see Greenaway, 1998 or Donnelly and Rochefort, 2012) and look to other settings in order to get “*fresh ideas*” that would bring political satisfaction (Rose, 2005). But lesson-drawing is also a matter of concepts, and how implicit or explicit hypotheses about a program are, including how it can be transferred. Lesson-drawing phenomena became of interest to a number of researchers (Montpetit, 2009) underlying the cognitive dimensions involved in policy making even more and this time at the level of specific instruments. Network analyses and actor relations and interactions have indeed been quickly related to “*policy learning*” theories (see Pemberton’s [2004] monograph for instance⁴² as well as the contribution from Stone [2001] who studied the role of non-state policy entrepreneurs). Knowledge transfers and lesson-drawing have been defined by referring to a process by which “*knowledge about how policies, administrative arrangements, institutions and ideas in one political setting (past or present) [can be] used in the development of policies, administrative arrangements, institutions and ideas in another political setting*” (Dolowitz & Marsh, 2000). As explained by Rose (1993), policy makers usually integrate lessons but not following an evaluation or social science approach, drawing unconsciously or consciously on “*lessons*”⁴³:

⁴⁰ Other approaches can also be quoted, as the “*political learning*” or “*government learning*” (Bennett and Howlett, 1992; May, 1992). Political learning would entail “*lessons about policy processes and prospects. Policy advocates become more sophisticated in advancing problems and ideas by learning how to enhance the political feasibility of policy proposals*” (May, 1992). Political learning should therefore be kept in mind as it “*entails policy advocates learning about strategies for advocating policy ideas or drawing attention to policy problems*” (May, 1992), influencing by nature the design and life cycle of a policy.

⁴¹ Rose (1991) states indeed that “*A policymaker is not a theorist but a social engineer seeking knowledge instrumentally.*”

⁴² Pemberton (2004) explored the role of policy networks and policy learning in the context in United Kingdom’s economic policy over the 1960s, showing that “*third order change*” occurred (according to Hall’s [1993] terminology).

⁴³ “*In the policy process a lesson can be defined as a program for action based on a program or programs undertaken in another city, state, or nation, or by the same organization in its own past*” (Rose, 1993).

“A lesson is more than an evaluation of a programme in its own context; it also implies a judgement about doing the same elsewhere. A lesson is thus a political moral drawn from analysing the actions of other governments” (Rose, 1991). Robertson (1991) also showed that political factors (especially in a confrontation context) heavily influence lesson-drawing. Political opponents can use lessons at different stages of policy making, such as at the adoption stage where political actors can use them as weapons. Several types of lesson-drawing ways can be listed:

- ▶ Photocopying
- ▶ Copying
- ▶ Adaptation
- ▶ Hybrid
- ▶ Synthesis
- ▶ Disciplined inspiration
- ▶ Selective imitation (source: Rose, 1991 and 2005)

Policy makers would learn from their own experience and the experience of others. Two preconditions are required: an *“easy access to information about what other governments are doing, and different responses to common problems”* (Rose, 1993).

Lesson-drawing is very often referred to as the adoption of related policy measures in more than one country (relating that way to what was referred to as policy diffusion in the previous sections). Policy makers can learn from positive and negative experiences related to a policy in another setting as long as this experience is useful to them: *“A lesson is a distinctive type of programme, because it draws on foreign experience to propose a programme that can deal with a problem confronting national policymakers in their home environment. Because a lesson is created by extracting knowledge from the experience of other countries, it differs from the normal practice of learning from your own experience (...) A lesson omits information that is interesting but non-essential and includes what is essential to make a programme work”* (Rose, 2005). It is interesting to note that although Rose (1993) quotes expert knowledge and multiple sources of information⁴⁴, **no reference is made to Strategic Intelligence such as evaluation, foresight, etc. as a vector of lesson-drawing** (the only reference made relates to evaluation considered as a fourth stage of lesson-drawing, when policy makers anticipate the impact of a new programme). For Rose (1993), *“Conventional evaluation research produces too much information too late”*. However, he confronts evaluation and lesson-drawing: *“Lesson-drawing is an exercise in comparative dynamics; evaluation of current practice elsewhere leads to lessons for changing the future here”*.

⁴⁴ Information is decisive in policy diffusion (see Tyran and Sausgruber, 2005).

Beside Strategic Intelligence, Rose (1993) referred to the role of international networks of experts, and all transnational agents pressuring for the circulation of ideas and actions.

- An example that is of importance for this dissertation is the exercise performed by Radaelli (2009) who took as a case the Regulatory Impact Assessments (RIAs): he sought to understand how RIAs enabled organisations to learn in the context of the European Union. Quoting Karol Weiss, he stated that problem definition, instruments, paradigms⁴⁵ are impacted by such a tool as appraisal exercises can change the way policy makers see and understand the world. Radaelli focused on the use of the “*instrument*”, which can take the form of knowledge utilisation, but also referred to the possibility of beliefs modification: “*when instruments are institutionalized, their implicit theorizations affect the way policy-makers think about policy (Hood 2007; Lascousmes and Le Galès 2004:27)*” (Radaelli, 2009).

Organisational Learning. How and why organisations learn is an issue that has been emphasized by many scientific fields, from industrial economics to organisational sociology (Dodgson, 1993). In research on public sector organisations, learning has been studied by a number of sociologists (see for instance March, 1981 as well as Haas and Haas, 1995⁴⁶): learning would be the source of a number of changes in values, attitudes, structural and functional adjustments and behaviours that can tell us about the nature and role of the learning process itself (Barrados and Mayne, 2003). March (1981) identified six perspectives to approach organisational change, among which are learning and contagion or conflict. The adoption of a specific behaviour can therefore be seen in a similar way than in some of the diffusion researches: learning is one of the possible explanations of behaviour or model diffusion from an organisation to another. Zito (2009) reminded the tendency of organisations to follow a certain path dependency, but a number of other scholars identified the impacts of learning on organisational paths of public institutions and agencies (see for instance Schout, 2009 or Borrás, 2011). Organisations integrate events and knowledge into their organisational routines, adapting their behaviour in function of their targets and the overall historical context in which they evolve and in function of which they react⁴⁷ (Levitt and March, 1988). This includes of course “*learning from others’ experiences*”. A good illustration of organisational learning is given by the work performed by Borrás (2011) who emphasized organisational capacities and organisational changes. Organisations react to their environment: “*Organizations have to observe their environment permanently to generate a match between environmental demands and organizational outputs*” and change to survive in their changing environment (Koch and Lindenthal, 2011).

⁴⁵ Hall, 1993.

⁴⁶ Haas and Haas promote the idea of ‘learning to learn’ in international organizations but also “*learning to teach*”.

⁴⁷ “*Organizations are seen as learning by encoding inferences from history into routines that guide behaviour*” (Levitt and March, 1988).

Single and double loop learning can take place at the organisational level according to Koch and Lindenthal (2011), at the organisational (system) and sub-organisational (sub-system) levels; according to them, learning can be observed in terms of changes in the (“*in-use*”) theories of the actors of the organisation and depends on its external environment.

Social Learning and the role of knowledge and epistemic communities. As already explained, because of definitional overlaps but also practical evidence, it remains difficult to dissociate social and instrumental learning (Zito, 2009) as values and instrumental features are closely linked to each other. The notion of social learning was derived from the frameworks developed by Heclo, Sabatier, as well as a number of other scholars. A major contribution to policy learning studies was made by Sabatier who developed from 1988 onwards the “*Advocacy Coalition Framework*” (see Section 2.2.2 in the present chapter). Sabatier insisted on the importance of beliefs (with a distinction between several layers of beliefs), which links straight to the social learning theory (Hall, 1993). However the main research stream here is probably based on Peter Hall’s (1993) contribution; Hall went beyond the technical aspects of policy to consider its paradigmatic side and underlying ideas (Fischer and Mandell, 2012). In his analysis of paradigmatic changes⁴⁸, Hall defined “*social learning as a deliberate attempt to adjust the goals or techniques of policy in response to past experience and new information*” (Hall, 1993). From a broader perspective, social learning refers to values and paradigms as well as behaviours (Rogers, 1995). It is located at the level of networks and communities, and presented as a broader form of learning, referring mainly to intangible elements. An interesting case is the one of the diffusion of New Public Management (NPM) to many countries across the world including in Southeast Asia. In this region, concepts such as “*privatization*” or “*good governance*” have been transferred through international organisations as ideological building blocks of new management practices (for an interesting analysis of this process see Common, 2001). Bennett and Howlett (1992) referred to paradigm and idea shifts, that have been qualified by Borrás (2011) as the “*most encompassing and profound form of policy change*”. Mintrom and Vergari (1998) underlined the necessity to pay more careful attention to ideas too and even linked it to policy networks that would be diffusion channels. The spread of liberalisation ideas through communication networks diffusing policy information was in that sense identified by Simmons and Elkins (2004). The fact that ideas can circulate across borders through networks was also confirmed by Levi-Faur (2005) as well as Jordana and Levi-Faur (2005) in their studies of the global and regional diffusions of Regulatory Capitalism⁴⁹. It is important to note that according to Dolowitz (2009), learning can be based on soft or hard forms of knowledge (see Borrás, 2011). One interesting perspective here was developed in the 1990s: it was derived from social learning and is called “*epistemic communities*” approach (Haas, 1989 and 1992).

⁴⁸ Brooks (2004) studied the diffusion of the paradigm underlying the diffusion of private pension models over the world.

⁴⁹ Completed by an institutional perspective with the contribution from Gilardi (2005).

Haas defined epistemic communities as bounded by *“shared belief or faith in the verity and the applicability of particular forms of knowledge or specific truth”*. One of the contributions from the epistemic communities’ studies is for instance to show that the inclusion of certain groups (consultants⁵⁰, experts, etc.) does not depend on the innovativeness of their ideas but on the fact that they share common beliefs with decision makers willing to transfer ideas and policies (Malik and Cunningham 2006 evoking Stone, 2000). This clearly links back to the aforementioned ACF where shared beliefs lead to compromises and thereon coalitions. While developing the epistemic communities’ approach, Haas (1992) claimed that *“ideas inform policies”* and introduced the notion of channel, which is quite interesting in the case of the present thesis: he argued that communities were channels *“through which new ideas circulate from societies to governments as well as from country to country”* (such kind of diffusion has been well-approached by a number of scholars, including King [2005] and Candler [2008]). Epistemic communities would constitute one of the channels for information and advice to policy makers, crossing national borders and governments⁵¹. Epistemic communities can diffuse *“problems”* and *“solutions”* and intervene at different stages of the policy process⁵² (Irvine et Al., 2011). Another parameter raised up by epistemic communities’ studies is the importance of the control of particular people or groups on knowledge production (decision makers and knowledge communities are quoted in the first place; see Ladi, 2005). Boswell (2008) already introduced the expertise/legitimacy issue by showing how European organisations (from the migration policy area) can use expert knowledge to legitimize their actions and/or positions. This directly relates to the studies of research utilisation in policymaking like studied by Carol H. Weiss for instance in the 1970s. One interesting idea in the case of RTDI policy is here the level of complexity or technicality associated to the policy itself, which would favour the extent to which policy makers turn to professional epistemic communities for advice (see Haas, 1992). Dunlop (2010) followed up on the question of knowledge production and underlined the importance of credibility, legitimacy and authority on knowledge that can be associated to actors (people can be considered as holding ideas that can be spread). This follows Haas (1992) who postulated that *“control over knowledge and information is an important dimension of power”* where some *“knowledge elite”* plays a key role. In that sense, the interplay between epistemic communities’ ideas can contribute to a de-politicisation of a debate (providing the stamp of neutrality and objectivity).

⁵⁰ Bennett and Howlett (1992) in reference to Heclo’s theory underlined the importance of civil servants, consultants (see also Saint-Martin, 1998) and experts influencing policy making. They also called for a reconception of the classical concepts of policy learning under the following categories: learning about policies, learning about programmes, and learning about organizations.

⁵¹ Exploring epistemic communities and governance issues, social learning approaches have even been an entrance point to better understand European integration (Zito and Schout, 2009).

⁵² They also add on the basis of their results that epistemic communities do not always work competitively but can also be co-operative.

It is interesting to note that each of those learning forms can respectively be associated to first, second and third-order types of change⁵³ (see Hall, 1993; Greener, 2001; Berman, 2012). The format of policy learning is therefore key to understand the outcome (policy change in the receiving country) under the scope. One could understand the main difference between the three dominant types of learning approach described above in terms of level of abstraction and institutional scope (*“institution”* holding here the simple and broad sociological meaning of *“structure of relationships linking individuals together”*). A quick illustration is presented below in Figure 8.

Figure 8: two dimensions to differentiate between main learning approaches

Source: the author, 2015

2.4.3 Beyond taxonomies: dynamics of policy learning and policy entrepreneurship

The **learning dynamic** also appears of interest as it adds to static typologies of policy learning. Stone (1999) made for instance an interesting nuance between *“exporting”* and *“importing”* policy: agents can indeed be proactive and promote a model outside their own borders, such exporting attitude taking place the more often in an informal way. An interesting analysis of the Estonian innovation policy structuration process by Randma-Liiv (2007) showed two main learning dynamics: *“the first is demand-based policy learning based on the initiative and acknowledged need of recipient countries. The second is supply-based policy transfer, which is to a large extent based on foreign aid and the initiative of donor countries”*.

⁵³ For Hall, first-order learning is about the setting of the instruments, second-order learning about the use of the instruments and third-order learning about the goals behind these instruments (see also Bennett and Howlett, 1992); an extensive description of the abstraction levels to which this scale can be matched is available in Hall (1993).

In that context, the author observed a shift from a transfer (“*pushed*”) to a learning (“*pulled*”) approach depending on the nature of the power relationships conditioning policymaking.

A key aspect in this study is the development of the Estonian administration, taking place in a transitional context in which Estonia has been evolving for some time. It is to be underlined here that beyond the transitory situation of Estonia, a second factor influencing its learning orientation was the size of the country (associated to limited expertise and analytical capabilities, making ready-made options more attractive)⁵⁴. Similar mechanisms were analysed by Bulmer and Padgett (2005) who identified and investigated the relationship between the institutionalisation degree of governance regimes and policy transfers, showing that stronger levels of institutionalisation lead to stronger forms of transfer⁵⁵.

This issue of the dynamics underlying policy learning is also definitely linked to the actors involved in the diffusion of policy ideas and practices as the process of learning is fundamentally human in nature. In that sense, Mintrom (1997) linked the diffusion of new policy ideas and practices with **policy entrepreneurship**. Other connections were operated between policy entrepreneurs and policy learning, for instance through Sabatier’s Advocacy Coalition Framework (see Mintrom and Vergari, 1996) and other network researchers but also more formally such as in Crow (2010) who recommended to investigate *“the role of information entrepreneurship, policy learning among communities, and the possible role that entrepreneurs play in this learning and policy diffusion”*⁵⁶.

The notion of entrepreneurship greatly exploited by economists since Schumpeter diffused to other social science fields, with for instance the development of the concept of institutional entrepreneurship in organisational studies which was mainly introduced by Eisenstadt (1980) who identified actors catalysing and orienting structural change. In this specific field, the concept was further developed by institutional theorists such as Di Maggio (1988) who were by then mainly interested in the convergence of organisational behaviours (see Leca et Al., 2008) such as studied in the sub-field of organisational policy learning. The role of the social context in which change actors are active and related pressures (whether organisational or of another nature) was put forward by scholars committed to develop this area.

⁵⁴ It is to be noted here that while Randma-Liiv presents a very interesting overview of the factors and conditions for transnational policy learning, still the “*how*” learning takes place is missing – as it was not the main objective of the author’s contribution.

⁵⁵ The authors conclude that *“there is compelling evidence linking the dense institutional arrangements of hard coercion with stronger forms of policy transfer (the emulation of an EU model)”*.

⁵⁶ Dolowitz & Marsh (2000) and Stone (2004) also called upon the concept of policy entrepreneur in a policy diffusion context as highlighted by Mintrom and Norman, 2009.

As highlighted in the literature review from Leca et Al. (2008), the relationship between the entrepreneurs and their institutional context were investigated, but more multi-level research is required to better understand institutional entrepreneurs (whatever their nature) who/which are embedded in multiple fields and levels of reality.

In policy studies, the concept of entrepreneurship inspired by economic studies⁵⁷ is more commonly associated to policy entrepreneurs viewed as **individuals influencing policy change and making use of resources to that aim in view of future returns** (Kingdon, 1995; Crow, 2010). Policy entrepreneurs would be advocates who would shape the perception or image of policy solutions as shown by Baumgartner and Jones (1993). In that sense, policy entrepreneurs are associated to policy innovation, adoption and diffusion (Mintrom, 1997; Grinstein-Weiss et Al., 2005) but also to policy stagnation (Baumgartner and Jones, 1993). Kingdon (1995) emphasized policy entrepreneurs as the ones linking the streams of problems, policy and politics. Entrepreneurs would be able to catch opportunity windows in order to push specific policy changes in line with their interests. In order to do so, policy entrepreneurs would have to develop strategies (Mintrom, 1997) and “*lead by example*” (Mintrom and Norman, 2009) in order to better convince and in that sense reduce the risk perceived by policy makers based on proven models.

This perspective establishes an interesting link between the study of politics and the study of policy as policy entrepreneurship research clearly takes the form of research on the “*politics of policy*”. Another interest presented by this research area is the one of qualifying specific forms of policy entrepreneurship such as done by Crow (2012) who analysed the role plaid by experts in their position of information entrepreneurs and diffusers linking with communities. As highlighted by Crow (2010), resources are of utmost importance for the understanding of policy entrepreneurship and policy entrepreneurs cannot achieve policy change alone as they do not control policy flows but influence them. Knowledge in general and in particular expertise seen as legitimate tend to be critical, especially when the issue appears to be technical. **Experts can indeed be central policy entrepreneurs**, and this is also echoed by policy practice: the September 2009 ODI Briefing Paper entitled “*Helping researchers become policy entrepreneurs*” for instance rose the question of “*engagement strategies*” that can be adopted by those who are usually considered as experts external to the institutional making of policy. Providing researchers with a practical model for reflecting on their policy influence and incentivizing their entrepreneurial attitude in that regard, the brief implicitly suggests that proactive expert strategies towards policy can support evidence-based policymaking. Crow (2010) explains that beside policy elites and citizens, “*scientific elites can act as policy entrepreneurs based on their expertise in a particular field or scientific policy issue*”.

⁵⁷ Theorized by Joseph Schumpeter in the first place.

Like other elites, experts would detain legitimate knowledge that would allow them overcoming policy cycle barriers and proved to be the most influential entrepreneurs of the author's study thanks to their advisory position and access to hardly understandable knowledge.

The crucial role of policy entrepreneurs in policy innovation and diffusion was clearly acknowledged by the literature. But most approaches to (expert) policy entrepreneurship remain limited as they:

- ▶ Are grounded into the idea that retribution is the main driver of their entrepreneurship, **without leaving any space to what will be called “Policy Learning Entrepreneurship”**
- ▶ Tend to make individuals the central actor of policy change while **disregarding the empowering role of social structures.**
- ▶ Mostly adopt a conflictual approach to policymaking based on conflicting coalitions and/or interests as the main source of policy change.

It is argued that change can also take place by the overcoming of learning barriers, or what will be analysed as **“Policy Learning Readiness”** which characteristics should be analysed in this study. Such concepts should contribute to the **understanding of passive and active dynamics**⁵⁸ to be assumed to underline the “push” and “pull” approaches introduced by Randma-Liiv (2007). The research claim of this dissertation is that **Strategic Intelligence can play both a resource and structural role** as an empowerment factor of expert policy entrepreneurs with no reward focus.

2.4.4 Policy learning: issues and challenges

The study of learning processes in innovation policy remains scarce (Borrás, 2011). The present section depicting policy learning as approached by policy scientists shows that policy learning covers learning from the past and can be viewed as a type of policy circulation that can take various forms and happen at different levels (organisational, instrumental and social). Policy learning as a research area still has to develop in order to overcome some limitations that are partly common to all diffusion-related studies. Below some of the main arguments that guided the choices made in the context of this thesis to study policy learning through Strategic Intelligence are presented. They can be summarized in a very simple way as done in the figure below (Figure 9).

⁵⁸ « Passive » refers here to learning during which no active resistance or initiative but also response can be identified, which can be illustrated by a situation in which knowledge would only be received or where knowledge would be taken from without response. This is opposed to « dynamic » which in a learning context would rather refer to a learning process during which actors actively source or diffuse information. The inward and outward perspective are illustrated by the concepts of “push” and “pull” in order to complete these two concepts.

These **arguments** are based on the **issues** and **challenges** encountered in the literature explored during this first part of the literature review and associated to **knowledge gaps** or **development opportunities**.

Figure 9: Issues and challenges encountered in the literature guided this research

Knowledge gaps remain with regard to "how" policy learning takes place. Lessons from policy studies can therefore be learnt in order to support knowledge generation on innovation policy learning. But researching such issue remains difficult for several reasons: first the conceptual ambiguities and methodological difficulties of studying learning processes can be seen as a first barrier; second, the literature in the field of RTDI policy studies approached this concept with a normative perspective (Borrás, 2011). Referring to Dolowitz (2000), Malik and Cunningham (2006) highlighted the lack of **understanding of how learning processes take place** and in which conditions. This implies that possible **resistance to policy learning should also be better understood** when observed in order to understand which factors hamper/enable policy learning. It remains clear that the classical studies of policy learning and policy transfers in general focus on whether the transfer took place or not as well as on the objects of these transfers. Policy transfer is then viewed as an independent variable, while it could be **considered it as the dependent variable** to be further analysed as a process in order to understand how innovation policy learning takes place. Part of the current situation is due to the fact that most studies focus on policy adoption, concern that was already described in particular in Section 2.3.; in the field of policy entrepreneurship studies in particular, the influence of policy entrepreneurs over the selection of alternatives occults to some extent other forms of policy change.

Moreover, the aforementioned policy learning models remain intentional (Dunlop, 2009) and quite linear, and do not explain why different countries learn differently. Some perspectives to overcome these challenges however exist: Volden et Al. (2008) for instance recommended to focus on policy maintenance or abandonment to understand policy patterns and to pay attention to what happens in terms of behaviour in the context of “*cross-state learning environment*” (Volden et Al., 2008). In order to understand the factors influencing policy learning, Füglistner (2012) argued that understanding “*where*” policy makers acquired and exchanged their information would allow for a better understanding of policy diffusion. She already showed in the context of the Swiss inter-governmental cooperation that learning networks and channels in a state are partly conditioned by other States’ policies as well as by the institutionalisation of the intergovernmental cooperation. These concerns meet the ones depicted in the analysis of the limitations of diffusion and transfer studies and this thesis will consider policy learning as a non-linear process potentially touching upon any stage of the policy making cycle. Such **process is expected to be non-linear, dynamic and be influenced by policy learning entrepreneurship and readiness factors**. This requires that the transferred objects, e.g. knowledge, policy contents, etc. have to be considered from the perspective of the instrument itself (distinguished from the paradigms by Peter Hall (Hall, 1993; Palier and Sural, 2005)). This relates to the need for considering all dimensions of learning (including organisational, instrument and governance learning (Schout, 2009)), while they have very often been separated. Peter Hall (1993) clearly identified a gap of information about what policy makers learn, from and through which dissemination channels (Hall, 1993); according to him, learning affects both means and ends (Bennett and Howlett, 1992). Detailed **understanding about the determinants and conditions** of policy transfers and the **role of learning mechanisms** in this regard is still lacking (Dolowitz and March, 2000 and 2012; Volden et Al., 2008). While policy learning studies are performed since the 1980s (Borrás, 2011), there is even still a lack of evidence that governments learn from one another according to Volden et Al. (2008).

Furthermore, **no or little distinction is made between transnational and cross-temporal** policy learning so that the origins of knowledge used in policy can be identified. The first definitions of learning were mainly conceptual and did not make the distinction between the sources of learning. It is when researchers working in the field of international policy (whether in comparative policy studies or in international relations) that a more “international” touch was given to the concept. However, following Heclo’s and Hall’s founding theories, learning is first of all based on knowledge integration. This knowledge can be derived from several sources, and a fundamental one remains “*past experience*”. The first who highlighted the difference between past and external experiences was Rose when developing his concept of lesson-drawing (see 2.4.2); but this distinction was not further exploited and to be revived it in this dissertation.

The key contribution of these authors was to overcome conflictual approaches to policy making, but their primary focus was on players involved in a specific policy making cycle (officials, consultants, politicians mainly) although Hall himself in his 1993 paper on Social Learning positioned his interest in comparative politics and Haas (1995) related to international relations. Therefore, one should not forget that an unavoidable building block of policy learning is “learning from the past”, a dimension of policy learning to which this thesis will refer to as “*cross-temporal policy learning*”⁵⁹. Policy learning was also understood in a cross-temporal manner by Sabatier when developing the Advocacy Coalition Framework (see 2.4.2).

One critical common point to these authors (also including Haas and others) is that they considered policy making as the result of network interactions and knowledge circulation which would alter cognitive perceptions of the actors involved.

Policy learning remains relevant to approach policy and especially policy circulation which has been a growing field of investigation since the 1960s. Policy learning was mainly developed as to better understand the international circulation of policy ideas and shows a great deal of promises when considering innovation policy: Transnational Policy learning in the field of innovation still is to be explored to get a better grasp on the “*transnationalisation*” of RTDI policymaking. Kuhlmann (2001) and Barben (2007) underlined the importance of the move towards more transnational functioning (e.g. with regard to the role of the institutions involved in the European innovation policy governance), and one could assume that links between transnational actors are still developing beyond the control of national Member-States: Lemola (2002) stated that R&D policies tend to be more and more alike because of this increasing transnational dimension. Lundvall and Borrás (1997) stated that “*EU Member States have great opportunities for engaging in and exploiting [such] learning processes. The EU institutions, the implementation of the R&D Framework Programme, and technological measures under the Community regional policy support frameworks provide formal and informal mechanisms for pooling and exchanging experiences. Similarly, the studies undertaken by the Commission on S&T indicators in the EU, and on national systems of innovation are valuable analytical tools for this type of mutual learning process*”⁶⁰. From a practical point of view, Zito and Schout (2009) noticed that “*there seems to be a mismatch between the extent to which learning instruments are now applied in the European Union (EU) and our understanding of learning in complex multi-level systems*”. According to them, the new interest for learning at the EU level is related to a shift of governance instruments paradigms.

⁵⁹ I wish here to thank Prof. Jakob Edler from the MioiR (Manchester University) for his precious time and guidance with regard to the development of the concept of cross-temporal policy learning and its dissociation from other forms of policy learning.

⁶⁰ Kuhlmann et Al. (1999) as well as Kuhlmann (2003) already referred to the existence of a need for strategic intelligence (in order to improve policy) at the transnational level.

Strategic Intelligence is an item that should be further analysed as it is supposed to be strongly related to policy learning. Schout (2009) found out that intelligence instruments like Regulatory Impact Assessments have their own learning effects⁶¹ and concluded that Regulatory Impact Assessments produced organisational and cultural changes but also resulted in a *“process of scientification of politics”* (on this topic see also Radaelli, 2009). These conclusions can easily be taken into account when considering other types of knowledge-based activities, and it seems interesting to observe policy learning through Strategic Intelligence tools. One of the most discussed forms of Strategic Intelligence is evaluation, and it is good to observe that evaluation and learning were linked in many occasions. Lundvall and Borrás (1997) for instance pointed out evaluation as a *“chief source of policy (re)formulation in the national context”* and made a clear distinction between evaluation exercises and ex-ante appraisals, even if the *“boundaries between those activities are fuzzy and subject to interpretation”*.

One aim of evaluation is to stimulate learning processes in the context of policy moderation and evaluation through learning can contribute to fine-tuning policies (Kuhlmann, 1998). Referring to Weiss (1995), Sanderson (2002) emphasized the use of evaluation, which in this situation was more conceptual than instrumental, *“reaching decision makers in unsystematic and diffuse forms, ‘percolating’ into the policy arena and influencing thinking about policy issues, providing policy makers with (...) a background of information and ideas that affected the ways that they viewed issues and the alternatives that they considered”*. Launso et Al. (2007) also showed that evaluation can play a role in increasing learning among stakeholders and thus influences practices. Following the words from Bennett and Howlett (1992), one can note that Rose *“argue[d] that evaluation and lesson-drawing are inextricably linked since a lesson includes a judgment about a program in effect elsewhere and the position of a potential user”*. Malik and Cunningham (2006) noticed that *“evaluation also forms an important learning device in the design of policy programmes”* in a number of countries⁶². Sanderson (2002) established a link between evaluation, policy learning and evidence-based policy making⁶³. Referring to an increasing *“need for evidence-based policy”*, he grounded his perspective in a *“modernist-rationalist”* approach assuming that learning can lead to the improvement of the effectiveness of policies. Putting in perspective scientific knowledge and evaluation, he shows the role of evaluation as a way for reflexing policy learning to take place. Benchmarking and evaluation but also other forms of **Strategic Intelligence seem to be placed at the core of policy-influencing variables** and a great (potential) source for policy learning.

⁶¹ He defined three types of learning (governance, instrumental and organizational learning).

⁶² They also add that *“the outcomes of these international experiences in evaluation activities represent a resource of huge potential. As a result, a number of countries are able to examine other countries’ experiences in order to learn and improve the design of their own national policies and programmes”*.

⁶³ See also the ODI report by Jones et Al. (2009) which starts from a distinction between academic research and policy-oriented research as ways to generate knowledge to be *“translated”* in a policy making context

The line established by Füglistner (who considers that *“an understanding of where policy makers exchange or acquire their information will contribute to comprehension of the factors that enable policy learning”* [Füglistner, 2012]) will be followed in order to echo Borrás’ call for empirical evidence linking organisational capacities *“and the increasing use of ‘learning tools’ in innovation policy (such as ex-post and ex-ante program evaluation, foresight, benchmarking etc.)”* (Borrás, 2011). According to Borrás, such evidence would allow make the distinction between the more suitable learning tools and the others. But this can only be done if one understands how learning processes take place. Some learning causes and conditions were already acknowledged by the literature, but no sufficient research was performed so far on the underlying mechanisms enabling policy learning (Obinger et Al., 2013).

An instrumental perspective would help deconstruct Strategic Intelligence and how it effectively enable and/or facilitate policy learning. The perspectives have to be broadened, diversified and to be kept opened (James and Lodge, 2003): different disciplines were mobilised such as sociology of professions and expertise, as well as the aforementioned streams to approach learning. They contributed to the debate by showing that the notions of *“uploading”* and *“downloading”*⁶⁴ were not enough to deal with transfers; these can indeed be seen as processes (Trépos, 1996; Zito, 2009) shaped by specific instruments. It is to be noticed that Evans (2009a) suggested a combination of the transfer analysis with other approaches in order to develop *“an empirically grounded account of policy change”*. **The policy learning and governance instrument approaches** should be combined to contribute to the research on policy change⁶⁵, especially from the perspective of cross-temporal and Transnational Policy learning (which in the case of transnational takes the form of diffusion). This perspective would echo Evans (2009a) who recommended the *“development of a multi-level ‘action based’ approach to the study of policy transfer”* in order to overcome the limits of current policy learning approaches (not explanatory enough, too descriptive and too often normative). As showed in the case of bureaucratic accountability instruments’ adoption (Bennett, 1997), Transnational Policy learning results from a conjunction of internal conditions⁶⁶ combined to external/transnational factors, in a situation where communication plays a key role⁶⁷. It is necessary to replace policies in their context (Massey, 2009) and to analyse the learning modalities to understand how learning happens and if learning is really a driver of change.

⁶⁴ Reference to the simple fact that one entity provides policy models (uploader), while another one receives or takes it (downloader).

⁶⁵ See Howlett and Ramesh’s (1998) classification of policy changes: they especially distinguished policy change types according to their length, their level (paradigm versus *“normal”*).

⁶⁶ Boehmke (2009) shows that the guiding assumptions behind policy diffusion studies tended to lead some researchers to under-estimate the role of internal factors driving external policy model adoption.

⁶⁷ Also through networks: Paré and Montpetit (2009) showed the particular role of networks for policy learning in the context of the European Union genome policy.

Policy change can also be variable in different ways: the adoption of a similar programme in different countries does not mean that the applications of this programme will be similar from a country to the other. Hence, one has to deepen the analysis and to consider the contextual elements influencing the application of such a programme to better understand its nature (Egan, 2009). The [instrumental approach](#) to policy and especially the model developed by Lascousmes and Le Galès (2004) present a great opportunity in this regard, re-positioning the focus on the instruments of public action and shedding some light on how a tool such as evaluation or any other source of Strategic Intelligence constitute a social device. This requires taking a closer look to the relationship between knowledge and policy.

2.5 Conclusion

This first part of the literature review positioned the main streams of literature that contributed to the understanding of policy learning. Key models and drivers of policy learning, strongly anchored in diffusion and transfer studies, could be identified as well as knowledge gaps to be addressed. It was noticed that although cross-temporal policy learning was to some extent addressed by different explanatory frameworks, it was little developed as a concept *in se*. The fields of policy diffusion and policy transfer studies, complemented by policy convergence research, led to a better understanding of policy circulation in terms of its main drivers and the conditions in which it takes place. All these fields led to the definition of a number of taxonomies that were taken up in policy learning research and this is in this context that most of the conceptual basis of the Policy Learning Theory was developed. These taxonomies are not always distinct but nonetheless led to the identification of key features and driving factors common to policy diffusion and policy transfers.

Policy learning was developed as a cognitive approach potentially able to reconcile policy and politics, internal and external change factors. This approach presented a number of conceptual overlaps with the aforementioned diffusion and transfer approaches but took a step further towards the integration of a cognitive perspective. It however faces major challenges and its underlying mechanisms and dynamic nature are yet to be investigated. Research on policy entrepreneurship already opened perspectives on how change agents can influence policy evolutions. Their role is therefore to be questioned. Especially the role of knowledge and in particular Strategic Intelligence in policy learning (whether it is about learning from the past or learning from somewhere else) remains a black box in the literature. In addition to the identification of drivers and knowledge gaps, this first part of the literature review also suggests that new approaches would be helpful to address the role of Strategic Intelligence in policy learning, and in particular the instrumental one to be depicted and picked up in the next section.

3/ Strategic Intelligence and Policy Change: the notion of a government (procedural) instrument

3.1 Developing an instrumental approach to Strategic Intelligence

The basic principle underlying any policy learning theory is that policy knowledge circulates, and that it can even transfer from a policy system to another. Especially when considering knowledge sources such as Strategic Intelligence, knowledge appears to be a fundamental building block of policy change and policy innovation in particular as “new” ideas and practices (or ideas and practices perceived as “new”) come into question. This therefore implies that knowledge production, diffusion, uptake and use are key to understanding policy change although they are definitely not straightforward as explained by Hoppe (2010)⁶⁸. This subsection anticipates the introduction of Strategic Intelligence and its link with policy learning by bridging both with the notion of knowledge-based policy making. Through this section, the instrumental approach and its building blocks should be used to conceptualise Strategic Intelligence as a procedural instrument, which can impact policy making through policy learning.

But before introducing the instrumental approach to Strategic Intelligence that was developed in the context of the present thesis, one should get back to the position of Strategic Intelligence as a subject of policy studies in order to define it. Therefore this second section will get back to the role of knowledge in policy (see Section 0), before isolating Strategic Intelligence as a source of strategic knowledge to feed in policy making. Conceptual clarifications will be brought to distinguish Strategic Intelligence from espionage (see Section 3.3), and the concept of “procedural instrument” (depicted in Section 3.4) will be used to **deconstruct Strategic Intelligence components and features** (see Section 3.5). Such deconstruction will be the starting point of the conceptual framework of this dissertation.

Strategic Intelligence is usually seen as a source of Strategic Knowledge for policy, or for actors of the policy cycle using it in their power struggles. Knowledge and power have long been considered as going hand in hand, and notions were developed that can help understanding the relationship between policy and sources of Strategic Intelligence.

⁶⁸ See Robert Hoppe (2010), “From ‘knowledge use’ towards ‘boundary work’: sketch of an emerging new agenda for inquiry into science-policy interaction”, Knowledge Democracy.

3.2 Knowledge in policy learning: the issue of knowledge-based policy making

3.2.1 From knowledge and power to knowledge and policy

Learning from experience is seen as a main feature of social change. It is assumed from a cognitive viewpoint that knowledge impacts the values of individuals, which in turn influence human behaviours and actions in a given socio-political context (Van Detg and Scarbrough, 1995). Knowledge has been viewed as a key component of power relationships (see for instance Foucault's governmentality theory [Rose et Al., 2006]). In his 1917 lecture "*Wissenschaft als Beruf*" (translated in English as "*Science as a Vocation*"), Max Weber already referred to the long existing links between knowledge and policy development in Hellenic society and the value of scientific knowledge for policy⁶⁹. Knowledge is also the cornerstone of what Bourdieu called in his 1986 "*The forms of capital*" as "*cultural capital*" and "*human capital*", both notions being related to the status of an individual in society. Knowledge is therefore a key element of the structuration of individuals and society as a whole.

Policies are considered as founded on existing knowledge. From the skills of policy makers⁷⁰ to the notion of policy repository used in evaluation⁷¹, it was acknowledged that policy is shaped around knowledge and even that policies are the expression of existing dominant knowledge. The types of relationships are numerous of course. Among the more recent developments, the role of standards and the process of their definition appear to be interesting as it illustrates the role of knowledge in policy design and how it can result in an instrument ruling part of a society (Grindley, 1995; Brunsson and Jacobsson, 2000; Hallström, 2004; Busch, 2011). Those studies indeed show the process by which knowledge is processed and used in order to define standards that will constitute a societal constraint on certain areas of the society. Borins (2008) explained that the diffusion of an innovation in the public sector "*depends on knowledge of the population within which an innovation might diffuse*". Walker (1969) in his leading paper "*The Diffusion of Innovations among the American States*" already evoked evaluation standards influencing the adoption of an external policy innovation (those standards can be expected to shape the perception in a given state of the legitimacy of another state to be a benchmark or comparable reference⁷²). Interest in epistemic communities (see Haas, 1992) led to many publications on the topic, emphasizing the role of knowledge and value-based communities in terms of knowledge creation, diffusion and use in policy making.

⁶⁹ While delineating the frontier between both worlds.

⁷⁰ Numerous studies of the education systems delivering policy or political science-related trainings have been conducted over the past decades.

⁷¹ See <http://www.3ieimpact.org/evidence/impact-evaluations/impact-evaluation-repository/>.

⁷² Which is also applicable at an organizational level: Berry (1994) showed that in an agency context, strategic plan adoption was also driven by the proportion of neighbouring agencies adopting such kind of plan.

One of Haas' arguments is that knowledge reduces the uncertainty that policy makers can face in their activities, providing them with an incentive to call upon epistemic communities for information and advice. An interesting link is made here between an existing group or network of actors and the formation and diffusion of ideas, such as in the case of the idea of nuclear arms control and its evolution over time that was pushed by two subgroups converging into a same epistemic community (Adler and Haas, 1992).

At a more **conceptual level**, the "*argumentative turn*" initiated by Habermas and Foucault's work introduced the idea that language traduces but also shapes the world in which we live⁷³ (Buchstein and Jörke, 2012). This emphasis on the epistemic dimension of policy making was based on the Foudauldian idea that social practices would be intrinsically linked to implicit knowledge, playing the role of a cognitive filter for the members of a society. Knowledge and power would structure each other (knowledge framing power, and power ruling knowledge). Such a post-structuralist position places the relationship between discourses, values and actions in the broader context of their development, putting an emphasis on the how and why a specific policy can be selected instead of another; in that sense, every object should be considered as "*discursively constructed*" and be critically deconstructed (Howarth and Griggs, 2012)⁷⁴. The argumentative turn was further defined in 1993 with Fischer and Forester's collection of articles edited in 1993 in line with the idea that argumentation "*is the hard core of good policy analysis*" (Hoppe, 2013⁷⁵).

It is neither the goal of this thesis to explore the meta-implications of post-positivism nor to explore the more complex and technical implications of language and discourses in policymaking. But it is indeed interesting to consider with a certain distance the role of knowledge and cognitive frameworks in policy processes. A policy starts indeed with a problematisation process (Howarth and Griggs, 2012), and depending on the form of the problematisation and the related (sometimes tacit) assumptions (Fischer and Mandell, 2012), a specific form of solution will be adopted. This is in that sense that policy analysts and researchers tried to understand the contribution of knowledge to policy making: Yehezkel Dror [1968] for instance referred to a correlation between knowledge and power. He also briefly described examples where scientific knowledge could be viewed as an input to policy making, noticing the increase of policy knowledge available. According to him, modern science both "*creates problems and provides better means for solving them*".

⁷³ "Discourses are historically located systems that construct the social world through the practices of subjects. But, according to Foucault, subjects should not be considered as autonomous and unconstrained actors; they are rather themselves the product of discourses. The subjects are not speaking; the discourse is speaking through the productions of speaking subjects" (Buchstein and Jörke, 2012).

⁷⁴ "Poststructuralist policy analysis thus rejects essentialist accounts of policy making which assume that objects, human subjects, or social formations have underlying and fixed essences" (Howarth and Griggs, 2012).

⁷⁵ Robert Hoppe (2013), "*REVIEWS – The Argumentative Turn Revisited. Public Policy as Communicative Practice*", Social Policy and Administration, Vol 47, N°5.

Likewise, a number of researchers investigated the role of scientific knowledge and its uptake in a policy-making context.

3.2.2 Social sciences and policy making

The role of knowledge and learning processes in social change has long been emphasized, especially in the study of the evolving values underlying the “modernising”⁷⁶ society (Smith, 1973). This was in part due to a reflection on the role of social sciences in society:

“The massive expansion of the social sciences after the Second World War was a response to an increased appetite for social knowledge. (...) However, early enthusiasm was followed by increasing disillusionment during the 1970s and 1980s about the ability of research to provide answers to complex social problems, bringing into question the whole enterprise of creating social knowledge for direct use by governments” (Nutley et Al., 2007; reference to Finch, 1986).

Achenbaum (2001) identified Lewis and Clark’s expedition mandated by Thomas Jefferson (1804-1806) as one of the earliest examples of the production of useful social science for policy making in American history. Other types of relationship between knowledge and policy could be observed along the centuries (see for instance Box 2).

⁷⁶ “A number of theorists define modernisation in terms of man’s increased knowledge and mastery of his environment. Black for example defines it as the ‘totality of influence of unprecedented increase in man’s knowledge of and control over his environment (and society and personality) in recent centuries’. Bellah regards it as the ability of ‘learning to learn’. He defines modernisation as the ‘increase in capacity of a social system to process information from within and without i tand respond appropriately’. Eisenstadt too emphasises the cultural and moral aspects of modernisation, when he characterises it as the capacity of a social system both to generate change and to absorb the change it produces through rational understanding. In all these accounts the goal of maturity is implicit” (Smith, 1973).

Box 2: Example of the knowledge-government relationships in Manchester by the 19th century

*“Interest in urban social problems was stimulated in the early 1830s by the cholera epidemic and by the work of the Poor Law Commission. In 1833, the Manchester Statistical Society was formed with the purpose of collecting detailed information in the interests of social reform. It was the first Statistical Society in Britain. Many of the Society’s members were Unitarians associated with the Cross Street Chapel. They were mostly middle class businessmen with Liberal political beliefs. Manchester became a national symbol of the new industrial society. As such, it attracted visitors of national and international stature, many of whom recorded their impressions vividly. Among the famous visitors were Leon Faucher, Alexis de Tocqueville, and Friedrich Engels. Their opinions of Manchester were generally bleak and critical. Benjamin Disraeli, in contrast, described Manchester as a modern Athens. Engels, who came to Manchester to manage his father’s factory, produced the most famous account of his book, *The Condition of the Working Class in England*. This book influenced the political theories of his friend Karl Marx.”*

Manchester Museum of Science and Industry, September-November exhibition, 2014

More recent developments dating from the early 20th century led some social scientists to focus on their own disciplines and question their role in society. During the 20th century, the **issue of the role of social sciences in society** became a growing preoccupation as the demand for a better understanding of society increased. In Europe and the United States, this trend has been steered by different crises as well as social challenges such as poverty, crime, climate change, etc. (see deLeon, 1988; Bulmer, 2001; Smith, 2004). On the other hand, social scientists increasingly questioned their role and the extent to which the knowledge they developed effectively reached policy makers (Wagner et Al., 1991). World War II for instance played a key role in terms of the relationship between the American government and social sciences⁷⁷: with an unprecedented growth of research funding and the contribution of social scientists to the war effort, science and policy in US became tied to each other. The Cold War context and the defence and health-related research budgets confirmed this trend; so did the more recent energy and financial crises. One key example is probably the American War on Poverty in the 1960s (Haveman, 1986) which triggered an important response from the science community asked to research on poverty issues. However, due to a failure in trying to reach the political sphere, social sciences remained closer to the administrative components of the US system and their role varied depending on the legislature (with a notable growth of the importance of this relationship under the Kennedy and Johnson’s administrations). Beyond their operational role, academics also played a role in elections as campaign advisers since the 1960s. Moreover, academics were appointed to high-level administrative positions, and assisted the administration in transitions (see Featherman and Vinovskis, 2001).

⁷⁷ American literature on the topic is quite dominant, so why I tend to adopt this perspective as an example to illustrate my arguments in an easier way.

Social scientists' aspiration to a legitimate, neutral and useful science to benefit policy making were qualified as "*positivist*" (Featherman and Vinovskis, 2001; Lynn Jr., 2001) Featherman and Vinovskis (2001) characterized this situation in an interesting way, underlying that "*policy relevance and scientific objectivity were strange bedfellows from the start*". They refer in particular to the consulting role many academic researchers played with the American government (through testimonies, etc.), trend that can still be observed today. Beyond the double "*hat*" of universities and social scientists involved in policy issues (whatever the nature of their implication), scholars also agree on the growing role of professional policy analysts and experts (see Haas and Haas, 1995), think tanks (see Rich, 2004), foundations and other peripheral relays of knowledge for policy.

The development of social sciences was also partly driven by the interest of a certain elite in knowledge aimed towards the improvement of policy management and policy making in general for reasons that can be interpreted in many ways (see Bulmer, 2001). But as underlined by Bulmer (2001), the impact of social sciences on society also went through public opinion (especially in the American context) in the case of the Social Survey movement that started in 1906/1909 with an important study conducted in Pittsburgh (local citizens calling for expertise on their own locale). Expert knowledge remained a key element in policy making, impacting policy change from different viewpoints. It is by the 1970s and 1980s that policy scientists mainly questioned their impact on society and especially policy making, with as a main finding that "*the high expectations of direct, instrumental use of knowledge (...) had to be considerably toned down*" (Hoppe, 2010).

3.2.3 Usefulness of expert knowledge and its utilisation

The notion of **usefulness of social sciences for policy making has been a growing concern for social scientists**, and not only in United States (see Nilsson, 1992 for instance as well as Landry et Al., 2001⁷⁸ and Hoppe, 2005⁷⁹). Some considered that the 1960s and 1970s constituted a golden age in terms of the proximity between social sciences and governments. One of the very key factors illustrating this trend was the growing number and use of evaluation and planning staff in those years following Johnson's Planning-Programming-Budgeting. However, the relevance and usefulness of this proximity remain uncertain (Featherman and Vinovskis, 2001). It remains that a number of concepts were developed to characterise the utilisation of scientific knowledge in policy.

⁷⁸ Respectively on Sweden and Canada.

⁷⁹ Robert Hoppe (2005), « *Rethinking the science-policy nexus : from knowledge utilization and science technology studies to types of boundary arrangements* », Poiesis Prax, N° 3, pp 199-215.

Referring to Weiss (1979), Nutley et Al. (2007) made the distinction between seven meanings of research use:

- ▶ Knowledge-driven model
- ▶ Problem-solving model
- ▶ Interactive model
- ▶ Political model
- ▶ Tactical model
- ▶ Enlightenment model
- ▶ Research as part of the intellectual enterprise of society

These concepts were used since then by many to better understand how research is (or is not) used in policy making in a “*positive*” way. But (most likely as a result from a certain demystification), the so-called “*faith in science*” (Mills and MacLean, 1992) or “*faith in the Experts and Expertise*” (Bulmer, 2001) became highly criticized by social scientists trying to question the role of expertise in policy making. This started as a result from a general “*dissatisfaction with social science and social research as instruments of social problem solving*”, even if most of the community agrees on the fact that social sciences should not only be problem-solving (Lindblom and Cohen, 1979). Scientists and experts were not regarded any more as a “*touchstone of objectivity*” since they remain individuals making value judgments (Mills and MacLean, 1992). The concept of “*boundary work*” was explored in that regard in order to objectivize further the activities and outputs of those who work at the intersection between science and policy and who would look for both demarcation and coordination (see Hoppe, 2010).

A **growing concern remained** nonetheless about the usefulness and legitimacy of expert knowledge to ensure its optimal utilisation (Boswell, 2008⁸⁰). Different theories were elaborated in order to understand the bridge between knowledge and policy. Ottoson (2009) identified the main ones: knowledge utilisation, diffusion, implementation, transfer and translation.

⁸⁰ The author distinguished three types of knowledge utilization function: instrumental, legitimizing and substantiating. In order to do so, she adopted an organizational focus, centred on the case of the DG JLS of the European Commission.

“Researchers need to be aware that the work they do, no matter how applied in intent and how practical in orientation, is not likely to have major influence on the policy decision at which it is purportedly directed – at least not if policy actors’ interests and ideologies are engaged” (Weiss, 1988)

Research on the use and misuse (or abuse⁸¹) of social sciences remains driven by normative values (for example, Heller (1986) synthesized 5 “*problem-solving modules*” on the basis of the work performed by his colleagues and himself). Such research orientations correspond to the positivist stream described by Lynn Jr (2001). This is interesting to note as the path to develop an understanding of the impact of social sciences on policy has mainly been driven by a positivist concern and was understood from a normative perspective by a community studying its own relationship to policy making⁸². Haveman (1986) already asked “*who is used by who*” in social science utilisation, answering by an (expected) mixed answer (both parties using each other).

However, **some researchers sought to take more distance** and see knowledge as a whole, considering various channels and different types of knowledge. An interesting research field paid attention to the role of knowledge in policy making: knowledge utilisation literature mainly focused on the use of research in policy making in order to explain the use and under/non-use of research. Neilson (2001) emphasized the existence of several research streams in the field, dominated by the “*Two Communities*” theory elaborated by Caplan (1979) and Weiss’ (1979) “*Enlightenment function*”. Caplan explained the (non/under-) use of research in policy making as being the product of a cultural or behavioural gap between the researcher and policy maker communities⁸³ who view the world differently. Further research in the field led to the conclusion that the process of feeding policy making back with research was not a straight-forward or linear process, and that research was one source of information among many others and could contribute to some incremental building of conceptual thinking like in Weiss’ approach of “*enlightenment*” (Neilson, 2001). Culture, values, but also types of knowledge are considered to play a role among other factors delineating the gap between the two communities identified.

⁸¹ See Heller (1986).

⁸² One could already question the assumption according to which a perfect utilization of science would necessary lead to positive societal effects as this constitutes a normative *a priori*.

⁸³ Referring to Diane Stone (1996), Neilson (2001) referred to the importance of different types of communities: advocacy coalitions, issue networks, epistemic communities and policy communities.

Research utilisation studies adopted quite linear models, similar to the Lasswellian approach to the policy cycle. Input-research, throughput-research, as well as action research can lead to different effects on policy: van de Vall (1986) showed for instance that action research can lead researchers to play a role in many different ways at the diagnosis, design and development stages of a policy.

Knowledge utilisation studies made clear the importance of communities' cultural and behavioural differences as well as on participation issues (inclusion of policy makers in research, etc.). Different **types of knowledge uses** can be identified, which are close to the ones detailed in the **Evaluation Utilisation Literature**. Evaluation utilisation research developed very intensively over the past decades to a certain degree of maturation (see Rich, 1997).

Referring to Zhang (1989), Hutchinson (1995) evoked four traditions at the source of the mainstream research on knowledge utilisation in policy making: planned organisational change, evaluation research, social science information and policy making, and innovation diffusion. Each of those streams made interesting contributions to the topic, leading to the distinction between different types of use:

- ▶ Instrumental use (Knorr, 1976; Caplan, 1979; Weiss, 1998; Hutchinson, 1995.)
- ▶ Conceptual uses (Caplan, 1979; Weiss, 1998; Hutchinson, 1995)
- ▶ Process-related and interactive uses (Forss et Al., 2002; Patton and Horton, 2009; Weiss, 1998)
- ▶ Symbolic use (Knorr, 1976; Balthasar, 2006)

These main types are accompanied by further thoughts on the **conditions** in which they take place of course as well as key drivers to explain the use under the scope. The institutional context (Dahler-Larsen, 1998)⁸⁴, the policy field under the scope (Nilsson, 1992; Nilson and Sunesson, 1993; Hutchinson, 1995), as well as the type of knowledge production exercise, are important elements to take into account to approach evaluation utilisation as it very much depends on those contextual aspects. Also, whether it is about research or evaluation (including monitoring and ex-ante impact assessment [Hertin et Al., 2009])⁸⁵, what matters is also what is valued in terms of legitimacy, which is closely linked to the consideration for the knowledge produced in the policy cycle.

The importance of considering who is using knowledge at which stage of the policy process to better understand the function of such use has been highlighted (officials using knowledge during implementation? Elected representatives before decision? etc.).

⁸⁴ Including the organizational context as described by Shearmur (2000).

⁸⁵ It is also interesting to observe that research can be a vehicle of evaluation knowledge and vice versa (see the example of knowledge use in Regulatory Impact Assessment by Hertin et Al., 2009).

In his contribution to a RAWOO report on the “*Utilization of Research for Development Cooperation*”, Rip (2001) made clear the diffuse nature of knowledge use in society due to the complexity of communication in general. He clearly showed that knowledge use cannot be understood as straight-forward, that the original knowledge source is not always where it is taken up before being used. The processes under the scope are thus quite complex and require strong analytical frameworks. Knowledge utilisation also depends to some extent on its access, also determined by diffusion techniques (analysed by Kingston, 2012). As explained by Kingston, codified knowledge but also tacit knowledge can be diffused through different channels that can present more or less “*connectivity*”.

Different features appeared to be of importance. Knowledge follows indeed a “*path*” that can be non-linear, but covers (even in an interactive way) different **stages** such as information generation, processing, diffusion, and use in decision and practice.

However, as already listed as a criticism of most learning studies, the focus on decision should be broadened to practice (implementation, organisational routines, etc.). Moreover, as explained when delineating Strategic Intelligence, this thesis will not focus on academic/fundamental research use in policy making, but will emphasize normative knowledge production (including policy evaluation and impact assessments).

It is interesting to note some convergence between the concepts built in the learning, evaluation and knowledge utilisation literature. A parallel could indeed be easily made between main dimensions, which summary is proposed in the following dimensions according of the effects observed (in terms of change):

- ▶ **Instrumental and technical/operational** (related to techniques and operational changes, very often associated as take-up of knowledge production outputs)
- ▶ **Process-oriented and interactive** (effects of process and actors mobilisation on the social relationships setting and mediation)
- ▶ **Organisational** (change in organisational behaviour)
- ▶ **Argumentative** (political, tactical and advocacy: in the context of confrontation, which can also be symbolic when coming to legitimizing a decision)
- ▶ **Conceptual** (change in theories and concepts, including related ideologies)
- ▶ **Paradigmatic** (change in terms of the vision of the world)

These dimensions relate to the type of knowledge, the objectives related to utilisation/learning⁸⁶, as well as the scope under consideration. It is important to make clear that bounded rationality is assumed (Simon, 1991) in this context, while the “*substance*” of the use or transfer (what is being taken up/transferred - Dolowitz and Marsh, 1996) should be kept in mind to better understand the processes and their effects. The policy under the scope can indeed be affected by knowledge use (whether in the context of a transfer or not) in terms of objectives, techniques, ideas and theories, behaviours and institutional/organisational changes.

Expert knowledge used in policy making appears to have quite some influence potential. While academic research mainly focused on social sciences and evaluation, one interesting pillar that is still developing in the most advanced countries appears to be Strategic Intelligence. It is proposed in this thesis to approach Strategic Intelligence through an “*instrumental perspective*” (to be explained in the following section) in order to better understand its influence on policy change, and most specifically on Transnational Policy learning processes.

3.3 Beyond “*Espionage*”: Strategic Intelligence as a source of knowledge for policy making

3.3.1 From policy analysis and “*PSI*” to Strategic Intelligence

“Analysis is, and will always be, political”

(Hird, 2005)

Before considering Strategic Intelligence as such, one should consider broader analytical practices and how they have been perceived in the literature. The previous sub-section introduced the broad relationship between knowledge and power, with two particular emphases on social sciences and evaluation as knowledge sources for policy. It highlighted in particular the notion of “*utilisation*” that bridges knowledge sources and policy to better understand the impact of the former over the latter. The following sub-sections will deal with **Strategic Intelligence and how it can be defined as a procedural instrument that is expected to enable/foster policy learning⁸⁷.**

⁸⁶ Kuhlmann (2003) explain that formative evaluations (distinct from summative evaluations) are very often associated to learning purposes.

⁸⁷ I would like here to warmly thank Dr Kieron Flanagan from the Manchester institute of innovation Research for his very inspiring support in the conceptualisation of Strategic Intelligence as a procedural instrument.

The best way to approach Strategic Intelligence consists in isolating its position among the sources of policy relevant knowledge. The research-based production of evidence to analyse policies and programmes has long been a matter of both academic and practical analyses usually referred to as public policy analysis. One could assume that the main difference between policy analysis and other sources of policy-relevant knowledge is that policy analysis is directed to policy (while policy makers could for instance theoretically make use of meteorological reports to redesign their environmental priorities). Lynn Jr (2001) referred to policy analysis in the American context as an administrative technology providing policy analysts with a role of mediator in society; instead of informing decision-makers, policy analysts would negotiate across institutions and contribute to the construction of the perception of events and actions. In such a context, the form of the normative arguments presented by the analysts would prevail on the value and robustness of their content. Policy analysis would play a structuring role for policy, which would still be constrained by political dynamics (discourses, participating stakeholders influence, etc.).

The recognition of the limitations of the positivist approach to policy analysis led to a new post-positivism stream (Lynn Jr, 2001; Buchstein and Jörke, 2012), reconsidering the position of evidence-based approaches to knowledge production aimed to orient policy (see for instance Howden-Chapman, 2010).

Dominated by a “*mainstream*” understanding of society, policy analysis would first be a matter of value, and therefore neither neutral nor informative in the way the positivist stream described it. Science and democracy would be in tension (Hird, 2005), tension illustrated by the “*two-communities*” model from Caplan (Caplan, 1979; Hird, 2005). This leads to question the conditions of knowledge production for policymaking. Academic knowledge as well as expertise, whatever their form, contribute to shaping the general cognitive framework in which a specific policy is designed, implemented and evaluated. As already described, academics mainly emphasized the relationship between science and policy (Wagner et Al., 1991). Although a large umbrella, policy analysis remains an interesting perspective to introduce Strategic Intelligence but should be narrowed down as it can cover all types of analytical approaches to understand policy-related phenomena.

Specific **sources** should therefore be identified, including both those that are directed to policy and those that are caught by policy makers. While Dror (1968) referred to literary knowledge sources such as biographies, memoirs, and journalistic material, another source of knowledge for policy has been growing over the past decades, which will be referred to as “***Strategic Intelligence***”. Strategic Intelligence still belongs to a broader category of knowledge sources that has been described by Lindblom and Cohen (1979) who took distance with the academic social sciences to consider “*Professional Social Inquiry*” (PSI) and is therefore inherently policy-oriented. PSI covers a large range of practices, from market studies to policy evaluation, through applied consulting, and the more conceptual reflections (like ideas coming out from the work of “*great thinkers*” such as Freud, Marx, etc.).

It is interesting to notice the proximity between those multiple practices and social sciences, given their objectives, methods or subjects of inquiry. However, PSI distinguishes itself from policy analysis thanks to a more practical connotation. Statistics, social processes modelling, systematic professional speculative thought and analysis, etc. are some of the practices identified by Lindblom and Cohen as providing inputs to problem solving. PSI is distinguished from “ordinary knowledge” while remaining complementary to it⁸⁸. If PSI remains non-scientific in essence, it constitutes an important source of influence on policy change and aims at gaining authoritativeness. Lindblom and Cohen’s critique of Dror (1968) denounced the under-estimation of the importance of the aforementioned notions of interaction and ordinary knowledge in policy making. The relative role of PSI knowledge was here put in question, making clear that PSI only constitutes one of multiple channels to policy change. The notion of PSI should be refined and viewed at the light of modern practices.

It is to be noticed for instance that Strategic Intelligence would here be both an analytical and interactive source for problem-solving as analytical approaches are very often coupled with participative processes.

3.3.2 Strategic Intelligence

The American Federal Bureau of Investigation (FBI) presents on its website (2013) a **definition of intelligence**:

“Simply defined, intelligence is information that has been analysed and refined so that it is useful to policymakers in making decisions—specifically, decisions about potential threats to our national security. The FBI and the other organizations that make up the U.S. Intelligence Community use the term “intelligence” in three different ways:

1. *Intelligence is a product that consists of information that has been refined to meet the needs of policymakers.*
2. *Intelligence is also a process through which that information is identified, collected, and analysed.*
3. *And intelligence refers to both the individual organizations that shape raw data into a finished intelligence product for the benefit of decision makers and the larger community of these organizations.”* (Source: Directorate of Intelligence section, <http://www.fbi.gov/about-us/intelligence/defined>)

⁸⁸ Referring here to “knowledge that does not owe its origin, testing, degree of verification, truth status, or currency to distinctive PSI professional techniques but rather common sense, casual empiricism, or thoughtful speculation and analysis. It is highly fallible, but we shall call it knowledge even if it is false. As in the case of scientific knowledge, whether it is true or false, knowledge is knowledge to anyone who takes it as a basis for some commitment or action” (Lindblom and Cohen, 1979).

Strategic Intelligence here does not refer to the usual notion observed in the fields of international relations and security studies and relayed by many dictionaries. The literature on Strategic Intelligence in those fields generally refers to the practices of various actors in the context of the activities pursued by national *“intelligence organisations”*. While there is no consensual definition of Strategic Intelligence in those fields (Jackson and Siegel, 2005; McDowell, 2009), authors mainly see it as a tool for policy makers to *“safeguard the national welfare”* (Kent, 1949). But one should already make a distinction between two key concepts. Strategic Intelligence is indeed very often confused with espionage⁸⁹; however, as Don McDowell (2009) puts in his main reference book, *“espionage is about gathering data in the intrusive and invasive environment of spying. Intelligence and analysis is a wider process of problem solving that involves data gathering and analysis, interpretation and speculative consideration of future developments, patterns, threats, risks, and opportunities”*. Mc Dowell also distinguishes between strategic, operational and tactical intelligence.

The baseline of those definitions remains nonetheless relevant to other policy sectors and can also be related to the aforementioned FBI definition: as Kent (1949) explained, Strategic Intelligence can be understood as *“an extension of the search for useful knowledge”* and approached as positive (understand here normative). Sixty years later, McDowell (2009) underlined the key features of Strategic Intelligence as being the *“depth of study, the development of futuristic and holistic explanations and projections, and the purposeful use of analytical results as the basis for actively planning for such a future”*. Meanwhile, the collaborative work of Maurer, Tunstall, Keagle and their colleagues (1985) made clear the underlying goal of uncertainty reduction through the analysis and interpretation of the information collected to guide policy makers. The present thesis shares with those authors the idea that **Strategic Intelligence is a process involving knowledge creation, transmission, and uptake**. Jackson and Siegel (2005) emphasized a linear model of intelligence being seen *“both as information and as the process through which this information is gathered, analysed, distributed, and used by decision makers”*. In an attempt to better conceptualize Strategic Intelligence, McDowell (2009) added the idea that intelligence should shed light on a situation and potential options: *“Strategic Intelligence analysis can be considered a specific form of research that addresses any issue at the level of breadth and detail necessary to describe threats, risks, and opportunities in a way that helps determine programs and policies”*.

It is interesting to note that the applications of strategic analysis can lead to a multiplicity of uses including *“political analysis, program & strategy development, commercial and economic prediction, economic analysis & forecasts”* according to McDowell (2009).

⁸⁹ Underscoring the importance of values in policy-relevant knowledge production, Lasswell and Kaplan already referred to intelligence in their definition of policy analysis: *“Lasswell and Kaplan defined the policy sciences as providing ‘intelligence pertinent to the integration of values realized by and embodied in interpersonal relations’”* (deLeon, 1988)

But if some main lines of conceptual definition can be identified, Strategic Intelligence literature remained focused on a specific policy field without considering other thematic areas than security and strategic relations. This could partly explain the under-theorisation of the concept of Strategic Intelligence denounced by Jackson and Siegel (2005) as well as the dominance of a linear vision of Strategic Intelligence, conform to the implementation model of daily activities conducted by intelligence organisations. It is however clear that the process of information collection to inform policymaking is not confined to foreign and security policy sectors (even if in this thesis the particularities and specificities of defence-related issues and policymaking are recognised). The notion of Strategic Intelligence should therefore be decomposed and approached as a socially constructed practice in order to understand how it is also applicable to other fields such as the one of innovation.

Definitions of Strategic Intelligence in the context of RTDI policy do usually not refer to spying techniques or any other type of espionage. Only a few scholars intended to conceptualise Strategic Intelligence and room is left to further definitional work. Therefore, in order to approach Strategic Intelligence, **an instrumental approach will be adopted**. The entrance point of the present approach is that Strategic Intelligence, which will be further defined later in this section, is to be considered as a government instrument. This requires to start from the definition of what a government instrument is, in order to better understand how Strategic Intelligence' features can be considered as such.

3.4 The concept of instrument: deconstructing what seems neutral

3.4.1 The notion of public policy instrument in policy studies

“Well, what does government do, exactly?”

(Hood, 1983)

I propose to approach **Strategic Intelligence as a procedural instrument**. This proposal is based on the idea that Strategic Intelligence is not neutral. The following text introduces the notion of policy instrument which will be used to better understand Strategic Intelligence, too often considered as external to policy although it can be instrumented in many ways (information, legitimation, etc.), and its role in policy learning processes.

As Hood rightly puts in his *“The tools of Government”* book, government does not stop at politics or day to day administrative life. Those interested in the study of public action mainly emphasized the instruments or tools (King, 2007) that governments use to change (or not to change) society. The goal of this sub-section is not to present an exhaustive review of such a broad field of study.

But it appears to be crucial for this thesis to highlight specific conceptual developments in the field of policy instruments research. Policy instruments as a topic of enquiry grew in importance as the focus of policy research moved from agency analysis towards the understanding of individual programs and a growing attention to the implementation and outcomes of those programmes (Howlett and Ramesh, 1995). This shift corresponds to a trend that took place in the 1970s when policy analysis and evaluation as disciplines grew in importance (see Salamon and Lund, 1989). Simplifying the introduction from Hood (1983), governments would detect information and decide to design and implement instruments such as laws (King, 2007), regulations and programmes (Schneider and Ingram, 1990). The instrument perspective has been an important stream in policy studies, and grew along the proliferation of new policy tools also referred to as a *“technological revolution”* (Salamon, 1989). To distinguish instruments from policies and programmes, Howlett and Ramesh (1995) stated that instruments are the means *“by which governments attempt to put policies into effect”*. Instruments would indeed be aimed at changing behaviours in society, pushing targets to act or not to act in specific ways (Schneider and Ingram, 1990).

“Carrots”, “sticks” and “sermons” long constituted the simplest categories used to identify instruments. This distinction referred to the nature and rationale of different government techniques translating power relationships: *“Vedung defines a tripartite instrument configuration: regulation (the stick), economic means (the carrot) and information (the sermon)”*⁹⁰ - (see Bemelmans-Videc et Al., 1998). The baseline for such a distinction is the definition provided by Vedung himself (1998): *“Public policy instruments are the set of techniques by which governmental authorities wield their power in attempting to ensure support and effect or prevent social change”*.

⁹⁰ *“Vedung defines regulations as measures taken by governmental units to influence people by means of formulated rules and directives which mandate receivers to act in accordance with what is ordered in these rules and directives. The defining property of regulation is that the relationship is authoritative, meaning that the controlled persons or groups are obligated to act in the way stated by the controllers (...) Regulation is the traditional instrument of government. (...) Economic policy instruments are characterized by Vedung as involving the handing out or the taking away of materials resources while the addressees are not obligated to take the measures involved. Subsidies are an example of this type of instrument. (...) [Information (or exhortation) instruments] are regarded as modern forms of intervention, with an emphasis on prevention of wrong or stimulation of the right conduct by offering insights into consequences of behavior. Vedung defines them as attempts at influencing people through the transfer of knowledge, the communication of reasoned argument, and persuasion. They represent voluntary appeals to the electorate as a whole or to particular parts of it.”* (Bemelmans-Videc et Al., 1998).

According to Salamon and Lund, *“it is really possible to discern a limited number of tools of action among the welter of individual government programs; (...) each of these tools has its own dynamics and operating characteristics (...) these characteristics have more or less predictable implications for the way the programs that embody the tool function”*; in that sense, they define *“a policy tools as a method through which government seeks a policy objective”* (Salamon, 1989; Salamon and Lund, 1989).

Howlett (2005) identified two main generations of thinking on policy instruments that would be the realm of economists and political scientists. The first generation would witness some dissociation between the two disciplines. Economists on the one hand questioned the role of government in terms of effectiveness when acting to address market failures, economy regulation etc. Political scientists on the other hand argued against deductive approaches pushed forward by economists to favour more inductive approaches to policy instruments. While economists focused on the appropriateness of the instruments, political scientists would have paid more attention to the political construction of the choices underlying public action. A second generation would have emerged with more nuanced approaches to instrument choice, going beyond decision making. Evaluation models and the growing consideration for more complex forms of instruments and especially *“mixes”* (Howlett, 2004) marked the raise of this new generation.

One way or the other, studies ended up emphasizing the design of the instruments under their scope (such as in Linder and Peters, 1984, where the authors make the link between instrument and theory); this is particularly true when considering what Howlett (1991) points as being the *“American approach”* initiated by Lowi and Anderson.

The contours of what a government instrument is have been drawn by many authors who tried to provide a **definition of what an instrument is (or is not)**, as well as classifications of instruments. In 1991, Howlett defined policy instruments as *“the generic term provided to encompass the myriad techniques at the disposal of governments to implement their public policy objectives. Sometimes referred to as “governing instruments” or “tools of government”, these techniques range in complexity and age”*. In 2005, the same author referred to instruments as *“techniques of governance that, one way or another, involve the utilization of state authority or its conscious limitation”*. In the same book, Landry and Varone (2005) referred to Schneider and Ingram (1990) and defined *“a policy instrument, or tool, as the means of intervention by which governments attempt to induce individuals and groups to make decisions and take actions compatible with public policies”*. Eliadis et Al. (2005) defined instruments as *“the range of instruments spanning law and regulation, subsidies and grants, organization and privatization, and information dissemination and taxation”*. Many taxonomies of policy instruments have been elaborated, from the choice-based and resource-based classifications to minimalist, maximalist and other types of approaches (see Vedung, 1998). Research on the designing and implementing institutions was part of the instrument studies.

With such a focus, an analytical distinction was made between “*command-and-control*” (vertical) instruments and horizontal instruments focused on coordinated forms of participatory governance such as partnerships etc.; but it is accepted that the use of a single instrument evolves towards a stronger consideration for “*instrument mixes*” (Howlett, 2004 and 2005) and the raise of new instruments such as the service-delivery instruments (including managing out or contracting out) promoted by New Public Management (Eliadis et Al., 2005). However, (numerous) classical taxonomies remained and mainly focused on substantive tools, directly correlated to public expenditures.

The form of the instrument itself has not been the only focus of attention. Policy scholars differentiated instruments from the policies and programmes themselves, considering instruments as a more technical or operational part serving a policy; Weimer (1992) underlined the generic nature of most of policy tools that can be applied in various policy fields.

Specific tools tend to be found in targeted areas though, such as can be observed in the field of energy policy (Carley, 2011⁹¹) or environmental policy where instruments tend to present a more coercive nature (Macdonald, 2001)⁹². Different ‘styles’ can also be identified, with variations from a country/national government to another (Howlett, 1991 and 2004), as well as at a supranational level (Kotzian et Al., 2011). Those styles also varied in the literature: the American, Canadian and British instruments literature, though inspired by Lowi, followed different pathways related to their diverging instrumental/policy styles (Howlett, 1991; Woodside, 1986). The underlying idea of a government “*toolkit*” (Hood, 1983) covering generic tools such as regulation, taxation (see also Khadria, 1996), or awareness raising led academics to question the choice, use and impacts of those tools and further analyse their constituencies. The initial assumption was that particular problems would be better addressed by particular tools⁹³. The same goals or expected impacts could not be the same for tools such as standards, subsidies, “*sanctions, public corporations, contracts, grants, arbitration, persuasion, education, licensing, and so forth*” (Schneider and Ingram, 1990). A “*sample of policy instruments*” is presented below as to illustrate the diversity of instruments considered by some of the researchers in that field (see Figure 10).

⁹¹ The author specifically emphasized property tax incentives, corporate tax incentives, sales tax incentives, property tax incentives, renewable energy-related public benefit funds, energy efficiency-related public benefit funds, energy efficiency requirements, Renewable Portfolio Standard, and public benefit fund.

⁹² The author suggests that “*one aspect of that process in particular - the balance of power between regulator and “regulatee” - is of importance in explaining relative coerciveness. We must first understand the ability of the regulator to coerce before we can explain the selection of more or less coercive instruments*”.

⁹³ In his classification, Hood (1983) referred to nodality (in terms of information possession into a given network), authority (power), treasure (money) and organization (organization capacity) as being the key resources for government instruments.

Figure 10: Tentative Enumeration of Representative Policy Instruments and Design Criteria

THE SAMPLE OF POLICY INSTRUMENTS

cash grant	gov't-sponsored enterprise	in-kind transfer
loan guarantee	'tax break'	fee/charge
certification/screening	gov't provision	fine
administered contract	quota	prohibition
quality standard	'jawboning'	public promotion
information/demonstration	procedural 'guideline'	insurance
loan	license/permit	price control
public investment	franchise	

Source: Linder and Peters, 1989

"Instrument" and "tool" are terms used to characterize governmental actions and interestingly illustrate the ideas of "*purpose*" and "*willingness*" to address issues through specific techniques⁹⁴ (problem-solving rationale). This implies that several instruments can serve a same (broader) policy, such as in the case of the European Common Agricultural Policy (CAP) which makes use of a number of different tools (Grant, 2010). Linder and Peters (1984) proposed to understand instruments through the characteristics of their main components, e.g. the problems they address, their goals and their instrumental features⁹⁵.

In their analysis of the behavioural assumptions underlying policy tools, Schneider and Ingram (1990) distinguished different types of tools:

- ▶ Authority tools
- ▶ Incentive tools
- ▶ Capacity tools
- ▶ Symbolic and hortatory tools
- ▶ Learning tools

⁹⁴ See for instance Palier (2007) who studied the French pension system and most specifically the changes of the related instruments and pension schemes over the time; another example is the one from Feiock et Al. (2008) who studied the choice of instruments and tools in the context of land use regulation at the local level, linking governance issues and instruments' features.

⁹⁵ In more details, the authors describe the key elements they refer to as "(i) the characteristics of problems (scale, collectiveness, certainty, predictability, independence); (2) characteristics of goals (value-laden, operational, process of goal-setting); (3) characteristics of instruments (suitability of different instruments)" (Linder and Peters, 1984).

In his effort to better identify instrument categories, Howlett (2005) designed a classification of instruments from different perspectives (namely a taxonomy of **substantive** instruments inspired by Hood [1977⁹⁶] and a taxonomy of **procedural** policy instruments⁹⁷). Those studies mainly emphasized the choice⁹⁸, design and implementation of policy instruments with the assumption that specific instruments can better address certain public challenges.

If classical instrumental studies focused on “*substantive instruments*” (Howlett, 2005), the evolution toward more indirect, complex and networked forms of governance led to consider new types of instruments involving the steering of networks by policy makers as pinpointed by Eliadis et Al. (2005). Jordan et Al. (2005) interestingly associated the evolution of government towards governance with a move from hard towards softer instruments (such as labels, voluntary agreements, etc.), in order to eventually notice variations between districts and policy sectors. The emergence of new instruments can therefore be observed (see also Zito et Al., 2003).

Lascousmes and Le Galès (2007) delineated broader categories to be used in order to catalogue policy instruments: “*legislative and regulatory, economic and fiscal, agreement- and incentive based, information- and communication-based*”. Their synthetic view on that matter is illustrated below (see Figure 11).

⁹⁶ I refer in this dissertation to Hood (1983), a more recent version of the author’s work on government’s tools.

⁹⁷ Substantive instruments are “*those instruments intended to directly affect the nature, types, quantities, and distribution of the goods and services provided in society*” while procedural policy instruments “*include education, training, institution creation, the selective provision of information formal evaluations hearings and institutional reforms*” (Howlett, 2005).

⁹⁸ Hahn (1989) studied the constraints over instrument’s choice (showing that constraints lead to the search for new tools but is not synonym of efficiency), while Bressers and O’Toole (1998) underlined for instance the key importance of networks in the selection of policy instruments. Both contributions are important as they show the importance of the broader context (institutional, economic, political...) in which instruments are shaped. The context is also key to understand the choice of alternative or new instruments (Weimer, 1992; Feiock et Al., 2003; Howlett, 2004) as well as the role of specific stakeholders in negotiating instruments (Bressers et Al., 2011).

Figure 11: Typology of Policy Instruments

Typology of Policy Instrument

Type of Instrument	Type of Political Relations	Type of Legitimacy
Legislative and Regulatory	Social Guardian State	Imposition of a General Interest by Mandated Elected Representatives
Economic and Fiscal	Wealth Producer State, and Redistributive State	Seeks Benefit to the Community Social and Economic Efficiency
Agreement-Based and Incentive-Based	Mobilizing State	Seeks Direct Involvement
Information-Based and Communication-Based	Audience Democracy	Explanation of Decisions and Accountability of Actors
De Facto and De Jure Standards Best Practices	Adjustments within Civil Society Competitive Mechanisms	Mixed: Scientific/ Technical, Democratically Negotiated and/or Competition, Pressure of Market Mechanisms

Source: Lascousmes and Le Galès, 2007

It is interesting to note that in the **innovation field**, taxonomies of Research, Technology Development and Innovation (RTDI) policy instruments have been designed too which were specific to the field. However, those typologies have mainly been elaborated by economists and a very few political scientists as the field remained distant from the mainstream policy sciences. The categories were mainly driven by two preoccupations: first, the economic foundations of the instruments and their relevance; second, a normative reflection on their (potential or effective) impacts. On one hand, some authors such as Rasmussen (2008) focused on specific categories of instruments.

Rasmussen identified two categories of government instruments designed to support the commercialisation of university-research, namely “*programs made to improve the institutional capabilities to facilitate commercialization projects within universities*” (infrastructural instruments) and “*programs aimed at supporting specific commercialization projects*” (project instruments). Others such as KOLDZIN (2011) organized their analysis in terms of the confrontation between closed and open innovation. On the other hand, a number of scholars identified broader taxonomies of RTDI support instruments (see for instance Smits et Al., 2012), paying more and more attention to new types of tools (one could quote networked or system-based tools for instance).

In the broader field of policy studies, the focus moved towards more attention paid to the relationship between governance and instrument, the evolution from “rowing” to “steering”, and the impacts of the tools under the scope⁹⁹. Implementation styles and implications of instrument mixes for governance were increasingly considered. An interesting example is the one of quotas elaborated in the context of the development of the American Affirmative Action (King, 2007). In order to reverse the injustice against African Americans and other minorities, quotas were defined as a tool for action by the government.

The overall instrumental perspective remained quite **normative**, with as an implicit goal for many researchers to design the best analytical frames to instrument selection in order to address issues and fix societal failures. The main focus of those studies over time remained on the factors explaining the choice for a specific instrument or mix of instruments. However, beyond the decision itself, those studies drew the contours of instruments’ main features, from their resources, targets, goals, legitimacy, setting, context, implementation style, to the related impacts and forms of policy innovation (Landry and Varone, 2005). Those studies allowed a refined focus on specific instruments in the context of diffusion studies (see Tews et Al., 2003 who studied the spread of new environmental instruments). They also led to very important considerations on the non-neutrality of instruments, such as illustrated in the following statements:

Box 3: Connecting tools to ideology

“I concluded that instruments are not just instrumental, or phrased in another way, not just tools. They also have characteristics related to a political-administrative situation. (...) Instruments have a normative side, too (see Stone, 1999). They can be goals in themselves, desirable to use when they are compared with other instruments. In the political history of Europe, these long-standing preferences can be connected with the most important political movements, which used some instruments more than others for ideological reasons” (Source: Ringeling [2005] in his chapter entitled “Instruments are normative”).

⁹⁹ “Practitioners of the policy sciences almost forgot that governments are not free in the instruments they select. Only authoritarian states have to bother with this limitation” (Ringeling, 2005).

3.4.2 A step further in instrumental conceptualization: Lascousmes and Le Galès' approach¹⁰⁰

“The implemented instruments are not neutral devices, they produce specific effects that are independent from the objectives formulated and they structure public action according to their proper logic”

(Lascousmes and Le Galès (2004) - second hypothesis)

-

“The details of how instruments are shaped and used in the EU are now beginning to be explored

(Kassim and Le Galès, 2010)” (Schout, 2009)

Policy sciences long emphasized the nature of public policies and programmes. Taxonomies and decompositions of what the instruments of public government are have been proposed by a number of scholars since the 50s. What appears to be interesting in those approaches is the “*technicity*” of the perspective adopted. Implicitly, the idea of instruments including technical components could be referred to as a “*technological vision of public action*”.

A parallel can be made between the hardware and software components of a technology according to Rogers (1995) and the **social and technical components** of a government instrument according to Lascousmes and LeGalès (2005). Indeed, Rogers defined the hardware dimension as being the tool, while software refers to the knowledge base for this tool. Rose (2005) referred to this convergence of concepts while describing the components of public programmes: “*Programmes combine the ‘hardware’ and the ‘software’ needed to advance towards a policy goal (...) The hardware consists of laws, money, personnel, and other organizational resources that are necessary to launch a new programme. (...) Software is also required, including the training of officials in new tasks, the development of informal procedures for integrating a new programme into existing public institutions, and delivery systems linking public agencies with intended beneficiaries*” (Rose, 2005).

¹⁰⁰ In order to overcome the limitations of learning approaches focused on adoption (see Howlett and Rayner, 2008), this research will rely on Lascousmes and Le Galès’ instrumental perspective.

The model proposed by Rose (2005) allows modelling a programme into distinctive features:

- ▶ Laws and regulations
- ▶ Organisation
- ▶ Personnel
- ▶ Money
- ▶ Programme outputs
- ▶ Programme recipients
- ▶ Goal (source: Rose, 2005)

The conceptual approach developed recently by Lascousmes and Le Galès goes even further as it seeks to dissociate formal and informal components of a policy instrument. The approach also allows going beyond the notion of programme as it is commonly understood. More important, the concept of instrument as synthesized by Lascousmes and Le Galès overcomes the limitations of focusing on programme adoption. This is why their heuristic will be adopted to approach Strategic Intelligence and will make use of their instrumental approach. This instrumental perspective has not been very developed by European social scientists¹⁰¹ (Kassim and Le Galès, 2010). The so-called “*instrumental approach*” that will be referred to in this dissertation relies upon a prime definition from Lascousmes and Le Galès (2004), who defined the “*instrument*” as a **social and technical device organizing social relations between the public bodies and their targets and beneficiaries**. In that relational scheme, the organisation of these social relations is based on representations and meaning as attributed by the public authorities. To illustrate such a vision, it is possible to quote the studies conducted by Isabelle Bruno (2008): analysing the use of benchmarking in the framework of the European “*Open Method of Coordination*” (OMC), she showed that statistical analyses are not neutral¹⁰², and that their design is indicative of forms and techniques of domination and of government, a conclusion that has also been made by others on indicators for instance (Desrosières, 2014; Schout et Al., 2010). Expertise is therefore not neutral, and produces some norms for policy making. Using the instrumental approach, Sophie Jacquot showed in her study about the “*instrumental engineering*” of the “*gender mainstreaming*” at the European Commission that comprehension, translation, and appropriation by actors were key issues for analysing a public policy (Jacquot, 2006). These analyses led the research community to consider the policy making process with more distance:

¹⁰¹ There is nonetheless a tradition in US and UK (Lascousmes and Le Galès, 2004).

¹⁰² In that respect the authors have been influenced by the sociology of science and history of technology which, since the 50s, deconstructed innovations as being the results of complex social processes and not neutral objects (see Lascousmes and Le Galès, 2007).

Saurugger and Surrel (2006) concluded that policy transfer instruments were not only tools designed for tackling societal issues, and that their analysis could lead to a better understanding of legitimacy and power relations.

The **scope of what a governance instrument is can therefore be broadened to go beyond the usual substantive instruments** studied in policy sciences set in stone by law or financial schemes. But in order to do so, a clear depiction of what a governance instrument is seems appropriate.

To give a clear overview of what Lascousmes and Le Galès defined as “*governance instruments*”, it is necessary to underline first that instruments represent a vision of regulation: instruments fit into paradigms and provide information on the broader governance system and on the conception of the ruler/ruled relations. The particularity of the instrumental approach is that means (instruments) can be even more important than ends (goals) when trying to explain policy change (Lascousmes and Le Galès, 2004).

“A public policy instrument constitutes a device that is both technical and social, that organizes specific social relations between the state and those it is addressed to, according to the representations and meanings it carries. It is a particular type of institution, a technical device with the generic purpose of carrying a concrete concept of the politics/society relationship and sustained by a concept of regulation” (Lascousmes and Le Galès, 2007); Governance instruments are therefore governance techniques with their own goals, rationales contents, and implementation modalities. The selection of a specific instrument is *“an intrinsically political act”* (Kassim and Le Galès, 2010). Governance instruments are characterized by two major types of components (technical [rules, methods, etc.] and social [values beliefs, etc.]). They represent a form of institutionalisation of norms and social relations according to the sociological definition¹⁰³. Governance instruments partly determine actors’ behaviours, the resources to be used and who could use them, and reduce or increase certain uncertainties, while diffusing a representation of regulation, problems and world in general. In a 2007 article, Lascousmes and Le Galès refined their approach in order to make the distinction between three components:

1. *“The instrument as a type of social institution (census taking, map making, statutory regulation, taxation).*
2. *The technique as a concrete device that operationalizes the instrument (statistical nomenclature, a type of graphic representation, a type of law or decree).*
3. *The tool as a micro device within a technique (statistical category, the scale of definition of a map, the type of obligation provided for by a legal text, presence/absence of sanction)”* (Source: Lascousmes and Le Galès, 2007).

¹⁰³ Set of rules and procedures.

This approach allows an **integration of politics and policy** (traditionally treated as opposed in policy studies) and introduces the notion of instruments' effects. It is indeed to be underlined that governance instruments generate effects (e.g. "*instrumentation*" [Kassim and Le Galès, 2010], also involved "*instrumentality*" [Voss, 2007]). The authors identify three types of effects: the instruments produce inertia (resistance to external pressures thanks to the possibility for stakeholders to work together on "*problematization*"), specific representation of the issue treated by the instrument (building the vision of the problem or its nature, and providing a certain focal point for understanding the world), and induce "*a particular problematisation of the issue*". The instrumental approach also permits a better understanding of the structuration of an instrument and actors' behaviours over time (see for instance Voss, 2007). Referring to Maugeri (2001), Lascousmes and Le Galès (2004) present instruments as vectors of tacit rules, power signification and diffusion of cognitive models. Instruments contribute to the structuration of the policy debate by determining "*politics' argument*" (Radaelli and Meuwese, 2010). Using an instrumental approach also allows the analyst to perform a deconstruction of the object and to understand the extent to which the instrument under the scope is not neutral¹⁰⁴. Instruments are indeed meaningful, built on specific paradigms and repositories (as an example, Grant [2010] identifies the main beliefs held by the Common Agricultural Policy¹⁰⁵) that can evolve over the time. Flanagan and Al. (2011) stated that "*Instruments are not necessarily stable over time and across space whether in terms of rationales, goals or means. Instruments frequently 'harden' over time into new actors and institutions which become part of the changed context in which future policy processes (and innovation processes) occur*". It is thus capital to insert the instrument and its components (ideas, paradigms, techniques, etc.) into their broader context, necessity reminded by Howlett and Rayner (2008).

Instrumental approaches encounter difficulties in understanding the constraining dimension of instruments or their appropriation by stakeholders. Some specialists recommended the use of new disciplines, like for instance sociology of sciences and techniques, or administrative diffusion sociology, to capture changes in cognitive frameworks of administration (Dumoulin and Saurugger, 2010). The classical objects of instrumental approaches have been policy instruments dealing with phenomena identified as problems during the policy agenda setting (e.g. laws, subsidies, etc.). But the use of expertise for normative knowledge production can also be considered as a government instrument, according to the aforementioned definition. The application of the instrumental perspective should therefore be enlarged to other relevant items and in this regard, it will be argued in this dissertation that **Strategic Intelligence is an instrument** institutionalizing learning processes.

¹⁰⁴ Lascousmes and Le Galès (2004): "*the public action instruments are not axiologically neutral tools*" (personal translation).

¹⁰⁵ He distinguishes three particularly influential beliefs: "*concerns about food security; a belief that markets could never work properly in agriculture; and concern about the income gap between urban and rural populations*" (Grant, 2010).

The idea is that Strategic Intelligence results from a human construction, and is not neutral. A “black box” remains about how this instrument impacts the practices and cognitive frameworks of policy-makers, stakeholders, etc. involved in the policy cycle. This thesis will analyse how Strategic Intelligence determines policy-learning processes and is a vector of policy learning from an instrumental perspective.

I therefore start setting up the analytical framework of this dissertation with the two statements from Lascousmes and Le Galès (2007) which matter to understand Strategic Intelligence in a Transnational Policy learning context:

“(1) public policy instrumentation is a major issue in public policy, since it reveals a (fairly explicit) theorisation of the relationship between the governing and the governed: every instrument constitutes a condensed form of knowledge about social control and ways of exercising it; and (2) instruments at work are not neutral devices: they produce specific effects, independently of the objective pursued (the aims ascribed to them), which structure public policy according to their own logic.”

If classical studies consider Strategic Intelligence components such as evaluation as being part of a same programme cycle (being its outcome or part of the programme itself - see Bemelmans-Videc et Al. (1998) or Eliadis et Al. (2005)), it is proposed to take distance with the information production tools. As underlined in the second conclusive statement issued from the 2005 “*Instrument Choice in Global Democracies*” conference: “*All instruments, particularly those designed and implemented outside of the legislative process, have important repercussions for the legitimacy and accountability of public action*” (Eliadis et Al., 2005). An interesting example referred to by the authors is the one of standards set up by industry. But an even more interesting approach is the one developed by Howlett (2005) who considers that **evaluation and selective provision of information are to be considered as procedural policy instruments (not substantive)**. New forms of instrument should therefore be considered, and it is to be argued here that policy knowledge production is not only neutral and aimed at a straight forward understanding of the effectiveness and efficiency of instruments. Most scholars indeed focused on Strategic Intelligence as a way to develop knowledge about the instruments, without considering the role of the process setting as such (while evaluation scholars for instance emphasized the politics of evaluation and the role of knowledge in policy extensively¹⁰⁶).

¹⁰⁶ Weiss (1995) clearly identifies three ways in which political considerations intrude evaluation: “*First, the policies and programs with which evaluation deals are the creatures of political decisions. They were proposed, defined, debated, enacted, and funded through political processes, and in implementation they remain subject to pressures –both supportive and hostile– that arise out of the play of politics. Second, because evaluation is undertaken in order to feed into decision making, its reports enter the political arena. There, evaluative evidence of program outcomes has to compete for attention with other factors that carry weight in the political process. Third, and perhaps least recognized, evaluation itself has a political stance. By its very nature it makes implicit political statements about such issues as the problematic nature of some programs and the unchallengeability of others, the legitimacy of program goals and program strategies, the*

3.5 Understanding Strategic Intelligence as a procedural policy instrument¹⁰⁷

As explained in the section above, few policy instrument researchers considered normative knowledge production (and in particular Strategic Intelligence) as a source of knowledge to inform policy makers in a non-positivist way. The current dissertation clearly positions itself in the second-generation of instrumental studies, with a focus on a specific category of procedural instrument that should be reviewed with double distance (the perspective adopted here is clearly post-positivist).

While most of the instrumental studies focused on the choice and design of instruments, it is important to emphasize the relationship between the instrument's (Strategic Intelligence) design and its impact on a specific programme. One key problem here lies in the **lack of conceptualisation of the role of Strategic Intelligence in policy**. Classical policy instrument studies paid attention to information production and dissemination in general (or as part of Vedung's "sermon" although Vedung himself did not include any of the Strategic Intelligence techniques into this category), conceptually bringing together political marketing and evaluations under a same umbrella. It is however obvious that the nature and rationale of both instruments are inherently different. Moreover, Strategic Intelligence seems not to be considered at all as an instrument (Hood [1983] does not refer to evaluation or any other type of Strategic Intelligence technique in his extensive description of information detection tools for government).

Box 4: Missing Strategic Intelligence? An illustration of its absence in instrumental approaches

"Information as a public policy instrument covers government-directed attempts at influencing people through transfer of knowledge, communication of reasoned argument, and moral suasion in order to achieve a policy result. The information dispensed may concern the nature of the problem at hand, how people are actually handling the problem, measures that can be taken to change the prevailing situation, and reasons why these measures ought to be considered and adopted by the addressees? It may also be just plain facts. However, no more than pure transfer of knowledge, persuasive reasoning, or exhortations are offered to influence the public or some segment of the public to what government deems desirable.

utility of strategies of incremental reform, and even the appropriate role of the social scientist in policy and program formulation".

¹⁰⁷ Caplan in his *Two-Communities* approach already went through a reflection on instrumental utilization of knowledge. What is interesting in our situation is to see that instrumental utilization of a certain type of knowledge can, to the extent that this knowledge is the product of governmental decisions, make the knowledge production, use and diffusion process a government instrument as such. I will here refer to such a type of process as strategic intelligence, using the terms mainly by convention.

Information is used here as a catch-all term for outright public communication campaigns; diffusion of printed materials like brochures, pamphlets, booklets, folders, fliers, bulletins, handbills, and posters; advertising; labelling; demonstrations programs; counselling; custom-made personal advice; training programs; education efforts; and other forms of amassing, packaging and diffusion of knowledge and recommendations. (...) government can also inform the citizenry about what is good or bad, right or wrong. Moreover, government can ‘provide information about’ what people are allowed to do, or how they should act and behave. The information category covers, in other words, not only true knowledge about the world, but also judgments about which phenomena and measures are good or bad, and recommendations how targets should behave”.

Source: Vedung and van der Doelen, 1998

“Governments can therefore use information (or “disinformation”) as an “effecting” tool, and have done so since ancient times” (Hood, 1983). Hood referred to the use and creation, suppression, and propagation of information, where the messages can come with different forms and through different channels. One of them is clearly evaluation: Kuhlmann (1998) showed how evaluation can be the arena of negotiations and policy moderation. He found out that evaluation contributes to the definition of the policy problems (setting up the policy agenda to be debated) and can be understood as self-organized learning. Segerholm (2003) stated that *“evaluation is integrated in accountability movements and in institutionalized systems for national governance. Evaluation is also embedded in a political ideology geared at values such as individual choice, consumerism, and competition”* in an integrated paradigm of New Public Management¹⁰⁸ or Audit society aiming to reinforce means-end, goal-result, performativity-thinking. Thus one of the potential effects of evaluation exercises could be policy learning, in the sense of the diffusion of paradigms, values, beliefs (see for instance Botcheva et Al., 2002), etc. conditioned by an apparently neutral set of techniques. Freitas (2007) underlined the importance of codified knowledge as policy instrument to *“monitor and upgrade innovation policy”*. These successive conclusions are also valid when considering benchmarking, socio-economic studies as well as other types of consulting or research-based services provided to governments in order to guide their actions; meaning by then, all tools and practices associated to Strategic Intelligence.

¹⁰⁸ According to Segerholm (2003), NPM in Sweden is mainly associated to the notion of decentralization.

Strategic Intelligence has however not been included in the typology of governance instruments developed by Lascousmes and Le Galès¹⁰⁹ (2004) while they remain a category of power technologies¹¹⁰ validating models and their uses (see for instance the influence of expert reports at the level of the European Commission). One could define Strategic Intelligence as a “soft” instrument, the way Tholoniati (2010) did when studying the Open Method of Coordination, which was characterized by a certain representation of power (see Schout et Al. [2010] for the rise of network-based instruments through the OMC) and having its own effects.

In that sense, the concept of instrument refined by Lascousmes and Le Galès is important to understand that Strategic Intelligence is not only a knowledge source for policy making (content) but also a set of norms and rules (instrumental theory). The idea is not new: Brown (1955) already emphasized advisory boards as government instruments; seen as platforms for expert advice, advisory boards in the American setting play an interpretive role. Such consideration remained of interest to some researchers such as Papaioannou et Al. (2006) who emphasized the importance of knowledge production¹¹¹ in a policy making context, underlying its learning component (or “principle”).

The present thesis will use Lascousmes and Le Galès’ lessons as to how to better decompose and analyse the historical trajectory of Strategic Intelligence considered as an instrument. But it is necessary at this stage to highlight that Strategic Intelligence rather fits the concept of “Procedural Instrument”¹¹² as defined by Eliadis et Al. (2005). Building on previous studies (mainly from Canadian origin), the authors brought in a clear distinction between “substantive instruments” (*“instruments intended to directly affect the nature, types, quantities, and distribution of the goods and services provided in society”*) and “procedural instruments”, the latter being *“primarily intended to alter policy processes rather than substance, per se”*. While most of the instrumental literature focused on substantive instruments, **procedural instruments were left aside**. The authors include under this specific heading *“education, training, institution, creation, the selective provision of information, formal evaluations, hearings, and institutional reform (...) “treaties” and a variety of “political agreements” that can affect target-group recognition of government intentions and vice versa (...) tools related to group creation and manipulation (...) provision of research funding for, and access to, investigative hearings and tribunals”*.

¹⁰⁹ Benchmarking and best practices are briefly evoked but not fully integrated.

¹¹⁰ Georghiou and Keenan (2006) already considered national foresight as a policy instrument in order to analyse the components of its rationale and assess its impacts; in the same way Havas and Al. (2010) considered the variations in policy rationale and the role of foresight in this regard to understand what foresight can bring to innovation policy making.

¹¹¹ Here benchmarking.

¹¹² I wish to thank Kieron Flanagan from the Manchester institute of innovation Research (MioiR) for his lights on that specific issue of defining Strategic Intelligence as a policy instrument which proved to be difficult as many (closed) taxonomies were produced which hardly left space for Strategic Intelligence.

Information generation, group structuration and management appear to be key to such a perspective, as they might structure the relationships between target groups, public authorities and (we assume) beneficiaries as well as tier parties.

Strategic Intelligence is therefore clearly a procedural instrument. But while Eliadis et Al. presented a resource-based taxonomy, the instrumental approach of Lascousmes and Le Galès will be applied to understand the components and trajectory of Strategic Intelligence which can be considered as such procedural instrument. But Strategic Intelligence does not fall under a sole heading when considering the taxonomy presented by the authors: some of the tools belonging to the category of what the authors call “*information-based*” instruments” could also fall under the category of “*authority-based*” instruments (such as audits for instance).

However, it is the thinking underlying this dissertation that limiting procedural instruments to modality and group membership issues (focusing on how these instruments structure groups and their relationships) is too reductionist.

This is why the retained hermeneutic is the one from Lascousmes and Le Galès. Also, the typology of instrument developed seems to underestimate the complexity of interplays and individual initiatives at stake, assuming some unity behind each group (whether public authorities or others). In summary, a **combination of the strengths of both approaches** is needed. One should indeed consider the features distinguished by Lascousmes and Le Galès (2005) in their attempt to define policy instruments, which can clearly apply to procedural instruments though they are not intended to have a direct effect on society through wealth repartition or so. Reference is also made in this thesis to their concept of **instrumentation**, which partly justifies the consideration for utilisation concepts (see 3.2.3) in line with the expected interactive nature of the relationship between policy and Strategic Intelligence that can take place beyond the sole adoption stage of the policy cycle. This echoes the **possible importance of policy entrepreneurship and in particular policy learning entrepreneurship** (expected to take form through to Strategic Intelligence).

This thesis therefore adopts an instrumental perspective in order to understand how Strategic Intelligence considered as soft **procedural instrument enables/fosters/facilitates/hinders cross-temporal and/or transnational policy learning**. It is assumed here that both cross-temporal policy learning and Transnational Policy learning can vary in nature depending on the Strategic Intelligence features mobilized during the policy process. Such an objective requires better delineating of the lines of the object to be studied in order to avoid any ambiguity in terms of the unit under the scope (Howlett and Rayner, 2008).

In order to avoid excessive simplification of learning phenomena¹¹³, it is important to consider the different features of the instrument (Strategic Intelligence) in scope and to include it in the broader policy mix and context it belongs to. It is indeed in a specific system that a policy measure is implemented, where other public initiatives are running and concern a number of actors from the quadruple helix (research organisations, private organisations, [semi-]public sector as well as citizens).

The same goes for Strategic Intelligence. Kuhlmann et Al. (1999) made the assumption that Strategic Intelligence (SI) knowledge is a policy resource coming together with *“institutional preconditions of using Strategic Intelligence activities”*¹¹⁴; both would influence each other while being the origin of mutual transformations in a complex and interactive setting. In that sense, they provide Strategic Intelligence with a functional position, knowledge being used as a *“medium”* by organisations and innovation systems’ agents (analytical, divergence clarification, objectification of perceptions, and mediation through discourse were highlighted in that respect). One of the normative assumptions presented by the authors was that the contribution of Strategic Intelligence to policy making would be positive and would benefit policy beneficiaries in *“need”* of (demanding) knowledge, which is not here an issue that can be dealt with. An interesting finding though is that agents pursue different objectives, and need intelligence accordingly (decision makers do not express the same demand than programme managers; needs also vary depending on the scale [local, national, supranational]). Overall, definitions of Strategic Intelligence remain quite normative, especially in the RTDI field as community members often are wearing several hats at the same time (being both experts and stakeholders for instance).

Before decomposing Strategic Intelligence thanks to the instrumental approach described above, this thesis will base its definition of Strategic Intelligence on Kuhlmann (2002) who defined Strategic Intelligence as *“... a set of – often distributed – sources of information and explorative as well as analytical (theoretical, heuristic, methodological) tools employed to produce useful insight in the actual or potential costs and effects of public or private policy and management”*. Public authorities would then seek to *“learn in order to improve their institutional performances and the preconditions for institutional survival or even growth (functional assumption) and to contribute to socio-economic modernization (normative assumption)”* (Kuhlmann et Al., 1999).

¹¹³ Howlett and Rayner (2008) explained that the tendency to conduct large-N studies pushed researchers to over-simplify the objects (policy measures) of their research.

¹¹⁴ Kuhlmann et Al. (1999) also found that an increasing need for comparative perspectives was to be observed, implying a broadening of the analytical scope feeding innovation policy. From this idea, the authors identified for each strategic intelligence tool the key changes implied for actors (role of SMEs in Technology Foresight for instance), making clear the idea of specific rationales and (potential) impacts of each approach listed so far on the agents of the innovation system.

Based on Kuhlmann (1999), Edler et Al. (2012) considered “*strategic policy intelligence*” as “*all analytical and discourse tools that support the design, implementation, and adjustment of policy by providing systematic evidence on underlying conditions and effects and by providing methods and tools that allow the stakeholders to reflect on these goals, instruments and effects*”. It is to be understood from this definition that **Strategic Intelligence refers to a formalized way of producing, transmitting and using knowledge, characterized by normative objectives (and thus excluding fundamental research or learning by doing) and being driven by normative principles such as the one of usefulness.**

Some of these tools such as **Evaluation, Technology Foresight, and Technology Assessment** have been in use for many years at different government levels and considered from a systemic perspective as (potential) source of “*distributed intelligence*” in the benefit of the various agents composing a specific system and its proper adaptation capabilities (Kuhlmann et Al., 1999).

Edler (2009)¹¹⁵ in his pragmatic attempt to identify opportunities for Strategic Intelligence to support demand-based innovation policies made the distinction between four main building blocks of Strategic Intelligence in a demand-based policy context:

- ▶ Conceptual¹¹⁶
- ▶ Discursive (support in identifying, defining and shaping public and/or private demand)
- ▶ Operational (technology/market intelligence)
- ▶ Evaluative (impact) (see also Edler et Al., 2012)

It is interesting to highlight from the above the existence of more abstract forms of Strategic Intelligence (embodied in conceptual and discursive types of Strategic Intelligence), which can suggest in a Policy Learning context that some more **abstract learning could be triggered by Strategic Intelligence**, for instance as a filter to understand reality or policy rationale. On the other hand, four main “*approaches*”¹¹⁷ were identified at the regional level as supporting innovation policy learning: strategic vision, innovation studies and evaluation, innovation strategies, and trans-regional cooperation were indeed the key approaches identified by Koschatzky (2009) who also put forward the importance of benchmarking and transnational institutional learning.

¹¹⁵ Edler, j. (2009), “*Strategic Intelligence in Demand Based Innovation Policies*”, Presentation to the Joint CIEE-CSTP Workshop on Demand-Led Innovation Policies. Session 3: Evaluation of demand-side innovation policies – Paris, September 15; the concepts elaborated here strongly relate to the four functions of strategic intelligence identified in Edler et Al. (2012) and which are 1) definition, 2) conceptualization, 3) impact, and 4) formation.

¹¹⁶ Lindblom and Cohen (1979) also referred to the argumentative as well as to the “*enlightenment*” function that links to Weiss’ well-known reference to the role of knowledge in policy-making.

¹¹⁷ Knut Koschatzky (2009), “*The uncertainty in regional innovation policy: some rationales and tools for learning in policy making*”, Working Papers firms and Region No. R6/2009, Fraunhofer ISI.

These categories appear to be useful as they include a broad set of Strategic Intelligence generation and diffusion tools, but should be refined in order to make clear Strategic Intelligence contours. On the basis of these operational approaches to Strategic Intelligence, it is possible to distinguish between different potential components as the following blocks and tools suggest. A fundamental definitional aspect for this thesis will be the nature of Strategic Intelligence initiatives, which have to be decided upon by public authorities¹¹⁸. Following the lines established by Kuhlmann (2003), one can understand Strategic Intelligence as a combination of different practices embodied by approaches. It was therefore possible to identify different approaches, and cluster them under the following headings (categories) to which they belong as potentially constituting a Strategic Intelligence Instrument:

Assessment of the existing situation - Backward-looking

- ▶ Policy
 - Mid-term and ex-post evaluations
 - Monitoring studies and devices
 - Audits
- ▶ Policy Environment (innovation system and its context)
 - Monographs and best practice reports
 - Socio-economic studies (segmentation and value chain analyses, etc.)
 - Scoreboards
 - Comparative studies

Horizontal Strategic Intelligence

- Benchmarking and interactive workshops (including best practice exchanges and peer reviews)
- Information devices and learning platforms (information networks [EU RTD evaluation network for instance] like innovation ambassadors, ERAWATCH, etc.)
- External knowledge management (reports collection, etc.)

Forward-looking (Policy/Policy Environment)

- Regulatory Impact Assessments (RIAs)
- Ex-ante evaluations (including impact assessments and cost-benefit analyses)
- Foresight studies and technology assessments
- Roadmaps and strategy design exercises
- Experimentations (with *in itinere* evaluation)
- Conceptual work (leading to the production of guidelines or reflection papers)

¹¹⁸ The focus is indeed here not to seek to understand the role of strategic information, but to understand how intelligence can constitute a policy instruments structuring social relationships and policy change processes transnationally.

These various approaches can mobilize conceptual and methodological frameworks (e.g. contribution analysis in the case of evaluation, etc.) as well as methods (quantitative and qualitative techniques) of enquiry while following particular processes (expert processes, inclusive and participative processes, etc.).

One can thus establish a direct connection with the concepts of “*technical*” and “*social*” components of an instrument according to Lascousmes and Le Galès’ definition, and the assumption that **particular technical features of Strategic Intelligence (methods and techniques) might impact policy learning**. In practice, most of the Strategic Intelligence initiatives are **launched with mixed objectives and are not often ordered in a rational fashion** (evaluations mainly cover the understanding of existing state of affairs while providing forward looking analytical recommendations) **or can be combined** (see Kuhlmann, 2003). Therefore, **Strategic Intelligence cannot be expected to be organised on the basis of a well-defined strategy**.

It is also to be understood that the Strategic Intelligence Instrument includes approaches as well as related devices (for instance, what Kuhlmann et Al. [1999] point as being “*Distributed Intelligence*” devices¹¹⁹). Strategic Intelligence approaches commissioned by public authorities usually address issues (what could be normatively called “*needs*”) and follow strategic objectives and publicly defined implementation modalities. Launching and using Strategic Intelligence initiated by public authorities implies rules (public procurement laws, privacy regulation, etc.) and gets along with normative interests. Other forms of Strategic Intelligence initiated by private or semi-public actors is constrained by the fact it is made public. The perspective adopted in this thesis being instrumental, it is to be underlined that knowledge organisations (evaluation units, etc.) or external advisors (consultancies, experts, etc.) are not considered as part of the Strategic Intelligence instrument as such, but as operators intervening in its process (decision, implementation, assessment). Strategic Intelligence mobilises a wide set of actors, from consulting firms to research institutes and dedicated administrative units (Kuhlmann, 2003) but also stakeholder organisations which are fully part of the innovation system.

¹¹⁹ Also identified as “*infrastructures*” potentially arranged through “*architecture*”.

Box 5: SII (Strategic Intelligence Instrument) contours

Following Lascousmes and Le Galès (2004), SII can be defined as an instrument involving the following “soft” and “hard” components. Inspired by this deconstruction grid, the following building blocks were defined in order to approach the whole object of Strategic Intelligence:

- ▶ **Social components**
- ▶ **Objectives**
- ▶ **Rationale**
- ▶ **Governance/setting**
- ▶ **Rules** (obligation to evaluate or make impact assessment, etc)
- ▶ **Technical components**
 - Assessment
 - Horizontal
 - Forward-looking
 - Process
 - Approaches and methods
- ▶ **Content**
- ▶ **Inputs and Outputs**
- ▶ **Impacts**

Learning through Strategic Intelligence implies knowledge creation, integration/absorption and further utilisation (for decision of non-decision). It is expected that the Strategic Intelligence instrument has structuring effects on policy and the innovation system in which it is operated. It is also expected to be embedded in various communities and (sub-)systems. Strategic Intelligence can thus be considered as a possible vehicle of policy learning, or channel. Should the Advocacy Coalition Framework (Sabatier, 1988) be followed, this thesis would consider Strategic Intelligence exercises as more or less open “forums” where coalitions (beliefs systems) can enter in confrontation and debate under professional rules. But Sabatier (1988) already recognized the limitations of his Advocacy Coalition Framework in terms of explaining the diffusion of ideas concerning causal relations and policy instruments. Another perspective will be adopted here: **This dissertation argues that Strategic Intelligence enables and facilitates policy learning. Strategic Intelligence can be considered as a governance instrument, with different forms of application. This instrument is part of broader strategic interplays and holds its own repositories, paradigms, beliefs, values, visions, concepts, theories, techniques and tools. This instrument produces interactions between individuals, groups, institutions, and produces effects through the circulation of models.** The instrumental perspective sheds light on interactions that are sources of policy changes. The instrument is a platform, a ground for empirical analysis of causal elements leading to policy changes.

3.6 Conclusion

This second part of the literature review (Section 3/) isolated a key source of knowledge for policy making: Strategic Intelligence. Falling under the category of Procedural Instrument, Strategic Intelligence was further conceptualised, starting first with a definition (*Strategic Intelligence refers to a formalized way of producing, transmitting and using knowledge, characterized by normative objectives (and thus excluding fundamental research or learning by doing) and being driven by normative principles such as the one of usefulness.*) and second being decomposed in a number of soft and technical components.

After a quick introduction of the importance of the interactions between knowledge and power and a review of “*utilisation*” categories, this second section of the literature review led to a more precise definition of Strategic Intelligence distinguished from other knowledge sources such as policy analysis or espionage. The use of the concept of “*policy instrument*” and more specifically “*procedural instrument*” was then at the core of this part of this second half of the literature review and allowed deconstructing Strategic Intelligence with a distinction made between key technical and non-technical features.

In order to frame this thesis, the **main research question and related lead sub-research questions** were decomposed in order to form an interrogative framework to guide the practical implementation of the research. Each of the following questions resulted from the claims made in the literature review. These questions were organized in two blocks corresponding to the two key research sub-questions. The distinction was made so as to be research-friendly and therefore a decision was taken to distinguish between cross-temporal and Transnational Policy learning (see Figure 12) although both can be considered as embedded by nature. This distinction between the two blocks of questions was undertaken as to better distinguish between two types of questions that should illustrate the possible dimensions according which policy learning through Strategic Intelligence could take place in practice.

Figure 12: Synthesis of the RQs - Strategic Intelligence as a vector of cross-temporal and transnational policy learning

The following table (Table 3) illustrates where in the literature review these research questions are grounded. This table is non-exhaustive and simply illustrates the articulation between policy learning and strategic intelligence chapters by providing examples of findings from the literature review that led to the development of these research questions. This selection of findings from the literature review should be connected to the research [claims](#) listed in Annex 3 and also derived from the literature.

Table 3: Highlighting the links between the literature review and the research questions

Item	Research (sub-)Question	What was the ground provided by the literature ...	
		On policy learning	On Strategic Intelligence
MRQ	How does Strategic Intelligence enable and/or facilitate cross-temporal and transnational policy learning?	Supporting evidence and further conceptualisation of cross-temporal learning should be developed and in particular regarding the drivers of cross-temporal policy change through learning (Section 2.2).	Scholars and practitioners see Strategic Intelligence as a key source of policy knowledge. Strategic Intelligence is however not neutral and can be considered as an instrument that impacts policy (Sections 0 and 3.4).
RQ1	How do soft and hard features of strategic intelligence enable cross-temporal policy learning?	Knowledge is a key component of policy learning. Among the sources of knowledge, Strategic Intelligence seems to be neglected (Section 2.4.4).	Deconstructed according to its instrumental soft and hard features, Strategic Intelligence can also be seen at different levels (rationale, tools, etc.). What is the dimension of Strategic Intelligence that enables and/or fosters policy learning (Section 3.4)?
1.1	What has been the role of strategic intelligence among the drivers of policy change over time?	Most explanatory frameworks consider policy change from a cross-temporal perspective. The learning dimension should better be addressed in this context (Section 0).	Knowledge and evaluation utilisation streams of literature consider Strategic Intelligence as a learning tool feeding back to the policy cycle (Section 3.2.3).
1.2	What type of learning occurred that was enabled/facilitated by Strategic Intelligence?	Particular forms of policy learning show different types of learning that can be associated to abstraction levels (Section 2.4.2).	Are the types of learning to be linked to the soft and hard components of Strategic Intelligence and if yes then how (Section 3.5)?

Item	Research (sub-)Question	What was the ground provided by the literature ...	
		On policy learning	On Strategic Intelligence
1.3	<i>Do specific features of strategic intelligence lead to particular types of policy learning in functional terms (structuration; policy repository; channelling)?</i>		Strategic Intelligence can be associated to different functions and in particular uses. How to link its components to such functions in a learning context (Sections 3.2.3 and 3.5)?
RQ2	How does Strategic Intelligence trigger or support transnational policy learning?	The role of Strategic Intelligence in Transnational Policy learning is to be further explored (Section 2.4.4).	Strategic Intelligence is assumed to support learning but requires further conceptualisation to better understand how it fosters cross-temporal and Transnational Policy learning (Section 3.3).
2.1	<i>What are the policy changes that are due to foreign experience vehicled by strategic intelligence?</i>	Policy change is also driven by exogenous factors that were mainly studied in the fields of policy diffusion, transfer and convergence studies; the interdependency between policy sub-systems should not be undermined (Section 2.3).	The instrumentation concept complemented by utilisation notions developed in the knowledge and evaluation utilisation literatures would be useful to better apprehend the uptake of Strategic Intelligence as a vector of policy making (Section 0).

Item	Research (sub-)Question	What was the ground provided by the literature ...	
		On policy learning	On Strategic Intelligence
2.2	<i>What are the 'pull and push', 'active and passive' dynamics observed in practice (eg instrumentation/utilization and policy-learning-entrepreneurship)?</i>	Policy dynamics were explored by the literature; among the existing streams, the “ <i>policy entrepreneurship</i> ” literature shows great potential to understand the role of individuals as active agents of policy learning and diffusion. Policy Learning Entrepreneurship but also Readiness could potentially be developed in that respect (Section 2.4.3).	
2.3	<i>To what extent does Strategic Intelligence allow the circulation of policy?</i>	In different occasions Strategic Intelligence proved to be involved in the circulation of ideas and practices, for instance through organisational learning; but its role remains to be further explored (Sections 2.4.2 and 2.4.4).	Strategic Intelligence considered as a procedural instrument is understood to have “ <i>impacts</i> ” on policy, with the possibility of diffused spill-overs (Section 3.4.2).

4/ Defining the scope of the research

4.1 Introduction and argument of this thesis

“Knowledge is a source of influencing those with power (...) If prescription is accompanied by evidence that a similar measure has brought satisfaction elsewhere, then promoters of a new program gain greater credibility (...) Expert opinion about what is technically possible is a third influence on lesson-drawing (...) If there is a positive consensus among experts about how a program will operate, this will reassure a policymaker who approves its goals.”

(Rose, 1993)

My research looks at how Strategic Intelligence fosters and/or enables policy learning. The **main argument of this thesis is that Strategic Intelligence is a vector of cross-temporal and transnational policy learning**. The following chapters examine how and why specific characteristics of Strategic Intelligence might lead to certain types of policy learning. The perspective adopted is instrumental: considering Strategic Intelligence as a procedural instrument, it is shown how specific soft and hard features can influence policy change and be channels for cross-temporal and transnational influences to take place. Strategic Intelligence may have some specific characteristics that open windows of opportunity for learning and further policy change.

The first two sections of the literature review spotted key **knowledge gaps** that leave room for new developments in the field of policy learning. Strategic Intelligence in particular seems to be under-studied and its role should be further investigated. The reviewed literature also acknowledged a number of **conceptual building blocks** that can be helpful to understand Strategic Intelligence. This **third** section of the literature review should provide the link between the theoretical blocks (research claims, research questions, and conceptual building blocks to address the targeted knowledge gaps) and the conceptual and methodological approaches. This “*scoping*” section is a first step towards the operationalisation of the research. It relies on the formalisation of the case unit definition.

Box 6: Scoping through a review of the literature

This scoping section could have been the introductory chapter of the following section dealing with the approach and methods adopted for this research. It was however decided to include it in the literature review because it is extensively based on the literature (whether academic or from the field of practice).

The initial rationale of this research is that policy makers look for innovative challenge-oriented policy models and can most likely learn from Strategic Intelligence. This section draws on existing academic and non-academic material to bridge this search for new models and the necessary case unit to be defined in the context of this thesis. Therefore, the review of relevant material will lead to consider the rise of demand-side innovation (4.2), in order to consider the growing attention paid to Pre-Commercial Procurement practices (4.3) and finally identify a concrete case, the Small Business Innovation Research Program (SBIR, see 4.4).

During the research that led to this dissertation, a specific policy model was emphasized as a research benchmark. The relationship between Strategic Intelligence and this policy model in different countries and situations constituted the main pillar of this research. The role of Strategic Intelligence was analysed through the **Small Business Innovation Research Program (SBIR)** launched for the first time in the course of the 1980s in the United States and that inspired many countries all around the world. This dissertation will therefore emphasize this specific model in different national contexts in order to understand how Strategic Intelligence has been a learning and diffusion channel (fostering both cross-temporal and transnational policy learning) for this model.

The selection of the SBIR as a case did of course not come out of the blue and resulted from a comprehensive reflection on contemporary developments in the field of innovation policy making. The following sub-sections introduce this perspective by getting back to the demand-side of innovation (which gained in importance over the past decades) in order to eventually focus on Pre-Commercial Procurement as a form of demand-oriented instruments and its main illustration: the SBIR.

4.2 Eye on: the demand side of innovation policy

In order to **introduce the SBIR Program** it is necessary to get back to recent developments in innovation policy studies and in particular the demand-side of innovation policy.

The analytical understanding of innovation has been progressively shifting towards system-based approaches, observed by Kuhlmann et Al. (2010) through the image of a dance that associates innovation practice, policy and theory. In that context, the role and relationships between the private and public sectors, research sphere and civil society have been evolving towards new patterns.

Boekholt (2010) linked this “*systemic shift*” towards an increasing attention paid to demand-led policies. Though innovation policies have typically been supply-oriented, the systemic understanding of innovation led researchers to emphasize more the demand side and the literature on innovation policy instruments evolved in a similar way. Contributing to the illustration of this “*rise of the demand side*”, Edler and Georghiou (2007) established a taxonomy of innovation policy tools viewed from a supply versus demand-side perspective.

Figure 13: Taxonomy of innovation policy tools

Source: Edler and Georghiou, 2007

The reasons and needs that are usually pointed out as a justification for demand-side policy making can be diverse. Edler (2012) refers to:

- ▶ High entry costs that are usually faced at the beginning of the market cycles
- ▶ Lack of information and awareness of potential users and customers
- ▶ Learning and adjustment costs arising when a product or service is new and –for instance– requires adjustments with other products or services (though later users face smaller costs to adapt)
- ▶ Lock-in effects and path dependencies, referring to when customers are “*locked in*” classical technological trajectories
- ▶ Lack of network effects that make the market entry less attractive for certain products
- ▶ The “*insufficient transformation of needs into market demands*” and mainly 1) A lack of adequate interactions between demanders and suppliers, as well as 2) the existence of a “promising market”.

The demand side of innovation became an increasingly important focus of OECD countries' policies to support innovation in a more systemic way (see for instance the case of Sweden presented by Edquist, 2009). By demand, one should understand the “pulling side” of the economic spectrum and refer in that respect to the definition shared by the OECD (2011): “demand is [thus] the force that directs resources and capabilities for innovation in a certain direction to meet societal or market needs”. Edler (2013) also refers to the demand side of innovation as “the ability and willingness of potential buyers to ask for, to adopt and to use innovations”. In a sense, demand would refer to the existence of a (potential) market opportunity. Therefore, demand-side measures would be about bridging supply and demand with particular attention to finding or opening market potential.

This trend has mainly be characterized by an increasing use of policy tools responsive to or triggering innovation (Stern et Al., 2011) such as standards, regulations, user-led initiatives, procurement, lead market initiatives, etc. across developed but also developing countries. This paradigmatic change was mainly associated to a broader view on the innovation process and its underlying feedback loops. This illustrates a new trend, moving the look from purely R&D and supply-centred initiatives towards some more innovative actions oriented by the demand side of innovation.

Another trend associated with this evolution has been the one of orienting innovation towards fixing issues associated with “*areas of strong societal demand*” such as health, etc. Though their use remains limited compared to supply-side measures, demand-oriented policy actions are growing and imply changes in governance and policy-mix setting (OECD, 2011¹²⁰). They can be defined according to Edler (2013) who defines “*demand side innovation policy as all public action to induce innovation and/or speed up the diffusion of innovation through increasing the demand for innovation, defining new functional requirements for products and services and/or improving user involvement in innovation production (user-driven innovation)*”.

The demand side can be considered both from private and public demand perspectives, underlying the potential natures of demand (depending on whether social demand emanates from the private or public sector). It is to be noticed that these two types of demand are not exclusive (an innovation adopted by the public sector can be spread to the private sector and the other way around; also technology adoption and diffusion can be mixed, taking place in both public and private sectors). In both cases, it was acknowledged since the development of some more systemic approaches to innovation processes that demand is important to understand the development and diffusion of innovations (Edquist, 2009; Edler, 2013).

¹²⁰ OECD (2011), “*Demand-side Innovation Policies*”, OECD Publishing.

Figure 14: Distinguishing between public and private demand dynamics

Source: the author, 2014

Note: the position of the author is that social demand can be expressed through public and/or private demand, but could also be expressed through other factors when non-economic or not going through (public/private) markets.

In both the academic and policy practitioners' spheres, a high interest in demand can be observed as it is seen as a key driver of innovation (in a sense covering **commercialisation** and deployment). The so-called "*Valley of Death*"¹²¹ as well as the "*European Paradox*"¹²² are examples of notions that emphasize gaps between R&D performances of countries as compared to the effectiveness of their returns, leading to further reflections on how to bridge the gap between earlier stages of the Technology Readiness (TRL)¹²³ Scale and the commercialisation stage of a developed product. The driving force of demand for innovation diffusion (including technology deployment) has especially been underlined by the Innovation Systems approach developed by Lundvall (2004) and considered as the new mainstream by innovation policy analysts. Demand-based policies would in that regard aim at "*creating incentives for innovation by overcoming system failures; targeting innovations towards societal goals and policy needs [...] and promoting business development in a particular region/nation by exploiting lead market potential*" (Edler et Al., 2012). Edler (2013) considers three pillars for demand-based policy which are the reaction to market and system failures associated to the demand side, the response to societal needs, and support to the supply side.

¹²¹ For one among many other references, please see http://ec.europa.eu/environment/enveco/innovation_technology/pdf/bridging_valley_report.pdf.

¹²² For one among many other references, please see http://europa.eu/documents/comm/green_papers/pdf/com95_688_en.pdf.

¹²³ Mainly developed by the NASA during the 1960s, this scale is described here: http://esto.nasa.gov/files/trl_definitions.pdf.

Table 4: Key features of demand-side policy instruments

Table 1.1. Key features of demand-side policy instruments

Demand-side policy	Procurement	Regulation	Standards
Objective	New product or service	Market uptake, increased competition, social goals	Market uptake, interoperability, transparency
Input	Money, performance requirements, Skills	Legal process, need to co-ordinate	Standards agencies, need to co-ordinate
Participatory incentive	Sales, Preferential treatment (e.g. SMEs)	Mandatory	Voluntary
Main player	Government	Government	Industry
Effects on success	Improved public services and stimulation of innovation	Reducing market risk	Reduce market risk
Possible risks	Insufficient skills in the public sector, idiosyncratic demand	Conflicting goals, lengths of the process	Technology lock-in

Source: OECD, based on Aschhoff and Sofka (2008).

Source: OECD, 2011

Demand-side measures are developing today with as a core idea to address societal issues and challenges: *“the basic idea is that demand can trigger and accelerate the production and diffusion of innovation and with it the production of scientific knowledge upstream and the creation of new, forward looking markets downstream”* (Edler, 2013). Demand has an important influence on product development and diffusion as new markets and requirements emanating from demand in broader terms define new paths for those products.

Edler and Georghiou (2007) distinguished between four main categories of demand-oriented instruments: regulation, public procurement, initiatives supporting private demand, and systemic instruments. They distinguished between different types of policy tools applied to the field of innovation as illustrated by the taxonomy below. They add to these main categories with examples such as training or awareness mechanisms (Edler et Al., 2012). They made a clear distinction between private demand stimulation and public demand (mainly considered through public procurement of innovative products and services). Edler (2013) referred then to main types of demand-side measures that are the following:

1. Public demand: state buys for own use and/or to catalyse private market
 - This category covers general procurement, strategic procurement as well as co-operative and catalytic procurement
2. Support for private demand
 - Two categories are distinguished here: 1) Direct support for private demand (demand subsidies and tax incentives) and 2) Indirect support for private demand: information and enabling (soft steering): State mobilises, informs, connects (awareness building measures, labels or information campaigns, training and further education, articulation and foresight, as well as user-producer interaction)
3. Systemic approaches
 - The measures covered by this cluster are integrated demand measures and the integration of demand- and supply-side logic and measures

The reader will have clearly understood that over the past decade, demand-side measures attracted quite some growing interest from innovation research communities (Rigby, 2013); this is especially the case when considering the first block described above (public demand). Academic researchers as well as policy makers showed a clear and growing interest in public procurement¹²⁴ as a way to foster innovation as can be observed through the increasing number of academic publications and policy papers on the topic¹²⁵ (see Lember et Al., 2014). This trend is associated to some optimism regarding the leverage power of public markets to play a role in that field (Uyarra, 2013).

4.3 Innovation-oriented procurement: from PPI to PCP

The contemporary form of **procurement for innovation** mainly reaches back to the post-WWII years and the driving force of American procurement for Defence-related issues. A more recent evolution would find its roots in the fact that these procurement initiatives now identify innovation impacts as a first-range objective: innovation came to the core of these initiatives as a key focus instead of a “*spill-over*” (Lember et Al., 2014). Initially, public procurement issues were essentially dealt with from a cost-efficiency perspective (Rolfstam, 2009 and 2012). This vision evolved and was in particular enlarged in Europe where scholars noticed a long-standing history of the use of public procurement for innovation purposes (Technopolis, 2011).

¹²⁴ It is interesting to note that procurement has also long been considered as a high-potential tool in other policy fields such as in environmental policy (Marron, 1997).

¹²⁵ While Edquist (2009) notes that “*the actual use of demand-side innovation policy instruments has decreased since 1990*”.

Following the lines established by the Communication *“Investing in research: an action plan for Europe”* (2003)¹²⁶, the so-called Aho Report (2006)¹²⁷ recommended making use of public procurement to drive innovation and enhance public services in Europe. Such an approach to innovation policy is called *“innovative public procurement”*, or Public Procurement of Innovation (PPI). Until a decade ago, such a kind of practice was usually called *“public technology procurement”* (Equist, 2009). The vocabulary evolved in order to include the broader notion of innovation. Innovation-oriented procurement initiatives have also been promoted more recently by the OECD who launched new initiatives focused on demand-side innovation and demand-oriented innovation policy (and which started in 2008)¹²⁸.

Public procurement markets are estimated to represent an important amount of GDP: in Europe for instance this share was estimated to 16% or 17% (see Rolfstam, 2009 and Rolfstam, 2012) up to 19% (see European Commission¹²⁹). Therefore, these markets represent a significant purchasing power (Rolfstam, 2009). It is thus understandable that innovation-oriented procurement is today being increasingly used by governments in order to play a leveraging role thanks to government’s market/purchasing power (Valovirta, 2012) and to potentially offer market entrance windows to emerging technologies (Hommen and Rolfstam, 2009). Public Procurement can also help with developing capacity (for instance when R&D activities are targeted by the procurement process). In that sense, public procurement is considered as covering a large amount of funding that could drive innovation which could then be diffused to private markets. Edler et Al. (2011) also consider that innovation-oriented procurement can to some extent stimulate private demand and exports. Public procurement is seen as a way to minimize risks through public instead of private markets (reducing entrance costs or awareness problems for instance¹³⁰) but also a way to achieve societal goals (Edler et Al., 2012).

In broad terms, procurement as an instrument at the service of innovation can be described as grouping the following possible features (see Table 5):

¹²⁶ This Communication from the European Commission clearly identified public procurement as a potential leverage tool for innovation; see <http://ec.europa.eu/invest-in-research/pdf/226/en.pdf>.

¹²⁷ Report entitled *“Creating an Innovative Europe. Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit and chaired by Mr. Esko Aho”*, 2006.

¹²⁸ See the reference made by Uyarra (2013).

¹²⁹ Reference available on the following web page:
http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index_en.htm.

¹³⁰ Reference: Lember et Al., 2014.

Table 5: Procurement types and possible effects of public sector interventions on innovation

Table 1.3. Procurement types and possible effects of public sector interventions on innovation

	Role of the public sector	Main motivation of procurement or award	Potential innovation type	Innovation-related risks on the supply side	Geography of procurement
Efficient procurement	Large efficiency-driven user	Best value for money	Incremental	Overdependence on public markets, risk of obsolescence	Centralised specifications (standard)
Adapted procurement	Niche user	The best adapted solution	Market niche	Market uncertainty	Regional specifications, regional procurement
Technological procurement	Large (sophisticated) customer	The best available solution	Architectural	Insufficiently reliable demand to justify investment	Centralised specifications, national procurement
Experimental procurement	Experimental (lead) user	The most innovative solution	Radical	Market uncertainty, difficult user-producer communication, insufficient incentives (e.g. IP protection)	Regional specifications, national procurement

Source: OECD, adapted from Uyarra and Flanagan (2010).

Source: OECD, 2011

PPI is considered as a key demand-oriented instrument. Public procurement is when a public agency purchases goods or services from an outside entity (Rolfstam, 2013). Through their purchases, public authorities can support the development of new products and services, but also act as testing-ground or provide lead markets for new technologies (Lember et Al., 2014). As a basic description, one could say that PPI is about a public organisation buying a product (good or service) of an innovative nature. Edquist et Al. (2000) defined Public technology procurement (PTP) as occurring “*when a public agency places an order for a product or system which does not exist at the time, but which could (probably) be developed within a reasonable period. Additional or new technological development work is required to fulfil the demands of the buyer*”. The language evolved and several types of innovative procurement types could be identified: Rolfstam (2013)¹³¹ noticed variations in the terms used and their definition. Among these terms one can find “*‘public procurement of innovation’, ‘innovation procurement’, ‘public technology procurement’, ‘innovative procurement’, and ‘pre-commercial procurement’*” (Rolfstam, 2013).

¹³¹ Max Rolfstam (2013), “*Public Procurement and Innovation – The Role of Institutions*”, Edward Elgar Publishing Limited.

The rationale for such an instrument appears to be twofold: public procurement of innovation aims to 1) satisfy human needs, and/or 2) solve societal problems (Edquist and Zabala-Iturriagoitia, 2012). Public procurement for innovation is considered as “mission-oriented” (Edquist, 2009) and can either be general or strategic (Edler, 2013); the former option refers to the use of innovation-oriented clauses in procurement tenders, whereas the latter implies that innovation is explicitly made a strategic objective of the procurement activity. At the public authority level, missions are determined by the needs and challenges to be addressed. Edquist and Zabala-Iturriagoitia (2012) identified two main categories of PPI function of the user of the product developed:

- ▶ Direct PPI refers to the situation in which the public authority is the direct user of the product developed through the process
- ▶ Catalytic PPI implies that the public authority buying the product is not the end user, but serves as a catalyst for outside needs to be addressed

Another distinction is made by the authors between three types of PPI function of the type of “character of the innovation” targeted by the procurement activity:

- ▶ Pre-Commercial Procurement (PCP) “refers to the procurement of (expected) research results and is a matter of direct public R&D investments, but no actual product development. Moreover, it does not involve the purchase of a (non-existing) product, and no buyer of such a product is therefore involved”;
- ▶ Adaptive PPI “is when the product or system procured is incremental and new only to the country (or region) of procurement”;
- ▶ Developmental PPI targets radical innovations which have to be “new to the world”.

Although many confusions are made between both instruments, a key **distinction is however to be made between PPI and PCP**. As illustrated in the taxonomy above, however, Lember et Al. (2014) would mainly point to the differences between two models in the sense of “innovation-oriented procurement as technology policy” versus “innovation-oriented procurement as R&D policy”¹³². Rigby (2013) distinguishes PPI and PCP as PPI implies buying innovative products while PCP would refer to a form of support to the process conducting to innovative products that can be taken up by the authority or other actors. The procurement process here does not target an existing product but emphasizing the development of a new product (or process) that would later be adopted and used in a wider context. “PCP is not the purchase of innovation” (Rigby, 2013) as it would be with PPI.

¹³² The authors also refer to the existence of two additional models which are the “generic innovation-oriented public procurement policy” as well as “public procurement for innovation as ‘no policy’ policy”.

The distinction between PCP and other forms of procurement is supported by Edler et Al. (2013) who explained indeed that PCP “*schemes are a combination of supply side (support for the innovation generator) and demand side (grants built on a clear definition of a public need with some intent to subsequently purchase the innovation) mechanisms*”¹³³. Table 6 emphasizes some conceptual and practical differences between PPI and PCP.

Table 6: Comparing PCP to public procurement policies

Report Title and Instruments	Overall orientation		Goals						
	Supply	Demand	Increase R&D spent	Increase non-financial capabilities		Systemic capabilities, complementarities	Enhance demand for innovation	Framework	Discourse
				Skills	Access expertise				
Public Procurement Policies		●●●	●●○				●●●		
Pre-Commercial Procurement	●○○	●●●	●●○				●●●		

Source: adapted from Rigby, 2013

The diversity of possible forms of innovation-oriented procurement schemes and their impacts remains (Uyarra and Flanagan, forthcoming). The goals of such tools when focused on innovation go from market diffusion support to addressing societal challenges. Moreover, their implementation modalities might vary as well from a country to another depending on the existing legal and socio-economic frameworks: in Europe for instance, public procurement functioning is ruled by the European Procurement Directives¹³⁴ that can vary from a sector to another and frame the conditions for public procurement to be used for innovation. Therefore, no single model for innovation-oriented procurement can be found though some recurrent features can be observed.

4.4 The scope of this thesis: the SBIR model and its transfer

4.4.1 The Small Business Innovation Research Program, a PCP “best practice”?

Public procurement has also been targeted as a way to foster innovation in SMEs that remains underused (References include among others the following: “*Insufficient use of public procurement to foster innovation in SMEs*”, Technopolis Group, 2011¹³⁵ and 2011a;

¹³³ The authors add that “*these programmes, largely based on US models, generate positive short-run innovation and economic effects for participating firms*” (Edler et Al., 2013).

¹³⁴ See http://ec.europa.eu/internal_market/publicprocurement/index_en.htm.

¹³⁵ It is here highlighted that in Europe, “*weight is reflected in the often-cited fact that public procurement accounts ca. 17% of the EU’s GDP corresponding to more than €2000b*”. In that report, two SBIR-like initiatives implemented in United Kingdom and Netherlands are identified as good practices.

“Demand-side Innovation Policies”, OECD Directorate for Science, Technology and Industry, 2011¹³⁶). A specific attention is paid to SME innovation support, as *“helping SME participation would thus favour greater competition and would make the formation of cartels more unlikely”* (Uyarra, 2013). PCP in that regard is viewed as a way for SMEs to overcome existing market barriers and many countries designed PCP schemes with a mission-oriented rationale.

The policy model that attracted my attention during the exploratory phase of this research is here to be introduced. It is considered as the main form of PCP and was copied in many countries around the globe. It was important that the selected case would allow analyses of both cross-temporal and transnational policy learning. The so-called “SBIR” fitted such condition: the **American Small Business Innovation Research Program (SBIR)**¹³⁷ model has very often been identified as a best practice in the field of demand-oriented innovation measures¹³⁸. Charles Wessner, Director of the Program on Technology, Innovation, and Entrepreneurship at the American National Academies of Science and leading expert of the SBIR, referred to this programme as *“one of the most innovative, effective, and adaptive programs for small business the world has ever seen”* (Hearing entitled “Reauthorization of the SBIR and STTR programs, Small Business Committee SR-428A).

Box 7: Note on the SBIR model and the definition of PCP

It is interesting to consider the implication that the type of instrument used by public authorities might have on innovation outputs and outcomes: *“From a policy perspective, industrial and sector dynamics can have implications for demand-side innovation policies. Nemet (2009), for instance, argues that demand-oriented innovation policy can be more effective in stimulating incremental innovation than radical disruptive innovation. Also, Malerba’s and Pavitt’s differentiation of innovation patterns across different industries calls for governments to adopt different policy approaches towards different sectors”* (Source: OECD, 2011).

However, the SBIR Program was based on a demand-oriented model, though it initially aimed at supporting radical innovation. In that regard, the 2011 Technopolis report on *“Trends and Challenges in Demand-Side Innovation Policies in Europe”* states that PCP is a specific type of instrument in the sense that it relates to the R&D part of the innovation process. Therefore, it influences both demand and supply sides of the innovation value chain.

¹³⁶ The 2011 OECD report on demand-side innovation policies states that *“demand-side innovation policy measures, with the exception of procurement by small and medium-sized enterprises (SMEs), are often still at a pilot stage”*.

¹³⁷ See <http://www.sbir.gov/>.

¹³⁸ For an example, see http://ec.europa.eu/enterprise/sectors/ict/files/kets/ex_of_practice_ket_final_report_en.pdf.

Also, the report concludes that in Europe, *“the focus of demand-side innovation policy instruments is primarily and predominantly on public procurement and more recently on pre-commercial public procurement”*.

This brings us to a final clarification on the definition of the **PCP category to which the SBIR Program belongs**. Though the OECD (2012) qualified the SBIR as an *“essentially supply-side instrument”*, a mixed of components can be found in its rationale. This is also illustrated by Rigby (2013) who defines pre-commercial public procurement (PCP) as *“the family of approaches in which there is public procurement of R&D services with other special conditions applying as to ownership of the results and payments”* and involving *“the purchase of research by a contracting authority which the contracting authority undertakes with the objective of stimulating innovation that the contracting authority or some other party may benefit from at a later stage when goods that currently available are developed from the outcomes of the research. PCP does not involve the procurement of goods that currently exist which is why the approach has been viewed by some researchers as not belonging per definitionem to the family of demand side policies”*. Rigby (2013) explained that *“Pre-commercial procurement is a generic form of procurement of which the most well-known example is that of the US SBIR”* which can be considered as a *“top-down”* form of PCP. Referring to Block and Keller (2011), Lember et Al. (2014) state that the SBIR *“has been regarded as one of the most successful economic development policy tools of the US”*. *“Scaled down versions”* of SBIR were implemented in several EU countries (Treumer and Uyarra, 2013¹³⁹).

Considered under the *“innovative procurement”* (and most specifically pre-commercial procurement; see for instance Koldzin, 2011) category, **the SBIR Program is in fact a mix of instruments** such as financial support (subsidies), technical assistance, and eventually the possibility of innovative procurement (but only to a certain extent). Figure 15 depicts the SBIR process and already highlights the diversity of support tools involved. According to Edquist (2009), *“procurement means simply that the public organization buys a good or a service (or a combination of the two, which might be called a system)”*. This is therefore why the SBIR could be called a hybrid programme combining different forms of innovation support (both from a ‘demand’ and ‘supply’ sides) rather than a pure form of PPI; in that sense, SBIR can be considered a PCP instrument (Rigby, 2013). Indeed, as highlighted by Edler (2013), *“PCP is not purely a demand side instrument, the support is for the generation of innovation directly, and there is no automatic purchase”* as there is no *“prior binding commitment to purchase the product subsequently should the R&D contract be successful”*. Referring to Rigby (2013), Edler et Al. (2013) point as PCP initiatives such as the SBIR, describing them as *“hybrid”* instruments between demand and supply without commitment to purchase.

¹³⁹ Steen Treumer and Elvira Uyarra (2013), *“Dialogue”* in Gustavo Piga and Steen Treumer (2013), *“The Applied Law and Economics of Public Procurement”*, Routledge.

The rationale of the programme originally relied upon the idea of financing highly risky research and development activities in order to promote radical innovation as well as entrepreneurship. One of the main objectives was to match federal needs in R&D through early stage support to small businesses (mainly supporting proof of concept and prototyping types of activities).

Figure 15: The SBIR program

Source: adapted from Wessner, 2013 ("Addressing the Innovation Imperative. How can we Support Innovative Ideas and Start-ups?" April 24, 2013).

4.4.2 The scope of the present thesis: focusing on the SBIR Transfer from the USA to the UK

Three **conditions** needed to be satisfied in order to select a field case and allow the practical implementation of this research (for more precise criteria see also the Sub-section 2.4 under the Approach and methods Section):

1. The programme or policy to be studied as field case should have been launched sufficiently long ago to see development or change in its design or practice.
2. The programme or policy to be studied as field case should be related to Strategic Intelligence.
3. The programme or policy to be studied as field case should have been transferred to another country.

This way, the relations between the three conceptual items could be studied in practice (Strategic Intelligence, Cross-Temporal and Transnational Policy Learning).

As Transnational Policy learning is seen as inherently cross-temporal, the search concentrated on cases that would show signs of transnational policy learning.

The initial SBIR model led to clear transfers from the United States where it was first launched by the end of the 1970s/early 1980s to other countries such as India or Russia. It was also the subject of Strategic Intelligence in the USA but also in many countries or at the level of supra-national organisations such as the European Commission or the Organisation for Economic Co-operation and Development (OECD). In Europe, an increasing interest in this programme led different countries to set up similar initiatives, leaving learning evidence along the way that was used as a selection factor for this programme as a core focus of this dissertation.

Table 7: Thinking the transferability of the SBIR model: practical example

<p>The list below is an extract from an exercise of “<i>Exchange of best policy practices</i>” to support the commercialisation of Key Enabling Technologies. Launched by the European Commission (DG ENTR) and externalized to an external research-based consultancy. This process mobilized representatives from all EU Member States (27 at that time) with as an aim to diffuse best practices and lessons from empirical research on the topic. Conditions of [SBIR] transferability were identified by the team of which I was a member:</p> <ul style="list-style-type: none">▶ <i>“Critical mass: the programme requires some minimum budget in order to fund relevant research and development activities</i>▶ <i>Willingness of the agencies to use the programme</i>▶ <i>Awareness: SMEs need to be aware of the programme and see the interest of their participation</i>▶ <i>Procurement authority: the implementing bodies must be procurement authorities</i>▶ <i>Implementation modalities can vary and be adapted depending on the country (implementation under each agency, presences of a central coordinating body, etc.)</i>▶ <i>Commitment of policy makers to a related systemic strategy is required for such an instrument”</i>

Source: <http://ec.europa.eu/DocsRoom/documents/4667/attachments/1/translations/en/renditions/native>

Evidence from exploratory interviews, as well as from various documentary sources, show clear intentions to learn or facilitate Transnational Policy learning in different ways. The SBIR Program in the USA has been the focus of a number of studies, mainly evaluative studies conducted in the United States. However, over the past decade a number of reports in other countries paid more and more attention to the US SBIR model, very often referring to this policy as a best practice: the American SBIR indeed corresponds to two features Identified by Rose (2005) as key for learning: “*too big or too good to ignore*” as well as showing “*attractive powers*”.

The United States have been the subject of many innovation policy analyses and benchmarking, and the perception of SBIR has clearly been one of “best” and innovative practice.

A growing repository of studies and policy briefs can be identified. Beyond the United States, traces of Transnational Policy learning can already be identified from basic sources. Similar models such as the British SBRI or the Swedish Forska & Vax were based on the SBIR model and came to reality through an interactive learning process.

The **UK SBRI** was clearly inspired from the US SBIR Program, as shown in the Erawatch report¹⁴⁰. The UK programme might constitute the clearer case of Transnational Policy learning from the USA to the UK, corroborated by many other sources, including intelligence instruments outputs. The 2010 NESTA report titled “*Buying Power? Is the Small Business Research Initiative for procuring R&D driving innovation in the UK?*” reported the following: “*Yet the original UK scheme was a pale imitation of the US SBIR. The scheme was hampered by limited public sector take up, and where SME contracts were awarded, researchers found that less than 1 per cent of them were for research and development. After successive calls for, and attempts at reform, a renewed UK SBRI was launched in April 2009 after a pilot in late 2008. The new SBRI finally resembles the American SBIR with a clear model process to help public sector bodies work with innovative SMEs and a strong focus on technological R&D. (...) The UK SBRI scheme is modelled on the successful American Small Business Innovation Research (SBIR) programme, operational in the US since the Reagan Administration. In this chapter, I explain the SBIR concept and describe the economic impacts of the US scheme. I clarify how the UK SBRI works; explaining what sets it apart from other R&D funding mechanisms, and how it differs from the United States SBIR*”.

Mandated by the CBR, David Connell, an independent expert, advertised his UK report entitled ““SECRETS” OF THE WORLD’S LARGEST SEED CAPITAL FUND: How the United States Government Uses its Small Business Innovation Research (SBIR) Programme and Procurement Budgets to Support Small Technology Firms” through different channels, including presentations (see following snapshots¹⁴¹, brought together in Figure 16). Many lessons were derived from his analysis of the US SBIR, both for UK and EU institutions.

¹⁴⁰ See

http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/gb/supportmeasure/support_mig_0036.

¹⁴¹ Sources from left to right: David Connell (2009), “THE UK SBIR CAMPAIGN: HISTORY, PROGRESS AND LESSONS FOR EU POLICY”, ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/pcp/20090616-david-connellv_en.pdf; and David Connell (2009), “CREATING AN EU SBIR PROGRAMME: LESSONS FROM THE UK AND PROPOSALS FOR EC ACTION” http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/files/connell_en.pdf.

Figure 16: Evidence acknowledging the role of Strategic Intelligence in policy learning in the UK

UK CAMPAIGN FOR A US-STYLE SBIR PROGRAMME

- UK "SBIR" launched 2001, but ineffective. "Innovative procurement" highlighted regularly in government policy papers
- Campaign launched in December 2004 with press coverage and 'White Paper'
- Informal 'supporters club'
- Meetings with Government Ministers, advisers and senior officials
- "Private Members Bill" (Anne Campbell MP in 2005) – carefully tailored to UK conditions

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Meetings with Government Ministers, advisers and senior officials

"Private Members Bill" (Anne Campbell MP in 2005) – carefully tailored to UK conditions

- RESULT:** Inclusion of 2.5% 'target' mandatory for all Government departments announced in annual Budget in March 2005 ("worth £100m per annum, guaranteed")

"SECRETS..." REPORT PUBLISHED JULY 2006

- BUT approach of "target and encouragement" led to no action and no competitions for 2 years
- Campaign continued: comprehensive analysis published of SBIR process and economic impact
- Second report, with comprehensive analysis of US SBIR, published; detailed design proposals for UK programme
- Second Private Members Bill and letter to Financial Times signed by 13 leading entrepreneurs, academics and VCs
- More meetings with Government Ministers, advisers and senior officials
- Wide support from trade associations etc

Other countries implemented equivalent programmes, as underlined by the OECD (see "*Public procurement programmes for small firms – SBIR-type programmes*"¹⁴²) or various evaluations conducted by the National Academy of Sciences (US)¹⁴³ or the Dutch Ministry of Economic Affairs, Agriculture and Innovation¹⁴⁴. Charles Wessner, well-known as being an expert of this program in the United States, identified several of these countries (see Figure 17).

¹⁴² On <http://www.oecd.org/innovation/policyplatform/48136807.pdf>.

¹⁴³ See http://www.nap.edu/openbook.php?record_id=11989&page=53.

¹⁴⁴ See <http://www.agentschapnl.nl/sites/default/files/bijlagen/SBIR%20brochure%20The%20power%20of%20public%20procurement.pdf>.

Figure 17: Evidence acknowledging the diffusion of SBIR world-wide

SBIR is Recognized Internationally as Best Practice

- Finland has adopted a 3-Phase SBIR Program
- Sweden & Russia have adopted an SBIR-Type program
- UK SIRI program is similar in concept; now being upgraded
- The Netherlands government has recently adopted SBIR, following a pilot program
- Japan, Korea, & Taiwan have adopted SBIR concept
- India has launched a SBIR Initiative for the biotechnology sector

Source: Charles Wessner,

http://www.unece.org/fileadmin/DAM/ceci/ppt_presentations/2008/fid/Charles%20Wessner.pdf

Transnational Policy learning clearly appears in those examples, where it is also visible that policy knowledge derived from Strategic Intelligence is made accessible and usable. A last example is given with the Swedish adaptation of SBIR depicted by the Swedish innovation agency (see Box 8).

Box 8: The example of Forska & Vax

Forska & Vax in Sweden was referred to as an example of SBIR-inspired programme¹⁴⁵. This programme has been pointed out by Charles Wessner as a “SBIR-like programme”¹⁴⁶. In the Global Forum for Health Research contribution to the Consultative Expert Working Group on R&D Financing (2011), The Swedish programme was included in the category of SBIR-like programmes and described as follows: “Forska & Vax (Research & Grow), administered by VINNOVA, Sweden’s innovation agency, supports product-related R&D-projects that “add a significant element of new knowledge” in firms with fewer than 250 employees. It begins with a 1-3 month needs analysis project that is fully funded for a maximum of €10,000. This is followed by a 3-6 month feasibility study fully funded at up to €50,000. For the final 6-18 months R&D project, VINNOVA provides a maximum of €500,000 per project, which is fully matched by the small firm. For 2009, the program has a budget of SEK 120 million (\$16 million USD). Forska & Vax has grown from an initial 1.1 M€ per year to 11 M€ for 2006 and 2007. Following a strong response from industry, VINNOVA aims to expand the program further. VINNOVA is seeking to increase the budget from current 12 M €per year, and is looking to introduce tax incentives for R&D to complement the program”¹⁴⁷.

In conclusion, the SBIR Program appeared to be a perfect case unit. Series of choices were still to be made regarding “how” to select the two main cases and how to approach them to draw valuable analyses and conclusions.

¹⁴⁵ See <http://preco.share2solve.org/main/files/2010/12/Haag-program-PCP-expert-meeting.pdf>.

¹⁴⁶ See “Venture Funding and the NIH SBIR Program” report on <http://www.nap.edu/catalog/12543.html>.

¹⁴⁷ Source: http://www.who.int/phi/news/phi_5_new_investmt_strat_SBIR_model_en.pdf.

3. Approach and methods

1/ General approach to this research

1.1 From theory to the research framework: setting up the stage

In addition to cross-temporal policy learning, one should note that Transnational Policy learning is a difficult concept. A first position adopted in the context of that research was the one of diffusion: it was voluntary and intended to select a programme (SBIR, see Chapter 2, Section 4.4.2) that would have some long-standing background, but that would also have diffused to other systems. The diffusion of a policy model to several countries and/or entities implies individual transfers. In the case of the SBIR, the transfers clearly belong to a form of transnational policy learning. First pieces of evidence allowed understand that Strategic Intelligence played a crucial role in the process of “*learning from abroad*” for different countries that have been approached during the exploratory part of the research. The adoption and implementation of both a domestic and a foreign policy or programme (inspired from abroad) by a State or any other government implies the intervention of internal and external factors driving policy change. The one that this thesis looks into is Strategic Intelligence.

Strategic Intelligence when considered as a procedural instrument covers different characteristics that can fall under two main categories (form and content, hardware/software) which have been further detailed by Lascousmes and Le Galès (2004) in their instrumental approach. When considering the transnational part of policy learning, it is assumed that Strategic Intelligence impacts policy change in the “*downloading*” institutional setting (whether national or other). But how? One key perspective remains of instrumental nature: knowledge uses/utilisation literature shows that the levels at which Strategic Intelligence can impact policy making vary in function of all the factors evoked so far.

The first question to be asked is the contribution of Strategic Intelligence to policy change. The Transnational Policy learning model, when seen through Strategic Intelligence, implies the following stages of reflection.

1. A policy model has been running for a certain period and was incorporated into an(other) institutional setting (region, country, etc.); what have been the main drivers of its adoption and change over time?
2. What types of “*learning from the past*” and “*learning from abroad*” situations are observed?
3. If Strategic Intelligence played a role in policy change, to what extent and how?
4. What is the contribution of Strategic Intelligence to policy learning (how did Strategic Intelligence enable and/or foster policy learning)?
 - Countries have different policy models: why and how do countries learn differently through Strategic Intelligence?

It is necessary to consider the policy in its entire life cycle (not limiting the analysis to policy adoption, but extend the scope to its implementation and further stages [re-design, re-orientation, end, etc.]). It is also important to take into account its process and output dimensions: Strategic Intelligence is a social process by which knowledge is generated in different forms and diffused through potentially different channels.

It is assumed here that Strategic Intelligence has three functions:

1. A structural function: as an institution (in sociological terms), shaping power relationships in a given social context/situation;
2. A policy repository function¹⁴⁸: as constituting the repository of knowledge and perceptions about (a) specific topic(s);
3. A channelling function: as bridging different policy systems so that learning takes place.

As any evolution should be observed in a certain time frame, an important aspect appears to be the dynamic nature of the processes under the scope; this should not be missed. In particular, the cumulative nature of knowledge should be taken into account together with the role of change agents.

1.2 Formulation of the Research Questions and analytical model

The Main Research Question of this PhD dissertation is the following:

« HOW DOES Strategic Intelligence ENABLE AND/OR FACILITATE CROSS-TEMPORAL AND TRANSNATIONAL POLICY LEARNING? »

The generic definition proposed for policy learning is the “*process by which knowledge is taken up by an individual, a group, or an entity (organization or institution) and turned into policy change*”. We know that policy learning can take different forms and happen at different levels through different channels. Policy change in a state can therefore be considered to be under internal and external influences. The present thesis seeks to understand how Strategic Intelligence enables and/or fosters cross-temporal and transnational policy learning. The starting point here is the cognitive perspective already described in the previous chapters. In that sense, the focus will be on policy change from the perspective of the policy repository. The literature acknowledges the role of knowledge in policy through this implicit notion of repository (as being the set of information, norms, values, references on which a policy is based – see Box 9).

¹⁴⁸ “Policy Repository” is here understood as a virtual location from where policy-related knowledge can be sourced. It is expected that Strategic Intelligence creates a virtual and ordered repository where relevant knowledge is referred to and made available.

At the same time, process approaches inform well on the role a device such as Strategic Intelligence can constitute as a structuring frame for policy change or how policy actors can make use of its processes and outputs (such as suggested by the knowledge/evaluation utilisation literature).

Box 9: "Repository"?

Although one could expect a repository to be a physical location where items can be stored, it is referred to as a **1) virtual location where 2) policy-relevant knowledge is stored, 3) can be sourced and 4) is not systematically ordered in a rational fashion.**

The assumption here is that Strategic Intelligence as an instrument reaches a level of institutionalisation that allows resources be gathered and used. It is not an organisation, but a softer procedural instrument with systemic functions that finds its instrumental nature in the uses made of it. Instrumentation is therefore what makes the instrumental (rather contingent) nature of Strategic Intelligence.

The particular nature of Strategic Intelligence is that the resources are made accessible publicly (one could make the comparison between fundamental research, a quasi-/ public good, and private R&D). Therefore, as a resource, Strategic Intelligence can be used in an instrumental way, even outside national borders. One can see two structural dimensions of the resources built by Strategic Intelligence, which could relate to a content/form dissociation.

- ▶ The first covers the cognitive content and is about the policy repository, resource for Transnational Policy learning (black box "*Strategic Intelligence*");
- ▶ The second is structural and relates to the way relationships are organized in the context of Strategic Intelligence; this thesis focuses on the structured framework in which policy learning processes take place through Strategic Intelligence but also considered its human dimension.

Starting from the idea that Strategic Intelligence can be a vector for new policy ideas to enter another given policy system (see Figure 18), it is expected that the policy knowledge transferred is shaped by the form and content of Strategic Intelligence.

Figure 18: Strategic Intelligence as a vector of new policy ideas

Source: the author, 2013

Both types of features shape the theorisation of the policy transferred. In other words, the form and content aspects of Strategic Intelligence’s influence on policy learning will be considered. The assumption here is that perceptions about the original policy under the scope are filtered by Strategic Intelligence, allowing for learning and –potentially– for a transfer towards another policy system. It was expected that the transfer could be active or passive, as well as pulled or pushed by the receiving system and related players. The theory used as to guide the all approach is research was summarized in the following **Error! Reference source not found.**), which already provides some insight on how to derive applied questions to the cases selected and derived from the main research question.

Figure 19: Theory underlying the approach of this thesis

Source: the author, 2015

The idea is not new but the momentum of Strategic Intelligence was expected to create some modifications in the social relationships setting that could trigger change. Strategic Intelligence could therefore be considered as having an opportunity window creation effect. Strategic Intelligence was expected to produce constraints for learning and be used as a constraint pushing learning effects (uptake of ideas and application in policy, whether in the same system or transnationally).

1.3 Conceptual framework: main components

1.3.1 First level: instrument level

In order to investigate the questions formulated above and the related theory (see summarized in the following Figure 19) which already provides some insight on how to derive applied questions to the cases selected and derived from the main research question, two case studies were conducted for which two main conceptual levels were made distinct. Both were indeed analysed in light of cross-temporal and transnational policy learning questions. Following the instrumental theory, one can break down the instrumental assumption into two distinct categories used as analytical grid when analysing Strategic Intelligence:

- ▶ Software dimension: Strategic Intelligence creates and diffuses a policy knowledge repository also marked by specific beliefs, values, and paradigms¹⁴⁹
- ▶ Hardware dimension: the technical components of Strategic Intelligence create a structure for policy learning, meaning by then channels and connections between the spheres of a same or several policy system(s)

An additional dimension should be added: the dynamic one, also taking into account the role of supra-national organisations active in terms of Strategic Intelligence use:

- ▶ Instrumentation dimension: how policy and political actors, and in particular organisations (such as supranational organisations like the OECD or EC) or political representatives use Strategic Intelligence as a policy (learning) instrument or resource

A basic pattern was expected to be observed:

- ▶ In the USA (SBIR case): Cross-temporal: incremental improvements brought to the policy. Transnational: Policy knowledge repository constitution and limited transnational learning (only limited outward promotion);

¹⁴⁹ “Repository” is not to be understood here as physical or rationally ordered but rather as a virtual place where policy-relevant knowledge is stored.

- ▶ In the UK (SBIR case, which will be introduced in Section 2.4 of this Chapter): Cross-temporal: scanning role to initiate the design of the programme and improvement along the lifetime of the absorbed model. Transnational: Active pull learning –repository adaptation and correction- and limited push effects;
- ▶ Across both countries: cross-temporal policy learning intertwined with Transnational Policy learning dynamics.

1.3.2 Second level: process level

The second level to be observed was the one of the individual processes under the scope. In a transnational policy context, an individual policy system can also be embedded into another policy system. It is therefore possible to illustrate this aspect from two points of view (see Figure 20).

Figure 20: The process level

Source: the author, 2013

It was assumed in each of these two figures that some **inner cycles exist, which correspond to cross-temporal policy learning (learning over time in a same system)**. Adding to the cross-temporal dimension, the figure on the left shows a single loop illustrating how Transnational Policy learning between two countries could conceptually look like. But the influences can be numerous. Therefore, the second figure (on the right-hand side) appeared to be more relevant to approach Transnational Policy learning through Strategic Intelligence. Merging the two figures, one could integrate the schemes above (at this individual level) into the same figure such as the one below, which illustrates passive and active dynamics of policy learning but also integrates cross-temporal interactions through the arrows connecting blue and red circles (see Figure 21):

Figure 21: Illustrating passive and active policy learning dynamics

Source: the author, 2013

Note: It is to be highlighted that cross-temporal policy learning was assumed in each blue circle as each of them interacts with their related red circle over time.

Considering the multiplicity of factors influencing policy change, it was sought to understand how Strategic Intelligence contributed to the change under the scope (mainly in the form of policy innovation), and more precisely as a vector of cross-temporal and/or transnational policy learning. This implied that:

1. External influences on national policy change should be detected;
2. The net contribution of Strategic Intelligence to the changes under the scope (at the programme/policy level) should be assessed;
3. The key features of Strategic Intelligence should be linked to the different types of learning signals that were possibly observable.

1.3.3 Integration of the two levels

In that context, it was sought to match the characteristics of Strategic Intelligence with the relevant programme/policy changes. This implied first that Strategic Intelligence in each of the national cases should be captured through a pre-defined framework, which follows in Figure 22.

Figure 22: Characterizing Strategic Intelligence

Social components	Social components: beliefs, ideas and paradigmatic dimension																		
	Social device: Rules and governance setting																		
	Rationale	Backward-looking								Horizontal				Forward-looking					
Policy				Environment															
Technical components	Technique	Mid-term evaluations	Ex-post evaluations	Monitoring (incl. Scoreboards)	Audits	Comparative studies	Monographs and best practices reports	Socio-economic studies (incl. VC analysis, etc.)	Scoreboards	Comparative studies	Benchmarking and interactive workshops (incl peer reviews and best practices exchanges)	Information platforms (through networks)	External knowledge management (reports collection, etc.)	RIAs	Ex-ante evaluations (impact assessments and CBA included)	Foresight studies (incl. Technology foresights)	Roadmapping and strategy design exercises (incl. CTA)	Experimentations (in itinere evaluation - mixed category)	Conceptual work (guidelines, reflection papers...)
		Tools (questions, methods and approaches, criteria, indicators and descriptors)																	
Impact	Outputs (content/human interactions) and impacts																		

It is crucial to note that the components of Strategic Intelligence could vary from a setting to another. The initial assumption was for instance related to the rules –Evaluation of public programmes is mandatory at the European Commission level but not in Member States such as France for instance–. Exploratory research showed for instance that in the case of the American SBIR through the past decade Strategic Intelligence was mainly composed by evaluation studies. The interesting point here was to establish the links between Strategic Intelligence and its impacts on policy change in terms of transporting policy knowledge from the past and abroad to condition current policy practices (in the American system and/or another system). Three main categories of elements were considered all along the causal chains to be analysed. Those elements are quoted in Figure 23 as they were helpful to organise the operationalisation of the research strategy. The categories presented in this figure were mainly used as conceptual guidance for the research process. Strategic Intelligence components mobilize actors and impacts policy change through various types of situations implying an uptake of (foreign) policy knowledge and its incorporation into (local) policy making.

Figure 23: Path from Strategic Intelligence to policy learning

Strategic Intelligence	« Bridge » / « connection »	Impact on policy change
<p>HARDWARE vs SOFTWARE 3 levels: social institution, technique, and tools</p> <ul style="list-style-type: none"> • Rules (obligation to evaluate or make impact assessment, etc) • Governance/setting • Objectives • Rationale • Technical components <ul style="list-style-type: none"> ▪ Assessment ▪ Horizontal ▪ Forward-looking <ul style="list-style-type: none"> □ Approaches and methods • Social components • Content • Outputs • Impacts 	<p>Who</p> <ul style="list-style-type: none"> ➢ Political representatives ➢ Experts and consultants <ul style="list-style-type: none"> ➢ Officials ➢ Stakeholders ➢ Target groups ➢ Beneficiaries <p>How: Active/passive – Push/pull</p> <p>At what level</p> <ul style="list-style-type: none"> • Instrumental and technical/operational (related to techniques and operational changes, very often associated as take-up of knowledge production outputs) • Process-oriented and interactive (effects of process and actors mobilization on the social relationships setting and mediation) • Organizational (change in organizational behavior) • Argumentative (political, tactical and advocacy: in the context of confrontation, which can also be symbolic when coming to legitimizing a decision) • Conceptual (change in theories and concepts, including related ideologies) • Paradigmatic (change in terms of the vision of the world) 	<p>At which stage of the policy cycle?</p> <p>What change in policy due to strategic intelligence?</p> <p>When transnational, resulting from what type or process?</p> <ul style="list-style-type: none"> • Instrumental learning and lesson-drawing • Organizational learning • Social learning

The characterisation of the type of learning taking place could only be done when the information about the learning process(es) became available, using the conceptual framework developed in the first part of this dissertation. The specific features of each type of learning, even as they were found mixed in practice, were used as a reading grid in order to qualify the type of learning observed in real-life conditions.

2/ Methodological framework

2.1 Research questions

As indicated earlier, the key research question is the following:

« **HOW DOES Strategic Intelligence ENABLE AND/OR FACILITATE CROSS-TEMPORAL AND TRANSNATIONAL POLICY LEARNING?** »

In order to link the theoretical background, the related questioning and empirical evidence, a set of research sub-questions was drawn which was used as to ease the operationalization of the field investigation. The sub-questions used to guide the field research were divided into two blocks and consisted in the following:

Cross-temporal policy learning through SI

RQ1: How do soft and hard features of Strategic Intelligence enable cross-temporal policy learning?

- ▶ 1.1 – What has been the role of Strategic Intelligence among the drivers of policy change over time?
- ▶ 1.2 – What type of learning occurred that was enabled/facilitated by Strategic Intelligence?
- ▶ 2.3 – Do specific features of Strategic Intelligence lead to particular types of policy learning in functional terms (structuration; policy repository; channelling)?

Transnational Policy learning through SI

RQ2: How does Strategic Intelligence trigger or supports transnational policy learning?

- ▶ 2.1 – What are the policy changes that are due to foreign experience vehicled by Strategic Intelligence?
- ▶ 2.2 – What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (e.g. instrumentation/utilisation and policy –learning– entrepreneurship)?
- ▶ 2.3 – To what extent does Strategic Intelligence allows the circulation of policy?

The research question and related sub-questions entirely guided the field approach, which remained qualitative and open to unexpected findings.

2.2 An abductive process tracking approach...

The nature of the questions asked by this dissertation required qualitative and process-oriented methods. The instrumental perspective implying interactions¹⁵⁰ required both a historical and a multi-actor/multi-layered view on policy processes. Kassim and Le Galès (2010) as well as Bache (2010) recognized the value of instruments' *"career tracking"*. In addition, the circulation paths of beliefs, instruments, paradigms, etc. required an adequate approach that would allow seizing the relation between causes and consequences of policy change. As a response to these prerequisites, the decision was taken to follow an abductive process-tracking approach based on two case studies that called upon qualitative techniques.

As suggested by Gerring (2004), *"All empirical evidence of causal relationships is covariational in nature. A purported cause and effect must be found to covary. They must appear and disappear, wax and wane, or perform some other transformation in tandem or at some regular, more or less predictable, intervals (...) the absence of such covariation is taken as disconfirming evidence"* (Gerring, 2004). Gerring also adds that *"the identification of causal mechanisms happens when one puts together general knowledge of the world with empirical knowledge of how X and Y interrelate. It is in the latter task that case studies enjoy a comparative advantage"*. Here, the author complements his statements by explaining the necessity of distinguishing between invariant (deterministic) and probabilistic causal arguments¹⁵¹. Reflecting on these words, it was decided to adopt a process-tracking approach for this research, depicted by George and Bennett (2005) as a method that *"attempts to identify the intervening causal process the causal chain and causal mechanism between an independent variable (or variables) and the outcome of the dependent variable"*. Such approach for case study research is useful as it allows for each case to *"empirically establish the posited intervening variables and implications that should be true in a case if a particular explanation of that case is true"* (George and Bennett, 2005). In addition, the style of this approach was made *"abductive"*: abduction in that context implied that the two case studies to be used for the process-tracking analysis were not implemented in a deductive or inductive way but mixed both in an interpretative way. Best explanations were selected in that sense. Abductivism is indeed based on the observation of real-world realities and although research claims were formulated during the literature review which suggest research expectations, facts and events were not bended to the research goals but were interpreted as they effectively were in light of the questions guiding this dissertation.

¹⁵⁰ See Abma and Widdershoven (2008) who describe and clearly show the importance of the role of stakeholders and evaluator-stakeholder relationships.

¹⁵¹ Invariant causal relationships are asserted to be always true, given some set of back---ground circumstances. They take the form of necessary, sufficient, or necessary and sufficient arguments. Probabilistic arguments, in contrast, are true in a probabilistic fashion; a cause increases the likelihood of an outcome and/or the magnitude of a (scalar)outcome (Gerring, 2004).

The key strength of induction (discovering unexpected elements) was in that regard embodied by the use of the case studies and related qualitative techniques, which did not restrict the scope of evidence as deductive methods would have.

The idea here was to follow a process-tracing approach during which each step of the policy process would be described. The path and conditions for policy change to happen were thus investigated through the perspective of its evolution over the time and factors pushing or hampering this evolution. George and Bennett (2005) presented the possibility to mix congruence (which is understood as the fact that the researcher *“begins with a theory and then attempts to assess its ability to explain or predict the outcome in a particular case”*) and process-tracing approaches. Therefore, the approach of this thesis consisted of an analysis of the causal chains that depicted how the dependent variable (Strategic Intelligence) impacted the dependent variable (policy learning)¹⁵². Along the study of each process, congruence was analysed by putting in perspective the different vectors of policy change and assessing/ranking their contribution to the observed change and the *“directness”* of their causal inference on the phenomena under observation. It was to be understood whether and under which conditions a factor X under observation was a direct (or indirect), necessary (or not) cause of the change Y¹⁵³. The process-tracing approach allowed analysing the causal explanations of policy changes and the role of Strategic Intelligence in policy learning. But it also knows limitations, and these were acknowledged to ensure an optimal accuracy of the research results.

George and Bennett (2005) identified two key limitations to process-tracing approaches:

- ▶ Process tracing can provide a *“strong basis for causal inference only if it can establish an uninterrupted causal path linking the putative causes to the observed effects, at the appropriate level(s) of analysis as specified by the theory being tested”*;
- ▶ *“There may be more than one hypothesized causal mechanism consistent with any given set of process-tracing evidence”* (George and Bennett, 2005).

Two modalities therefore proved to be essential in order to address these limitations:

- ▶ The narratives of the policy processes (design, implementation and evolutions) issued from the research were strongly controlled;
- ▶ The qualitative tools used for this research remained open (semi-structured interviews, etc.) in order to catch any unexpected factor or set of factors that would explain the phenomena under observation.

¹⁵² As suggested by George and Bennett (2005).

¹⁵³ Also see the importance of the principle of equifinality described by George and Bennett (2005) as
☐ alternative causal paths [leading] to a same outcome and alternative outcomes for the same causal factors.

Moreover, processes and change patterns were to be cross-checked (comparison between cases of key features related to the research questions) in a comparative fashion but also in order to strengthen the cross-case dimension of the analysis.

2.3 ...through two case studies

It has been decided to follow such abductive tracking approach while calling upon the use of two main case studies¹⁵⁴. The use of a qualitative approach seemed indeed unavoidable for such a research¹⁵⁵. Explanatory case studies appeared as the ideal method here to answer “how” and “why” questions. Yin (2009) clearly showed that case studies are good to investigate and trace operational links over time. Flyvbjerg (2011) also underlined that case studies were strong for the analysis of context and process dimensions of a social phenomenon. Considered as a heuristic more than a methodology, method or research design (Wynsberghe and Khan, 2007), case study research can be used in various ways and can pursue different goals. The logic of theory-testing as described by Eisenhardt (1989) was followed. The design of the case study method used to support the process-tracking approach is presented below. Rowley (2002) defined case study design as *“the logic that links the data to be collected and the conclusions to be drawn to the initial questions of a study”* and stated that the role of such design is to ensure coherence. Yin (2009) defined the main components of a case study research design as following:

- ▶ Questions and if needed the related propositions
- ▶ Unit of analysis
- ▶ Logic connecting data to propositions
- ▶ Interpretation criteria (Yin, 2009)

Case studies do not represent a sample and are not based on frequency but aim to expand and generalize theories (analytic generalisation is here confronted to statistical generalisation): *“Case studies like experiments, are generalizable theoretical propositions and not to populations or universes”* (Yin, 2009).

¹⁵⁴ “Cross-sectional survey data are unable to answer many of the “why” questions about diffusion (...) one-shot surveys can’t tell us much about time-order, or about the broader issue of causality” (Rogers, 1995). In addition, the all process of policy implementation should be taken into account. Any policy scholar would agree on the need to overcome the sole policy adoption while recognizing its importance: policy learning cannot be considered from an adoption perspective only. The evolution of a programme over time can also show some learning.

¹⁵⁵ Bennett and Howlett (1992) considered for instance that Hecló’s approach was quite relevant for studying of policy learning. They recommended an intensive comparison of two similar cases, on the basis of archival work and elite/key informant interviews.

The idea with a multiple cases approach was to follow a replication logic (still compared by Yin to experimentations replication¹⁵⁶) of the “*theory-testing*” research and not to compare identical or similar samples like one could do with a quantitative model. The case study approach was also chosen as it is recognized as a strong technique to identify the relationship of the case with its context (Zaidah, 2007).

As showed by Yin, case study approaches distinguish themselves from ethnographic studies as they imply preliminary theory development on the basis of the research questions. The theory is then to be tested on the basis of empirical research. In the present dissertation, the abductive nature of the work conducted implied iterations that were based on the use and refinement of an analytical framework.

2.4 Case studies: selection and analytical framework

Making the distinction between statistical and analytical generalisation principles, Yin (2009) stated that cases are not “*sampling units and are to be selected as a laboratory investigator selects the topic of a new experiment*”. The developed theory can then be tested and compared to empirical results and two cases with the same results are then enough to claim replication (Yin, 2009). The cases used in this dissertation were selected because of their contrasting characteristics (Eisenhardt [1989] suggested to select polar types when possible in order to better identify the phenomenon under study): they will offer different framework conditions and will then allow sharpened theory testing. They were also selected as they were closely linked in nature. Key parameters seemed to be explicated in order to select relevant cases, and the cases were the show:

- ▶ A long “*enough*” experience of SBIR-like programme(s) in order to observe policy change over a sufficient period of time (a 10-year threshold was determined);
- ▶ Observable policy change (launching/implementation of a SBIR-like programme and changes over time);
- ▶ Existence of first-hand evidence of policy learning in that context;
- ▶ Existence of evidence that Strategic Intelligence played a role in policy learning;
- ▶ Different structures and characteristics of the national innovation policy system (including STI and economic structure of the country);

¹⁵⁶ Yin (2009) indeed refers to the analogy between multiple-case studies and multiple experiments; replication would thus consist in reproducing the case study while reproducing the same conditions or altering only unimportant experimental conditions. Theoretical replications can differ only for anticipatable reasons (contrasting results should be anticipated to ensure replication).

The two cases selected for this thesis were the Small Business Innovation Research Program (SBIR, US) and the Small Business Research Initiative (SBRI, UK). The initial reason for the selection of the two cases considered in this thesis was that “*the two best forms of SBIR concept programmes (sub-types of PCP) are that of the United States and that of the United Kingdom*” (Rigby, 2013). While the American SBIR was the first case study because of its ‘origin’ nature, the SBRI was selected as second case study for several reasons: first, it is a country where an SBIR-type of program has been adopted (SBRI). Second, it is a first-range adopter of the programme (world-wide). Finally, evidence gathered during the preparatory phase of this research shows that UK experience with SBRI also constituted a model for other actors¹⁵⁷.

The integration of the conceptual components of the analytical framework were applied in order to link the empirical evidence gathered from the field research to the analytical structure and research questions as well as the existing academic corpus in which this dissertation is grounded. The eventual analytical framework designed for that purpose is illustrated by the figure below (Figure 24), which integrates all dimensions of the analysis to be performed.

¹⁵⁷ Another country (the Netherlands, where an SBIR programme was set up as well) was valid according to these criteria; but less evidence of learning and less policy changes could be observed and the decision was taken to go for the SBRI case where clear change items were identified.

Figure 24: Analytical Framework

Source: the author, 2013

2.5 From design to practice: case study protocol

2.5.1 Case studies in practice: towards the analysis of the findings

A case study-based approach was preferred to other options as it is better suited to the analysis of conditions and causal mechanisms underlying social processes. Case studies allow in-depth qualitative analysis of social phenomena, and open the use of a large number of information sources, from documentary sources (databases, policy documents, general literature, press articles, etc.) to interviews and other methods that can be combined to build each case. Case studies also allow contextualisation and the identification of unexpected influencing factors and trajectories. In that sense, case studies show great exploratory value when the field investigated is unknown or when no clear hypotheses could be drawn. Relative positioning of the influence of each variable identified before and along the field research is also possible (ranking of the change factors according to their range of influence).

Beyond the individual analysis of each case study, a cross-case analysis could be conducted which identified commonalities and differences in each case but also related each to the other in order to fully understand the role of Strategic Intelligence in the SBIR learning process. In terms of practical approach, Yin (2009) suggests that explanations can result from a series of iteration as listed below:

- ▶ *“Making an initial theoretical statement or an initial proposition about policy or social behaviour*
- ▶ *Comparing the findings of an initial case against such a statement or proposition*
- ▶ *Revising the statement or proposition*
- ▶ *Comparing other details of the case against the revision*
- ▶ *Comparing the revision to the facts of a second, third, or more cases*
- ▶ *Repeating this process as many times as is needed” (Yin, 2009)*

The two protocolled case studies (SBIR and SBRI) were therefore conducted in the United States and in the United Kingdom, aiming to get a better grasp of:

1. The impact of Strategic Intelligence on policy change;
2. The forms of policy learning observable;
3. The particular contribution of Strategic Intelligence to the learning phenomena under observation.

Each case study was conducted on the basis of in-depth literature review, interviews (leading me to interviewing 55 people for SBIR and 31 for SBRI, and 8 cross-national ones) and to some extent participatory observation.

Literature review grids and interview guidelines were designed and refined in order to connect the specific features of Strategic Intelligence with the characteristics of the policy learning elements observed. The following sub-sections describe the design and use of the methods mobilized in the context of the case studies and show how method triangulation was operated in practice. Three main blocks were structured in order to guide the analysis and the reporting of the case studies:

1. Analysis of the policy pathway;
2. Analysis of cross-temporal learning through Strategic Intelligence;
3. Analysis of transnational learning through Strategic Intelligence;

The (cross-case) analysis was operated according to an explanatory pattern matching strategy.

Eisenhardt (1989) presented the possibility to compare different cases to identify their similarities. For each case, light was shed on policy change patterns and the role of each variable. The patterns and conclusions from each case were compared and synthesized in an explanatory way (Yin, 2009 about how or why something happened).

This pattern comparison enabled a distinction to be made between the constant changes and the key conditions that are common to the two cases. A cross-case analysis grid was therefore used which was in line with the main research questions and related sub-research questions to guide the research. Doing so contributed to ensuring the reliability of the case studies. Other modalities were in place, including internal validation - which was sought by studying rival explanations (see Yin, 2009 for a typology of potential rival explanations) - and triangulation (see Eisenhardt, 1989) from two main points of view:

- ▶ Methods triangulation (use of several methods to investigate a fact);
- ▶ Source triangulation (shedding light on a fact thanks to different sources of information, e.g. different interviewees, etc.).

Box 10: More details how the analysis was performed in practice

The overall analysis was guided by the research questions from which all questions used for the desk research and the interviews were derived. It systematically referred to the conceptual framework designed to support the research approach. It was also iterative as the insights for each case were progressively drawn along the study process and were progressively refined and confronted to a final review of all findings.

More formally, a case report was drafted for each of the two case studies and a first round of analysis was operated at the case level. A second round focused on cross-case analysis gathered the main lessons that were to be triangulated to be considered valid. In order to ease the cross-case analysis, a similar structure was used for the reporting of each case. Relevant evidence was connected to relevant questions and analytical topics were shaped on the basis of the rationale underlying the approach and the rationalised code categories used in the context of Atlas T.I. Iterations between Atlas T.I. and a personal review of the evidence and cases was operated in order to make sure no piece of information could be left out.

A correspondence matrix (see Annex 3 available p.304) was used to illustrate the links between each analytical statement, the related research question(s) and claim(s) formulated on the basis of the literature review.

A case study database bringing together and classifying all the information gathered during the information collection phases was built up and structured according to the case study protocol: information (in the form of interview reports, synthesis of the literature or analytical reports/grids, etc.) was classified in folders to rationalize the information gathered during each case study. More information on the storage can be found in the following Sub-section 2.5.8.

2.5.2 Phasing of the country case study

The first step of the protocolling work consisted in phasing the field research. The following steps were identified and followed along the field research:

1. Literature review
 - Policy change over time
 - Contours of Strategic Intelligence
2. Exploratory interviews
 - Driving factors for policy change
 - Contribution of Strategic Intelligence
3. Thorough literature review, in-depth interviews and participative observation
 - Linking specific policy changes to policy learning forms (process, knowledge uptake, etc.)
 - Linking policy learning forms to specific Strategic Intelligence features
4. Validation and triangulation
5. Additional information collection
6. Analysis and reporting

2.5.3 Literature review

A protocolled literature review was implemented. Its characteristics are described below.

- **Features and questions addressed:** Based on an analytical grid derived from the research questions, the literature review covered all documentary sources that provided information about the SBIR and SBRI schemes as well as about the Strategic Intelligence associated to each scheme. The aims of the literature review were to:
 - Identify the characteristics of SBRI and SBIR Programs in a comparative manner, and delineate the evolution of each programme over the years and their key changes.
 - Delineate the contours of Strategic Intelligence in both cases (what instruments, tools, characteristics [questions, approaches, methods, criteria, indicators, descriptors, processes...]);
 - Analyse the policy learning types in SBIR and SBRI contexts
 - Constitute the support/set of information to be triangulated with interviews and other potential sources in order to understand the influence of Strategic Intelligence (in UK and US) in terms of enabling cross-temporal and transnational policy learning.

► Documents considered

- Documents such as archival records
- Reports and studies' outputs (monitoring, evaluation, impact assessment, etc.)
- Minutes from meetings etc. that would be made available by the officials for the research
- Legal and policy documents
- Communications
- Websites
- Press releases and other types of information publicly accessible
- Other sources: documentation provided by interviewees etc.

► Additional sources

- This thesis also relied on video transcriptions of hearings at the American Congress as well as some European expert contributions found on web-based audio-visual platforms.

2.5.4 Interviews

The second method used for this research was **semi-structured interviews**. A total of 94 interviews were conducted in the context of this thesis. This number does not cover less formal interactions with stakeholders, beneficiaries and other actors involved when being present in UK and/or US-based events for instance, or informal phone calls and mail exchanges. The interviews occasionally involved the participation of more than one person (but never more than two). More details are provided in Annex 2/. The summary table below (Table 8) provides an overview of the interviews conducted.

Table 8: Overview of the interviews conducted for this thesis

	US	UK	EU	US/UK
Companies	5	3		
Experts	10	10		3
Stakeholders	8	1		
Policy makers	32	17	3	2
TOTAL	55	31	3	5

Note: One can already observe an important difference between the UK and the US: the respective format of SBIR and SBRI led to different interviews in line with their real-life configuration which does not involve the same proportion of policy-makers versus stakeholders.

- ▶ **Features and questions addressed:** Interviews were conducted with a broad range of targets. The **interviews were conducted in an open way** (most of the time **face-to-face**, otherwise through **Skype/over the phone**) and were either **recorded** or **formalized by an interview report**. The indicative topics of discussion were further described in adapted interview topics lists specific to each of the cases. The questions were also adapted to the targets (officials, stakeholders, etc.). The open interviews were to cover all aspects of the policy (from decision to implementation and impacts). They followed a source triangulation strategy. They were prepared on the basis of a preliminary literature review as well as exploratory semi-structured and more open interviews. The interview topics were refined on the basis of the results from the exploratory interviews during the first case study.
- ▶ **Targets:** Policy makers, stakeholders, targets and beneficiaries of the policy as well as academic experts and consultants were the main targets of the interviews. A **monitoring grid** was designed to save all details about people contacted and people interviewed.
- ▶ **Objectives:** the interviews helped to build the causal links between the forms of policy learning observed during the investigation and the causes linked to specific features of Strategic Intelligence (is knowledge about past/foreign experiences? Is knowledge coming from a domestic/foreign source? Is the participative approach involving foreign actors? Etc.). The interviews followed the abductive approach described earlier in this chapter. Attention was paid to other influencing factors as well as to the overall context and chronological evolution of the SBIR and SBRI programmes (including pre-existing context).
- ▶ **Key interview topics:** these interviews were based on five key topics. Other discussion topics (described in detailed questions in Annex 0) were used to the extent necessary in order to re-frame, stimulate or expand the scope of the discussion. The five key topics to be discussed were introduced by an open question tailored to every interviewee in function of his/her position and the context in which the interview took place (also depending on the experience of the interviewee with SBIR/SBRI, etc.):
 - **Historical description of the SBIR/SBRI policy process (incl. context) by the interviewee from his/her perspective**
 - Pre-question, introduction: “When and how did you come to work on the SBIR/SBRI programme?”
 - Open question: “have you already been working on other similar programmes (in your organisation or elsewhere)?”

- Identification of key changes of the programme and their underlying drivers (learning from “the past”)
 - *Open question: “Have there been (big) changes in SBRI design/implementation over the past years?”*
- Identification of changes inspired by foreign sources (learning from “abroad”)
 - *Open question: “SBRI a copy of the American model and if yes to what extent?”*
- Isolating the influence of ‘Strategic Intelligence’ on SBRI change
 - *Open question: “What are the sources of information you usually use doing your work?”*
 - *Open question: “How did you know what to do in the context of the design, implementation, re-design of SBRI?”*
- Assessment of the dynamics behind learning from abroad through Strategic Intelligence
 - *Open question: “Do you or anyone else promote SBRI abroad or has the chance to know about other programmes in other countries?”*

2.5.5 Participatory observation and additional inputs

Some participatory observation could be conducted: it mainly consisted in my participation to an SBIR hearing at the Senate Small Business Committee in the United States on the very topic of SBIR. Another form of participatory observation consisted in my contribution to a seminar on the role of peer reviews in S3 policy learning (organized in the context of the SMARTSPEC project¹⁵⁸ being currently supported by the European Commission). These experiences contributed to enrich the analysis with additional insights, which proved to be mainly practical (technical) such as about the role and perceptions of experts during hearings, etc.

Among others, the following inputs were integrated along the implementation of the present thesis:

- ▶ Participatory Observation: Senate Hearing – 18/12/2013 – Small Business Committee “SBIR-STTR Measuring the Effectiveness of the Reauthorization Act and Maximizing Research Dollars to America’s Small Businesses”
- ▶ 2011 Senate Hearing of Dr Charles Wessner (NAS) on SBIR Reauthorization – Proposal Mills

¹⁵⁸ See <http://www.cardiff.ac.uk/cplan/research/smartspec>.

- ▶ 2011 Senate Hearing of Dr Matthew Silver (Cambrian Innovation) on SBIR Reauthorization – Introduction
- ▶ 2011 Senate Hearing of Dr Charles Wessner (NAS) on SBIR Reauthorization – University Objections
- ▶ 2011 Senate Hearing of Dr Charles Wessner (NAS) on SBIR Reauthorization
- ▶ 2008 House Hearing – Questions and Answers by Ms Velasquez
- ▶ 2008 House Hearing of Mr Bean on SBIR – America’s National Technology Development Incubator

2.5.6 Software support: use of Atlas T.I

Tagging and linking information related to 1) SBIR and SBRI changes, 2) learning from abroad, 3) learning from Strategic Intelligence, and especially 4) causes and factors of learning were core focuses of the use of the Atlas T.I software. Atlas T.I was used for data organisation purposes, as well as to put in relation key information derived from the other methodological tools.

Using Atlas T.I, a number of elements were flagged but also linked: “*References to abroad*”, “*References to Strategic Intelligence*”, “*Learning factors*”, “*Influencing factors*”, etc. in order to map the process of learning. Relationships were drawn on the basis of the social change process (historically described). The rationale behind such minimalist coding is simple to describe. After identifying policy changes from an historical perspective, two aspects could be isolated as part of cross-temporal policy learning: learning from abroad and the role plaid by Strategic Intelligence along the process, whether leading to Transnational Policy learning or not. The following structure was therefore instrumental in the organisation of the data to be analysed (see Figure 25).

Figure 25: Atlas T.I main classification structure

A series of more specific codes were applied to the available data and material according to the following segmentation (see Box 11).

Box 11: Atlas T.I codes used in the context of this thesis

Domestic Policy Change

- ▶ Code: *- References to policy building blocks
- ▶ Code: #- References to policy controversies, change(s) and related driver(s)

Strategic Intelligence

- ▶ Code: 1- Reference to the role of domestic Strategic Intelligence and its use(s)/utilisation(s)
- ▶ Code: 2- Reference to the role of foreign Strategic Intelligence and its use(s)/utilisation(s)
- ▶ Code: 3- Type of Strategic Intelligence referred to and meta-instrumental features (incl. hard-tech/soft-social)
- ▶ Code: 4- Transnational characteristics of Strategic Intelligence (incl. repository/structural/channel)

Transnational policy learning

- ▶ Code: a- Reference to foreign experience
- ▶ Code: b- Type of learning (instr./social/org.)
- ▶ Code: c- Nature of learning process dynamics (Active/passive [utilisation] & Pull/Push)
- ▶ Code: d- Other causes and learning factors than Strategic Intelligence

Transnational Policy learning through Strategic Intelligence

An additional composite family of codes was composed such as illustrated below.

It was expected that the key sources of information related to the process of Transnational Policy learning through Strategic Intelligence would come from the quotations coded under the codes '2', '4', and 'C'.

2.5.7 Analytical signals and strategy

The following signals were used as the basis for the concrete analyses of cross-temporal and Transnational Policy learning through Strategic Intelligence. These signals were information comprised in support files from the repository constituted along the case studies (reports, interview transcripts, hearings, etc.):

- ▶ Reference to knowledge or experience from ‘the past’/‘abroad’;
- ▶ Reference to domestic knowledge or experience about ‘the past’/‘abroad’;
- ▶ Reference to interactions with people from the domestic system/‘abroad’.

These signals highlighted the occurrences of cross-temporal impacts of Strategic Intelligence as well as the transnational circulation of policy knowledge or the confirmation of a transnational channel through which information could circulate. They were used as detectors in order to better cluster the information and information sources used to structure the arguments of this dissertation with regards to the questions raised on how Strategic Intelligence enables or facilitates cross-temporal and transnational policy learning.

An additional item was exploited in order to structure the understanding of both SBIR and SBRI Programmes. This item was mobilized in order to keep an open view on the possible co-evolution of both programmes and/or their relationship to Strategic Intelligence, as well as to possibly identify non-visible channels for policy learning or knowledge transferred:

- ▶ Reference to the use of Strategic Intelligence or key features of SBIR and SBRI

2.5.8 Information collection and storage

Information was collected all along the case study process. All information was stored on a hard disk and clouded when possible. Reports were written in word version and the relevant records were stocked in a specific folder. Anonymity was guaranteed to the interviewees who requested it (in the form of no formal link between the quotes in the text and the person who formulated them). Other interviewees referred to in this thesis were attributed a reference code to facilitate their identification during the information treatment phase (analysis). The material gathered along the case study was classified for each of them along the following segmentation:

1. Policy and legal material
2. Communication material
3. Strategic Intelligence
4. Academic work on the impact of SBIR/SBRI
5. Interviews (including participatory observation)

4. Analysis

1/ Overview of the case studies: Strategic Intelligence as a vector of policy learning for SBIR and SBRI

1.1 Synthesis of Case Study 1 – The Small Business Innovation Research Program (SBIR)

1.1.1 The Small Business Innovation Research Program

Rationale and paradigmatic/social components. The SBIR was officially launched in 1982 and has been evolving since then. Initially aimed at supporting breakthrough innovation and high-risk investing in small businesses innovation, it is today oriented towards short-term and commercialisation-oriented support. The target group of SBIR is American small businesses (less than 500 employee¹⁵⁹) which are seen as critical to the economy (NAS, 1999) but face important growth constraints. The paradigmatic blocks and rationale of SBIR rely on the principle that the State can be an actor of importance to the economy, able to correct for market and systemic failures (NAS, 1999) such as the challenge of the “Valley of Death” (NAS, 2007a and 2008a) and be a motor of manufacturing-oriented technology development (SBA, 2012¹⁶⁰). The programme in itself adopts an interventionist position through the role of Federal Procurement as a mechanism to support Small Business Concern’s (SBC) innovation performance (see Uyarra, 2013). In that sense, the SBIR uses a double approach, both “*technology push*” and “*demand-driven*”: SBIR provides direct support to R&D, but also opens the possibility for federal procurement of the supported R&D.

Technical components. Before everything else, the SBIR is a law that conditions the use of extramural R&D expenses made by federal Departments and agencies with more than \$100 million of such expenses, stating that a certain amount (from 0.2% in 1982 to 2.7% in 2014 and increasing by 0.1% yearly since 1997 and until the next reauthorisation is discussed in 2017)¹⁶¹. The programme pursues four main objectives (1) Stimulate technological innovation; 2) Use Small Business to meet federal R&D needs; 3) Foster and encourage participation by minority and disadvantaged persons in technological innovation and 4) Increase private sector commercialisation of innovation derived from federal R&D)¹⁶² and is composed by three phases mixing several types of instruments (see Figure 26):

¹⁵⁹ Including affiliates; see <http://www.sbir.gov/about/about-sbir>.

¹⁶⁰ See also the Executive Order 13329 “*Encouraging Innovation in Manufacturing*” by The President, 2004.

¹⁶¹ For more details about the evolution of the set aside rates, see Annex 1.2.3.

¹⁶² Description by Audretsch et al (2002) of the initial 1982 objectives; which are today presented in SBA (2012 and 2014) .

Figure 26: SBIR as a process involving multiple instruments

Source: the author, 2014 (inspired by NAS, 2004)

Although there is a natural link between the three steps, there is a possibility for companies to get a direct access to Phase 2 (pilot initiative on-going from 2012 to 2017). By the first phase, selected SBCs are offered the opportunity to benefit from \$150 000 for 6 months which should be directed to feasibility research. A second phase possibly follows, continuing Phase 1 but bringing the possibility for SBCs to conduct R&D over a maximum of 2 years and being provided with an award of maximum \$1 000 000 for development/prototyping. Without direct R&D support but rather technical assistance, Phase 3 is a phase that is for the SBC to link up either with private or procurement markets; it is by this phase that the SBCs are expected to better attract possible private investments to scale up products etc. Since recently, these phases can be complemented by other measures complementary to SBIR (and especially STTR) or which aim to develop synergies with the mechanism (“matching programmes”¹⁶³ for instance); those are implemented either by the managing departments or States willing to play a leverage power on SBIR-supported companies. Therefore SBIR groups together several types of technical characteristics: legal and financial, direct and indirect, including technical assistance and awareness raising but also the possibility for procurement¹⁶⁴. The programme gained in flexibility over time, with more and more opportunities for federal agencies to tailor the mechanism to their own needs through adaptations or rights to complement it with complementary/synergetic measures.

¹⁶³ Several examples can be mentioned, from the Defense Microelectronics Activity SBIR Phase II Enhancement policy (DMEA, 2014) or State-level matching programmes to the NIH Commercialization Assistance Program –CAP- (NAS, 2009b). See Table 13 for a more detailed list.

¹⁶⁴ Other technical features could be listed, such as IPR retention by the SBC, R&D performance on the American territory, etc.

Rules and governance. Although attention is usually directed towards the 12 Departments and Agencies implementing SBIR and the Small Business Administration (SBA) Office of Investment and Innovation in charge of its coordination, the programme is considered a “*Congress Program*” rather than a policy closely driven by the executive branch. House and Senate Committees¹⁶⁵ have jurisdiction over SBIR (as covering both small business and innovation issues). The politics of SBIR have since its creation been animated by unusual cross-party coalitions mixing Congress members and staffers, stakeholders, as well as federal Departments and agencies themselves. While the White House Office of Science and Technology Policy (OSTP) always remained distant to the programme (see GAO, 1985), the Office of Management and Budget (OMB) plays an interface role between legislative and executive branches. The GAO and Comptroller General usually play a control and compliance functions over the programme and its implementation. One key aspect of SBIR in practice is the role of Departments which are in charge of defining support areas (depending on their challenges and needs). Variations in Department’s spending commitments have been similar since about 30 years and show that over 96% of SBIR expenditures (totalling around \$1.791 billion a year) are spread over DoD (50.9%), HHS (30.4%¹⁶⁶), DoE (5.6%), NASA (5.6%), and NSF (4.3%) while the other Departments altogether count for 3% of overall annual SBIR expenditures (NAS, 2008a, 2009 and 2014). Many difference between Departments are identified by NAS (2008a) which are related to different factors such as the type of market and technologies Departments deal with and which affect the form (grant or contract), the amount, timing, process, etc. associated to individual awards to companies. The delivery of SBIR is operated differently from a Department to another and can even prove to be complex as illustrated by (see Box 55) comparing DoD and NIH SBIR organisation, although dedicated HR in every Department (SBIR managers) are in charge of Department running of the scheme at an operational level.

1.1.2 Cross-temporal policy learning through Strategic Intelligence in the SBIR context

Strategic Intelligence in the SBIR context. Strategic Intelligence is not a homogeneous set of methods or techniques and is by nature context-dependent. It is viewed in this case through the programmatic perspective (Strategic Intelligence directly related to SBIR and influencing its evolution). SBIR Strategic Intelligence is linked to disagreements, political conflicts and even controversies around the programme. According to the Strategic Intelligence definition provided in Chapter2, Section 3.5, a typology was designed of Strategic Intelligence that appeared to play a role in SBIR policy change. Most of the influencing Strategic Intelligence was set in stone by Public Law (PL), for instance when considering the use of metrics, GAO control or the NAS SBIR evaluations which should take place every 4 year.

¹⁶⁵ House Small Business Committee, House Science and Technology Committee, and Senate Small Business Committee.

¹⁶⁶ Almost entirely concentrated in the NIH.

Reporting and metrics are required by Policy Learning from the Departments and SBIR beneficiaries to feed in (annual) reports (see DoD, 2007 and 2009; NIH, 2007 and 2009; NASA, 2011) to be submitted to House and Senate committees.

Monitoring modalities and associated metrics are considered a powerful technique of Congressional control over the Departments, and were instrumental in some conflicting cases such as analysed in Annex 1, Section 2.3. They have also been one of the main engines of the evolution of SBIR towards a more commercialisation-oriented design and focus (see Box 40). Also to be put on the forefront of influent Strategic Intelligence since the end of the 1990s, the most crucial source of Strategic Intelligence has without a doubt been the comprehensive evaluations of the programme operated at the level of the five main spending Departments and agencies by the NAS (launched in 2001 and implemented from 2004 for a release by 2008). 11 such studies from the NAS focused on SBIR (including issue-specific studies) and are considered the main source of Strategic Intelligence that impacted SBIR since the early 2000s. Forward-looking assessments and internal intelligence have also been referred to, but to a lesser extent as they were mainly used to guide technological choices made by Department officials (impacting mainly the selection of solutions to be called through SBIR). More attention was paid to normative evaluations operated by the GAO and linking to specific metrics (see GAO, 2006, 2006a, 2010, 2011 and 2013) and were a key tool to ensure Congressional control over the Departments. Other more focused socio-economic studies also influenced SBIR from a management perspective; only a few were conducted which were used by Department officials to get analytical inputs to their SBIR operations.

The techniques used in all the Strategic Intelligence exercises were quite usual (desk research, surveys, interviews, workshops, agency consultation, database analyses, and case studies) and depended on the goals of every individual Strategic Intelligence exercise: while GAO studies would be implementation-oriented and sometimes output-focused, the NAS comprehensive evaluations brought value judgments over the programme and its achievements vis-à-vis its objectives. Information was mainly gathered at company, award and administration levels; moreover and especially since the last -2012- Reauthorisation, databases were progressively structured upon Congressional order as a basis for programme implementation, monitoring and evaluation. Relevant data is used in the calculation of transition and commercialisation benchmarks regulating the access to SBIR support since the 2012 Reauthorisation. The outputs of Strategic Intelligence exercises directly linked to SBIR were used in different ways, such as for the production of argumentative material (arguments relayed during Congress hearings or through letters and conferences) or codified knowledge about SBIR; and were used to better identify the role of the scheme (bringing analytical and discursive value but also self-justification) or for management purposes (identification of best practices) but also assessment of the programme's impacts (delineation of SBIR contribution or needs for complementary actions) and related recommendations (mainly rooted into stakeholders' discourses).

Strategic Intelligence and the SBIR policy process: 30 years of interactions. SBIR and related Strategic Intelligence closely interacted and shaped each other all along the lifetime of the programme up to now. With the creation of the SBA (1953) and its office of advocacy (1976), policy attention towards SMEs was growing.

Facing the low share of federal procurement directed to SMEs despite of the share of R&D HR working for American small businesses, an NSF official named Roland Tibbetts came up with the idea of SBIR to support risky and early-stage R&D in SBCs (see Tibbetts, 2008). A division emerged in the NSF regarding the idea itself that was perceived as going against the interest of Universities, the main beneficiaries of the NSF. Comforted by meta-level indicators (share of SMEs in federal procurement, etc.) and the 1980 White House conference on Small Business, the arguments for setting up the SBIR at the NSF encounter the interest of Congress representatives in search of new solutions by 1976 which led to the first NSF pilot to run from 1977 to 1978 as a result of a Congress solicitation. With the support of key policy entrepreneurs from the SBA and the Congress, R. Tibbetts overcame the resistances from the NSF, NASA, NIH and DoD and associated industries to convince R. Reagan to launch this bipartisan initiative under the 1982 Small Business Innovation Development Act (PL 97-219). Although the programme exponentially grew over the years in terms of budget (see Schacht, 2012) but also technological and business outreach (see Annex 1, Section 2.2), the SBIR remained controversial and faced the opposition of institutions and stakeholders all along. Strategic Intelligence was used in that context mainly as a Congressional way of controlling Department's uptake of the mechanism, while Strategic Intelligence-based arguments would be used by administrative and political actors to confront each other in the Congress arena. Disagreements were to be found at the level of the objectives of the programme but also its implementation modalities, which were seen right from the beginning as not adapted to certain Departments, too constraining or too rigid and perceived as an "R&D Tax" by the Departments which for a long time did not benefit from any additional budget to implement SBIR (RAND, 2006; NAS, 2007a).

Towards a commercialisation-oriented horizon: framing objectives through Strategic Intelligence.

In three decades the programme became better targeted and better structured. Increasing ownership by SBIR managers fostered the anchorage of the scheme in Departments and benefits of the programme were progressively acknowledged (for a time perspective, see NAS, 1999 and NAS, 2008) until the programme "*exploded over the past 10 years*" as noticed by an interviewee. But the direction of SBIR was altered by political pressures to show visible success (mainly in terms of employment) emanating from the Congress and first operated through GAO but also OMB (White House) reports. Limited organisational capacity from the side of the SBA kept Strategic Intelligence in the hands of external organisations (GAO, NAS, contractors) and the Departments to fill in relevant metrics. The objectives of the SBIR shifted over the years towards a more performance-oriented shape with commercialisation shifting up the prioritized list of objectives. Such evolution has all along been evidence-based and framed by Strategic Intelligence initiated by the Congress in an instrumental way.

The Congress mainly used GAO reports as to frame the objectives of SBIR and the way the achievement of these objectives would be sought and outcomes delivered. The amendments brought to SBIR by 1992 and 1994 and strengthened from then up to 2014 show an increased focus on effectiveness in the policy language (NAS, 2008) used and in the perceptions of what the success of SBIR ought to be.

Since 1995/1996 and the newly introduced DoD Fast Track policy (towards commercialisation – see NAS, 2009c), new measures were introduced (in SBIR design or combined to it) to support a faster and more direct access to the markets for products developed under SBIR. The political will to focus on commercialisation performance which goes against the initial rationale of funding high-risk projects was illustrated by the different metrics used to monitor and evaluate the programme (benchmarks, sales, etc.).

Since the first evaluations of SBIR (RAND, 1984; GAO, 1985, 1987 and 1992), the commercial focus was pushed up on the agenda. Though the 1999 and 2004 GAO evaluations analysed this dimension, it is with the NAS evaluations (2004-2008) set in motion with the 2004 methodological report that commercialisation was really made the focus of comprehensive Strategic Intelligence in line with the requirements of the 2000 Reauthorisation. Strategic Intelligence became an arena for discussing commercialisation and how to assess it as agencies as Departments would calculate commercialisation success in different ways (see GAO, 2005). Strategic Intelligence also paved the way for further reflection on the role of Phase 3 (see NAS, from 1999 to 2014) and how to strengthen the link between R&D and the market (bridging the so-called Valley of Death); other commercialisation-oriented components were introduced as a result of reflective Strategic Intelligence (mainly conducted on behalf of the NAS) such as the 2000 Fast Track Initiative assessment and the NIH 2003 evaluation of SBIR where commercialisation became the central benchmark for SBIR performance. Particularly relevant to the role of Strategic Intelligence in SBIR evolution, is the introduction of new metrics by the 2012 reauthorisation which set commercialisation in SBIR stone: the amended Small Business Act introduced a “*system and minimum commercialisation rate*”¹⁶⁷ accompanied by a relevant database (listing companies’ patents, sales, licensing revenues, etc.). Companies should now provide commercialisation plans and Departments are tied by the benchmarks which rule the access of a company to SBIR. Commercialisation potential became a key proposal assessment criterion even for the ones submitted for Phase I support and the last reauthorisation included a Commercialisation Readiness Pilot Program allowing DoD use 10% of SBIR budget for Phase 3 and commercialisation-support activities. Such an evolution has important implications (disregard of the diffuse nature of innovation, shorter-term perspective, incremental rather than breakthrough outcomes, etc.).

¹⁶⁷ See SEC. 5165 in the 2012 Reauthorization amending Section 9 of the Small Business Act (15 U.S.C. 638).

As for the present programming period (2012-2017) no consensus was found on the repository of beliefs and norms through which to view and understand SBIR, some claiming that it should be focused on commercialisation while others tend to show attachment to its initial stimulation role (see RAND, 2006). But Congressional command over the most influencing SBIR-related Strategic Intelligence clearly made commercialisation a focal point for both SBIR and the Strategic Intelligence with which it interacts and co-shapes.

Argumentative use of Strategic Intelligence in SBIR decision process: eye on three key controversies. The case study emphasizes three main controversies that took place by the last reauthorisation process. The field research showed that SMEs as a political interest group were supported by political discourses but face(d) important challenges, most of them due to the structural role of lobbies in the American system; and especially when confronted for instance to more powerful lobbies grounded into -more powerful- economic power through their members (one could refer to the interests of the biotech, venture capital and defence industries for instance) and having an influential position towards electives in search of election support. The last reauthorisation process was pointed out by several as a unique case for an innovation programme: mixed coalitions across the House and the Senate committees in charge were conflicting over the reauthorisation itself which was delayed through 14 temporary reauthorisations (from 2008 to 2012). These continuing resolutions extended the time of negotiations until a compromise was reached and the reauthorisation included in the 2012 National Defence Reauthorisation Act as a strategic coup to circumvent the constraining rules of the Senate which can lead to lock-ins in the decision making process. Overlapping stakes were debated and led to intense confrontations between committee members but also stakeholder organisations and agencies themselves. The complexity of these controversies lied among others in the fact that some of the actors could adopt different positions depending on the controversy and causes defended. Strategic Intelligence in that context was heavily used by the players at stake along the negotiation process, in a purely instrumental way but without impacting the positions of struggling parties (use of Strategic Intelligence as to confirm or support arguments and positions already established) as arguments would be selected in a biased way by interested individuals/organisations. Strategic Intelligence was relayed through individual testimonials taking place in Congress hearings (in 2007 and later on) which formalized political arguments made evidence-based. Strategic Intelligence was even made a priority for some of the issues to be further framed and ruled on an evidence ground as illustrated by Annex 1, Section 2.3.

1. Size(s) and set aside calculation. Opposing the small business community (usually represented by the NSBA and mainly by the SBTC) to universities, NIH, NSF and to some extent the health and (up to the 2000s) defence industries, this issue touched upon the size (overall budget and award size) as well as the calculation methods of the set aside which was first subject to disagreements between GAO and some Departments in the early life of the programme. Resistances to the incremental increases of the SBIR set aside rate but also of the amounts of the awards emanated from Departments dealing with health and defence industries, university-linked institutions (NSF, House Science and Technology Committee and to some extent OSTP), as well as stakeholders such as the Association of American Universities or the Federation of American Societies for Experimental Biology. However, the experts in charge of the NAS evaluations of SBIR pushed in the direction of the increases in SBIR set aside and award sizes; but the conclusions from the NAS reports (modest on the paper, but made visibly in favour of an expansion of the programme through hearings and on-line position papers) were disregarded and somehow circumvented by the stakeholders while arguments highlighting the value of SBIR for the academic community were pushed forward by the evaluators without finding any echo. Strategic Intelligence came in support to the expansion of SBIR but did not change the positions of political players, although the progressive integration in Departments (through SBIR managers) slowly broke down some barriers to SBIR recognition through Strategic Intelligence.
2. “Mill riding” issue. The 1987 SBA Annual report followed by the 1999 GAO assessment of SBIR got to the issue of the “*mill riding*” awardees receiving multiple awards and not showing growth as a result of their cumulated (11 or more) SBIR awards. Concern raised in the Congress about this issue while the NAS SBIR Chief Evaluator recognized as the most respected SBIR expert by almost all interviewees qualified this issue as an “*urban myth*” and even produced an NAS paper on the topic supporting the argument of the “*myth of the mills*” (see Wessner and Gaster, 2009) which was grounded into the NAS evaluations. Despite of these expert conclusions that provided a more nuanced view on the issue and showed it was not to be considered negatively, the House Committee positioned itself against the so-called “mills” and promoted the limitation of the number of awards an SBIR awardee can cumulate, which was assumed to lead to a shift of awards towards less participating States. This was based on GAO’s past statement that “*awards are proportionate to applications*”; the resulting misconception was fought against by Senate Small Business Committee members using the NAS Strategic Intelligence and experts at its source (see for instance Wessner, 2011). The philosophical position of the House won the battle to some extent against the evidence produced and directions suggested by the NAS. Transition and commercialisation benchmarks were introduced, negotiated upon with the Senate, which should restrict the access to SBIR by multiple awards winners.

These benchmarks are since the reauthorisation passed used as eligibility requirements for SBIR applicants but also for monitoring and control purposes as they should constraint programme implementation according to Congressional lines. Though comprehensive Strategic Intelligence did not lead to any change in positions, monitoring and metrics as Strategic Intelligence were generated and made inherent to SBIR functioning as a result from the political controversy and should therefrom frame the running of SBIR.

3. *“Venture Capital” (VC) issue.* This 15-year controversy found echoes in the media and is considered the most emotional SBIR-related controversy. In 2001 the SBA closed the SBIR access to Venture-backed companies majority-owned by one or more Venture Capital(s). This SBIR-specific issue became critical as it touched upon the definition of what an SME is in the United States. The new decision endorsed by the Administrative Law Judge modified the eligibility standards to access SBIR support: being an SME meant from then on being majority-owned by one of more *“individuals”* with an overall number of employees (combined to turnover limitations) bringing the total number of employees to a maximum of 500 (including affiliates). The rationale behind the restriction was that any SBC owned in majority by a VC had its internal decision-making under the control of this VC, which makes the SBC a VC affiliate that cannot be considered as a proper SME as the board is under the control of a larger company. The NVCA first together with BIO¹⁶⁸ (in collaboration with the Defence industry) were supported by the NIH (and later on by the House Science and Technology Committee) in first instance and used the 2003 pre-election opportunity window to spot the issue to fund raisers in political parties. The controversy confronted these stakeholders to the Small Business Community (NSBA and SBTC) backed by the SBA and later on also the Senate Small Business Committee. On both House and Senate sides the issue was used as to lever campaign money and positions got locked until a dead-end that forced confronting parties to find a compromise in order for policy making to go on. Strategic Intelligence was used all along as to provide conflicting parties with arguments drawn from the NAS evaluations and BIO/NVCA member surveys but also from SBIR data publicly available and mainly released by the SBA. While BIO and NVCA valorised internal surveys and studies, the existence of Strategic Intelligence was perceives as favourable to the Small Business Community which could make use of publicly available data and findings to build up their argumentation. Evidence was mobilized by stakeholders to argue during hearings or through position papers and communication material. Several interviewees even referred to the use of *“made up figures and data”* during the political negotiations between House and Senate. As a consequence of the intensity of that controversy, the Congress pushed the idea of an NIH-funded study on the topic that would be implemented by the NAS and which resulted in the 2009 *“Venture Funding and the NIH SBIR Program”* (NAS, 2009d).

¹⁶⁸ In 2013, BIO had lobbied on that issue for 9 years already.

The recommendations of the NAS study directed the parties towards a compromise that was eventually reached in difficult conditions: while the Senate ended up cutting a deal with VC supporters, the House was left in a stand-alone position while the decision was taken to allow a limited access to SBIR by Venture Capital Operating Companies (VCOCs). A last political fight between Senate members led the chair of the Senate Small Business Committee to force decision over the reauthorisation and related compromises through its integration into the 2012 National Defence Reauthorization Act (under Sec. 5107). Relevant modifications were made in the 2013 guide to SBIR eligibility and control modalities were set up in order to monitor VC-backed companies' access to SBIR awards.

Congressional Strategic Intelligence (Schacht, 2011) was mobilized to vulgarize and synthesize the issue, and Strategic Intelligence mechanisms were put in place to monitor the access of VCOCs to SBIR. In addition, studies are foreseen (grounded in PL) to be conducted by the GAO on the specific issue of VCs in SBIR, while monitoring of the VC-backed firms benefitting from the programme is operated through the Tech-net database (SBA, 2012) and the central company registry database¹⁶⁹.

1.1.3 Strategic Intelligence as a frame for perception and export resource: the American “Outward perspective” and limited learning from abroad

Embedded cross-temporal and transnational learning processes through Strategic Intelligence. Domestic Strategic Intelligence contributed to learning in different ways, for instance when introducing power relationships in a structural fashion through GAO studies or legitimizing the SBIR through the legitimate NAS evaluations. Also, an incomparable amount of PCP-relevant knowledge was produced through SBIR-focused Strategic Intelligence. Although the GAO studies were perceived as control and audit exercises, more comprehensive studies from the NAS, DoD (RAND) and NIH appeared more user-oriented. The hearings on “*the Hill*” are also key momentums and relay platforms for Strategic Intelligence to impact decision makers from the legislative branch, providing stakeholders and advocates with an arena for confrontation and diffusion of their policy arguments. A similar view exists with regards to conferences held in the country on the subject of SBIR. From a managerial perspective, Strategic Intelligence is less positively perceived as managers consider the metrics as a duty and evaluations as a repetition of what managers state during their interviews. The operational value of Strategic Intelligence would therefore be limited. But the use of Strategic Intelligence for legitimation purpose has been observed, for instance in the case of the NIH reports on its SBIR programme (see NIH, 2003, 2007 and 2009). The NAS and GAO studies are very often felt as tools for the Congress to pressure the executive branch.

¹⁶⁹ Source: 2011 SBIR Reauthorization Act, Sec. 5142.

In that sense, the extensive set of metrics and associated monitoring system are put in place as to allow Congress to exert more control over the implementation of SBIR on issues of prime political importance (commercialisation, VCOCs' access, "mills", etc.). A similar (political) instrumentation of Strategic Intelligence is to be observed when Strategic Intelligence outputs (reports mainly) are turned into arguments for political communication and negotiations. But Strategic Intelligence is also viewed as a relay of stakeholders' and managers' voices. Beyond informing policy and politics or having accountability and control functions, Strategic Intelligence also plays the role of discursive power tool especially mobilized in conflicting situations.

A last diffusion aspect to be linked to Strategic Intelligence is the one of "*rolling down*" of SBIR-related policy knowledge to the States which implemented complementary and matching measures but also benefitted from Strategic Intelligence-based knowledge of the programme to position themselves vis-à-vis the Federal programme.

A critical role of Strategic Intelligence along the SBIR lifetime was to shape the repository in which the programme is grounded and frame critical issues affecting the programme. The example of the use of the NAS expertise to clarify the VC issue or how Congressional Strategic Intelligence was used to track the evolution of the amendments proposed by the House and the Senate show how Strategic Intelligence provides a cognitive frame to approach the programme or the issues at its core. Also the progressive evolution of the programme towards a more commercialisation-oriented focus is exemplary in that regard. Two other key influences of Strategic Intelligence over SBIR have been observed during the conduction of the case study: Strategic Intelligence and in particular the NAS evaluations implicitly introduced two major models in the design of the programme, which are respectively the Valley of Death (see NAS, 2009) and the non-linear model of innovation (see NAS, 2004a). Both visions of innovation and systemic failures facing SMEs have been introduced by the NAS about 20 years after SBIR kick-off¹⁷⁰ as to justify and legitimize the programme (proved to be relevant when adopting both reading grids). That way, Strategic Intelligence made both concepts the ground for approaching SBIR and understanding its success. The involvement of academics is here perceptible, although the influence of academic work has been only be found at this level (Strategic Intelligence did not prove to be a key relay of academic advances or a relay for any other repository such as international ones). The impact of such influence is to be eventually considered at the level of the analytical tools (such as the Technology Readiness Level scale) used to analyse and implement the programme as well as the increased focus on commercialisation-oriented indicators such as sales, third-party funding, etc. (see NAS, 2008).

¹⁷⁰ These cognitive components were not part of the initial SBIR and were added to the building blocks of the programme *a posteriori* by the NAS evaluation which in that way brought a renewed version of the needs addressed by the programme and how innovation works in practice.

Moreover, following the same line, legitimate and credible Strategic Intelligence was sought by stakeholders and political entities in search of evidence-based arguments to argue in their own directions. Although their information gathering strategies plaid the role of “*lesson filter*” (filtering what should be taken up or not from Strategic Intelligence), the content filtered was still shaped and framed by Strategic Intelligence. Nevertheless, more concrete impact of Strategic Intelligence as lesson-drawing engine appear to be limited as highlighted through the “mills” and “set aside” controversies: the perception of the value of Strategic Intelligence is a limitation factor. It is nonetheless to be noticed that the case study highlighted the particularly important role of anecdotal evidence (case studies, success stories and Strategic Intelligence taking the shape of story-telling) in influencing policy makers’ decisions.

Overall and again at the level of perceptions, the NAS evaluations contributed to build a dominantly positive image of the SBIR despite of its limitations (see Edler et Al., 2013).

Foreign Strategic Intelligence and the repository shaping function: internal legitimation and perception building. The repository shaping function of Strategic Intelligence plaid a critical role in the problematisation of the issues the programme is to address. The first of all is the necessity for the US to drive innovation in a competitive context. International Strategic Intelligence was mobilized by domestic Strategic Intelligence in that regard, in order to highlight the rise of new competitors in the international economic arena. Foreign Strategic Intelligence was used (to a limited extent, but) to the purpose of justifying the importance of the SBIR, although international markets conquest is not monitored closely (see NAS, 2007). However the argument of international economic competition is expressly used in hearings (and regularly during Senate hearings), workshops and conferences by experts and advocates of the programme to legitimize SBIR in that sense. Another use of the competitive argument relates to the programme itself; using emulation as a success benchmark (the fact that the SBIR is emulated by other countries), SBIR advocates including NAS chief evaluator point at the diffusion of the SBIR model as a source of competition (other countries trying to compete with the US on the same policy level – see 2011 and 2013 Senate hearings as well as Wessner, 2008 and Tibbetts, 2008) and as a sign that the programme is a success. Reporting world-wide emulation of the programme through Strategic Intelligence led to comfort the general positive perception of the SBIR also in the US. Also the nature of foreign Strategic Intelligence itself is remembered as to imply the objectivity of the judgments formulated, making an evidence-based statement on the success of SBIR more credible and leading to further legitimation of the programme. The perception of SBIR as a successful programme was also shaped internationally through Strategic Intelligence produced for more than 33 years as the knowledge generated led to the constitution of an internationally and publicly available repository of Strategic Intelligence providing value judgments over the programme. However, the SBIR repository accessed during the case study was 100% American and no foreign source was referred to by the interviewees.

Strategic Intelligence and TRANSNATIONAL POLICY LEARNING dynamics in the SBIR Case. When considering the typology foreseen in (Chapter 2, Section 2.4.3), the SBIR case study shows very limited (almost none) learning from abroad while some active and passive export dynamics could be identified. The limited active and passive sourcing is mainly explained by the limited organisational absorptive capacity (time and HR) as well as cultural factors (existence of an American-centred culture referred to by several interviewees). Also, the unique scale of the SBIR and the fact that the American programme is older than any of its international counterparts did not incentivize officials and stakeholders to look for equivalent foreign practices (no comparable benchmark). The case study points to the overall design and implementation but also Strategic Intelligence generation and use processes tending to be operated in a closed circle with no or limited “*outward perspective*”. However, some active and passive outward dynamics could be identified.

As many countries in the world sought to emulate the SBIR model, several actors from the American SBIR system passively respond to foreign enquiries. This mainly goes through foreign delegations connected to relevant entities through the diplomatic corps or using existing connections (in the Congress or at the level of the Departments’ international offices for instance). Visiting delegations would come prepare and be explained fundamentals of the SBIR in one or more meetings with American officials and NAS expert(s), before leaving back home with the relevant Strategic Intelligence (almost always the NAS evaluations) in their luggage. The SBA plays a particularly important role in that regard as one of the 4 to 5 HR in the SBIR unit is in charge of that transnational function (receiving foreign delegations twice a week on average). Delegations are usually aiming to adopt an SBIR-like programme or to improve their on-going similar initiative with as an objective to tailor the lessons learnt to their own national context. Conferences also provided SBIR with more visibility world-wide, as they constitute a glass to the programme in other countries. No specific effect of these conferences could be grasped during the case study, but it has been acknowledged by several interviewees that SBIR experts are called abroad to present the SBIR programme. This dimension particularly underlines the role of transnational experts’ communities which also link to foreign policy makers during international meetings. Active promotion and export of the programme lied in a very limited number of individuals, all having the status of expert. The main actor promoting the SBIR programme abroad is the lead evaluator of the SBIR from the NAS who (it was confirmed by a number of interviewees) came to evaluate SBIR with neither prior knowledge nor any a priori and became convinced by the value of the programme along with the evaluative work of the NAS over the first decade of the 21st century. Now a well-known advocate of the programme, the expert voluntary promotes the programme (see Wessner, 2010, 2011 and 2013 and responds to foreign queries. A few other experts also play such a role, however to a less visible extent (see Link, *no date*). Domestic Strategic Intelligence is here selectively used to build a set of references and repository content (understanding of the programme and of its impacts) to promote SBIR internationally.

Some interviewees expressed their interest in promoting and/or learning from abroad but mainly referred to material constraints (time and money) as well as cultural (for instance language) barriers to such a proactive attitude.

1.2 Synthesis of Case Study 2 – The Small Business Research Initiative (SBRI)

1.2.1 The SBRI case in context

A British version of SBIR. 20 years after SBIR was launched, many countries from all continents in the world adopted a similar programme. Many of these countries called upon the NAS expertise to set up or improve their programme. In the EU, the UK was the first adopter of an SBIR-like programme in 2001, followed by the Netherlands in 2004. Strategic Intelligence played a role in both cases as to shape the design and implementation of the domestic initiatives, and in the UK the emulated programme had an important impact on innovation policy making. Mainly presented as a demand-side measure making use of the leverage power of procurement, the Small Business Research Initiative (SBRI) introduction in the UK coincided with a growing interest in Pre-Commercial Procurement (PCP), the Valley of Death and early-stage SME support needs. Like its American counterpart, the initial finding of the relatively small place of SMEs in procurement markets led to SBRI kick-off while in parallel, knowledge was developed at the EU level inspired from the SBIR and SBRI experiences (in US and EU) which led to the development of the PCP framework of the European Commission. Starting from the 2000-2010 Lisbon Agenda development plan, the EC agenda headed towards further recognition of the role of public procurement in 2003 and 2006 (publication of the Aho report) in the creation of lead markets and improvement of public services (Rolfstam, 2008 and 2013) through demand-led innovation. The development of the PCP framework at the EU level (under procurement legislation) impacted the middle- and later development stages of SBRI in the UK through different learning channels such as EU platforms. Both inspired each other, sometimes through legally constraining interactions (Carpinetti et Al, 2006), and in different ways which are further depicted in Annex 2, Section 0 and in particular 3.2.

Common and diverging blocks and features. The British emulation of the American SBIR lies on a similar paradigmatic basis: the SBRI was grounded into the belief of an increasing international competitive pressure taking place at the global level. Influential policy and Strategic Intelligence references (DTI 1998 Competitiveness White Paper, DIUS 2008 Innovation White Paper, 2007 Sainsbury Review, etc.) underline such pressures facing “*knowledge-based economies*” which constitute the overall framework in which the SBRI was developed and implemented. The SBRI adopted a similar rationale to SBIR and tended to get as close as possible to the American raw model along its iterative changes. The main principles (competition, standard mechanism, innovation focus, possible use of procurement, etc.) were taken up.

But some tailoring took place with further attention being paid to the role of procurement in the functioning of the initiative which was affected by the concepts of PPI and PCP and is considered as part of the innovative procurement strategy of the British government (see DIUS, 2008 and TSB, 2014a), although it was eventually recognized as a PCP (OGC, 2009). The key building block that was put at the core of the rationale of SBRI was the idea of “*purchasing*” or “*buying*” (DTI, 2004; CBI and Qinetiq, 2006; NESTA, 2010) power of public authorities which can use that PCP opportunity (Golding, 2011) to become lead/early-adopters (DIUS, 2008). SBRI positions government as lead customer (TSB, 2011) to support SME seed funding. The State is given an interventionist role comforted by new developments (see Mazzucato, 2013) conceptually reconciling the State and the economy in the mind of officials (source: interviews). If SBRI ought to provide government with relevant technology-based solutions (DH, 2013) for better public services (aspect that is made more visible in the UK case than in the US one), it is also aimed at supporting the route to market and support companies crossing the Valley of Death. Commercialisation through public or private market mechanisms is therefore a central notion to the programme and got reinforced with the uptake of SBRI coordination by the Technology Strategy Board (TSB), the British industry-oriented innovation agency.

Last building block of the programme’s rationale, although the SBRI cannot be restricted to SMEs, it emphasized the SME target groups and potential benefits rather than larger companies.

From a more technical point of view, the SBRI initiative differs from the American model as it is first of all not based on any legal mandate. The Departments were only incentivized to use the mechanism by HMT-fixed targets¹⁷¹, and for long SBRI was only used by ministries on a voluntary basis. Policy initiatives rather emphasize the process rather than the objectives of the SBRI: targeting SMEs in particular (but not only), the scheme provides direct support for feasibility research and prototyping/technology development in two phases (TSB, 2011) with amounts proportionally similar to the US scheme¹⁷². Placed under procurement law (which allows 100% cost coverage through contracting with the external R&D performers), the SBRI is positioned vis-à-vis other policy measures (Forward-Commitment Procurement, R&D Tax Credit...) and expanded with the introduction in 2009 of a NHS-specific Phase 3 (SBRI Healthcare, 2014) with similar aims to the American model (technical support¹⁷³). A comparative view of SBIR and SBRI is offered in Table 19.

¹⁷¹ The spending targets introduced in 2013 consist in £100m in total with £50m to be spent by MoD, £30m by the NHS, £7m by MoT and £3m by the DECC and DEFRA.

¹⁷² Awards size varies from £20k to £100k for Phase 1 (over a 9-month period) and go up to £1m for Phase 2 (to be conducted in 2 years maximum).

¹⁷³ Mainly in the form of health economists support to companies but also to be used by NHS to show success to policy makers.

The use of SBRI proved to be very limited for about 10 years (up to 2009) and has nothing comparable to the scale of the American SBIR (Connell, 2014). But overall, the SBRI use expanded over time until the critical introduction of targets in 2013 which are expected to boost SBRI spending. In terms of governance, SBRI followed a centralisation path: central coordination was given to TSB in 2009 (TSB, 2012) after management was operated at the ministerial level. The executive branch (Chancellor of the Exchequer and HMT in particular) has been more and more influencing in terms of decision making, especially with respect to the non-mandatory nature of SBRI use by ministries later followed by the setting up of ministerial targets. Westminster did not play an important role in SBRI change, although Members of the Parliament (MPs) played a critical role in bringing up issues to the executive branch. Although SBRI implementation should take place at the level of the ministries and agencies, SBA remains central in co-funding and supporting the organisation of these competitions. Repository constitution and awareness raising complement the functions of the TSB, re-baptized Innovate UK in March 2014. The agency is still positioned under the Department for Business Innovation and Skills (BIS) in charge of strategic aspects related to the initiative. Organisational resistances developed in ministries against SBRI integration for reasons that are both related to resource availability (time and money) and cultural issues (innovation and procurement as “oil and water”¹⁷⁴).

Available to all public entities, the SBRI is however barely used by most targeted entities, although the largest ministries are progressively coming to an increase (and partly constrained) use of the mechanism while some of them even proactively develop their appropriation of it (mainly the NHS through the SBRI Healthcare¹⁷⁵).

1.2.2 A decade of emulative interactions between Strategic Intelligence and SBRI

Strategic Intelligence in the SBRI context. SBRI-related Strategic Intelligence is of a quite different nature compared to SBIR-related Strategic Intelligence. The generation of Strategic Intelligence exponentially grew over the past decade and was initially referred to as to identify needs and challenges to be dealt with by the Government. Although Strategic Intelligence is produced at the BIS level, the Strategic Intelligence that impacted SBRI and its development/integration in the UK was mainly Strategic Intelligence that was not commissioned neither by BIS nor by the TSB. SBRI in the UK is not associated to any legal obligation of evaluating the scheme and monitoring is mainly operated at TSB level. Influencing forms of Strategic Intelligence included Status reports issued by Departments and calling upon key political figures to provide a meta-analysis of a given topic to be released by a ministry (BIS, DIUS, etc.).

¹⁷⁴ Source: interviewee.

¹⁷⁵ See SBRI Healthcare, 2009.

In general these studies come to flag critical issues on the basis of evidence analysed at a “meta” level, and can form the ground for renewed policy (see for instance the Sainsbury Review published in 2007). Monitoring mechanisms are a second source of Strategic Intelligence mainly operated at TSB but also HMT and in relevant ministries (see for instance the evidence presented in NHS, 2014) using key indicators (SBRI expenditures, licensing, etc.). Especially TSB (Innovate UK) project and programme monitoring based on the 6 guiding criteria¹⁷⁶ of the agency (rather performance-oriented) appear to play a central role in terms of impacting SBRI management at the agency. One of the most powerful forms of Strategic Intelligence in the SBRI context remained what was called in this dissertation “privately-initiated studies” which were mainly self-initiated by the authoring individual(s) or organisation(s). Usually more focused than status reports, they remain different from policy briefs or lobby material as they are grounded in evidence-based analyses (or at least claim to be so) and are not intended to defend the interests of a specific group (although they can be unbiased and directed towards decision makers as to influence policy). Strategic Intelligence is also produced at the level of the legislative branch(es), for instance when 1) status or synthesis reports are generated by the services of the Parliament of the United Kingdom or the Northern Ireland Assembly Services¹⁷⁷; or when 2) hearings lead to the production of committee reports which enter in that category¹⁷⁸. This specific form of Strategic Intelligence implies that knowledge is issued by experts, officials and political representatives to be relayed and discussed during the committee hearings in order to eventually end up integrated into a consolidated version made final report.

Specific sources of Strategic Intelligence (almost exclusively taking the form of studies) play a particularly important role compared to any other Strategic Intelligence source. Those are especially the reports produced by an expert considered as “*lead SBRI expert*” in the UK and at the source of the British emulation of SBIR and a critical part of its progression in the UK, and some targeted reports of different natures (Sainsbury review, NESTA reports, etc.). Other forms of Strategic Intelligence were also identified such as the on-going SBRI evaluation (first of its kind) and stakeholder organisations’ contributions, although these proved not to have a significant impact over the SBRI trajectory compared to more influencing (although not critical) sources such as EU-funded projects on the topic of PCP.

¹⁷⁶ Scope, time; costs, exploitation planning, risk management and project planning; See Annex 2, Section 2.1 as well as related Figure 43 and Figure 44.

¹⁷⁷ See the Northern Ireland Assembly Research and Information Service Briefing Note on the SBRI (2012).

¹⁷⁸ See for instance House of Lords Science and Technology Committee (2011) or House of Commons Science and Technology Committee (2013).

SBRI and Strategic Intelligence: co-construction over time. It is possible to dissociate between three main periods of SBRI interactions with Strategic Intelligence. These periods cover the entire lifetime of the programme and highlight the role of Strategic Intelligence as a central vector of both cross-temporal and transnational policy learning.

1. Initiation. By the late 1980s/early 1990s the American SBIR came to the attention of a venture capital expert contributing to Thatcher's newly created committees on small business policy. Some lessons were drawn from the SBIR experience in the US and included into the recommendations of the committee without further action. Later on, the same expert pushed by a 9/11-related security market opportunity to enter in contact with the British government found that no public support mechanism allowed the uptake of relevant detection technologies while SBIR was benefiting American competitors. Driven by "*national interest and competition*"¹⁷⁹, the SBRI expert exchanged with the Minister of Science and Innovation Lord Sainsbury who launched in 2001 the first SBRI based on the American model in appearance but missing its substance. DTI (2003) acknowledged the "*need to do more*" in order to improve and reinforce the SBIR-emulated initiative and its coordination; the ministry took initiative in dialoguing with and collecting data across ministries in that regard.

The first version was indeed a non-mandatory set aside targets (2.5%) for extramural R&D expenses (DTI, 2008) to be in place by 2004/05 (DTI, 2003). This voluntary mechanism (Lord Sainsbury of Turville in House of Lords Select Committee on Science and Technology, 2010a) was however only used by the ministries to advertise contracts allocated to SMEs in order to show compliance with the SBRI indicative targets, making the scheme a reporting mechanism (Matrix, 2008; Bound and Puttick, 2010) with no substance (Connell in Richard, 2008). SBRI Mark 1 became a failure (NHS, 2012) and fell "*a long way short of its US counterpart*" (Connell, 2004). Followed the DTI 2004 5-year programme calling for a better use of SBRI as procurement-oriented tool. By the same year, the expert at the origin of the SBRI concept launched a campaign for a better emulated version of SBRI. The campaign supported by MPs and key stakeholders targeted the executive branch and made use of the media, a Private Members Bill, a "*White Paper*", an Early Day Motion and meetings with ministers and high-level officials (Connell, 2014) to gain in visibility until the expert's proposals were integrated in 2005 as part of the budget.

¹⁷⁹ Source: interviewee – DC.

In concordance with the campaign, the same expert released on behalf of its VC-company a self-initiated study formulating an evidence-based proposal¹⁸⁰ for SBRI based on a critical review of SBRI failure and systematic comparisons with its American counterpart as well as targeted success stories (Connell, 2004). Following up on the framing work operated by the expert through this report, Gordon Brown included the central recommendation from Connell (2004) which was a “*mandatory 2.5% target (worth around £100m per annum)*” for all government into the 2005 budget (Connell/NESTA, 2010; NESTA, 2007; Richard, 2008).

2. Failure and reinforced learning through Strategic Intelligence. The leading SBRI expert initiated from then on a number of studies aiming to foster the emulation of the American SBIR, making use of and referring to foreign Strategic Intelligence (mainly SBIR-focused from the US, such as the NAS evaluations). This Strategic Intelligence was biased in that sense and was used for advocacy purposes through channels opened by the political contacts (from the legislative branch) of the expert which led to the top executive positions and their occupants. MPs even called for further use of foreign Strategic Intelligence (see Box 65). The complex iteration game between the expert (holding a central advocacy position in that negotiation landscape) was slowed down by resistances from the side of the administration (officials advising political representatives). Cultural but also organisational capacities were identified as issues leading officials to consider SBRI as an “*R&D tax*” over ministries such as in the US. Among the official causes of administrative resistance to SBRI, was the issue of State Aid compliance which was put forward as an argument not to setup an SBRI that would cover 100% of companies’ R&D costs. Making use of another Strategic Intelligence exercise, the lead expert clarified that issue in Connell (2006), showing a path through procurement legislation for SBRI to be implemented legally. The report inspired by the success of the US in a competitive economic context and the success of SBIR in particular, benchmarked the British initiative and its failure to the SBIR design and its (perceived) success. The report was even endorsed by MPs formally (foreword) and informally (promotion). SBRI Mark 2 was to be launched after multiple contacts between the expert and ministerial officials and electives. By this time, the use of SBRI by the ministries did not lead to any success: although the targets were formally met, an analysis of the content of the contracts signed led to the conclusion that almost none of these contracts fitted the technology development purpose of SBRI (see DIUS, 2008) and no organisational change could be observed in the ministries (Connell, 2010a).

¹⁸⁰ Starting from the idea that “*What the SBIR programme does in the US (and SBRI should do in the UK) is to greatly simplify and speed up the process of awarding Government contracts to fund early stage, research and development programmes*” (Connell, 2004).

In parallel, the Sainsbury Review (2007) was directed by Lord Sainsbury himself on behalf of DIUS, mobilizing the SBRI expert and including visits to the US (meet up with the lead SBIR evaluator from the NAS, DoD, DoE, and NIST) where the American SBIR and the British experience were discussed in order to draw additional lessons for the UK delegates to take back home and use in their review of UK innovation policy. Among other priorities, a new role for TSB to become a more central actor in the UK innovation system appeared to be key as TSB would later (in 2009) be charged with SBRI implementation. TSB was made an industry- and user-oriented agency partly inspired from the American DARPA. Overall, the Sainsbury Review was explicitly inspired by the American experience (see Box 69) and provided SBRI with greater visibility in the innovation policy area. The resulting report entirely took up the recommendations formulated in Connell (2006) regarding SBRI. Especially the recommendation regarding the establishment of a process similar to SBIR was to be taken up. The initial “Secrets Report” (by reference to Connell, 2006) which became the central repository for SBRI was therefore relayed by the Sainsbury Review which was itself to be taken up – in full – by the DIUS 2008 “*Innovation nation*” White Paper and eventually the March 2008 budget after approval by the Prime Minister (DIUS, 2008a; Connell, 2010 and 2014).

3. Further efforts to emulate SBIR through Strategic Intelligence. While previous versions of SBRI were considered as failures (Connell, 2009), the targets also proved to be insufficient to make SBRI effective. However, the development of a process by and the centralisation around TSB¹⁸¹ were instrumental factors of progress leading to first pilots (MoD and NHS) in 2008 before the initiative rolling down to the other entities by 2009 (Bound and Puttick, 2010). This post-Sainsbury Review SBRI also called “*Mark 3*” (Connell, 2010a; interview, FH) finally started to look like the American SBIR and was the result of an important Strategic Intelligence-based campaign (Connell, 2014), Strategic Intelligence being used to flag failures and identify policy (SBRI) development tracks (see for instance Box 74). The embedded nature of Strategic Intelligence also proved to be of importance as the lead SBRI expert contributed to strategic Status Reports (see Richard, 2008) with political visibility and the related impact¹⁸² as the content taken up from the “*Secrets Report*” confirmed the need for further emulation of the SBIR. Further investigation of the Sainsbury Review and the process of its uptake shows that the involvement of the most influencing self-initiated Strategic Intelligence author led to critical discussions and interactions in the government (from both political and administrative standing points).

¹⁸¹ Charged with the SBRI coordination from 2009 on, two years after the agency effectively came into function in the British innovation system.

¹⁸² The Richard report was initiated by David Cameron.

Also Strategic Intelligence progressively reframed some paradigmatic view on SBRI, shifting it to the “*demanding innovation*” side, reaffirming its link to procurement and related value¹⁸³, and refocusing the initiative on technology development and prototyping (DIUS, 2008a). Again, implementation was problematic: though targets were fixed, ministries did not commit to them and did not make use of the TSB process (Connell, 2010a) leading TSB to adopt a promotion role combined with competition co-funding. In parallel, Strategic Intelligence exercises whether endorsed or not by experts (see Connell and Probert, 2010; as well as Tredgett and Coad, 2014) relayed the idea that SBRI should be “*scaled up*” (Bound and Puttick, 2010; Connell and Bradshaw in House of Commons Science and Technology Committee, 2013; and Gray in House of Lords Select Committee on Science and Technology, 2010a) for better alignment of SBRI with SBIR.

Strategic Intelligence such as studies and reports (used as channels or outputs) and hearings (discursive platforms diffusing to MPs) was here the relay of expert advice towards policy makers. Recommendations were channelled to HMT and other government representatives by NESTA (who involved the SBRI lead expert in several of its studies but also in SBRI promotion meetings with high-level officials¹⁸⁴) and other organisations (for instance the IET¹⁸⁵) as well as individuals (MPs). Further to these targeted operations, came hearings by the House of Commons and the House of Lords committees in charge of Science and Technology issues. These thematic committees led to integrating SBIR (first) and SBRI as part of the solutions presented to deal with issues such as innovation through procurement¹⁸⁶ and the Valley of Death. Committee hearings and related written contributions operated a definitional role (pedagogic access to expert knowledge by MPs and relay of stakeholders’ and officials’ views) and linked existing Strategic Intelligence to Westminster (enlargement of Strategic Intelligence outreach). The particular role of experts coming with legitimate analysis power is important in that regard. References to the US model(s) and needs to be addressed were particularly put forward to committee members by influencing speakers. The 2011 committee report on procurement and innovation triggered a response from the Government (2011) which ensured SBRI would be continued and reinforced. SBRI evaluation also suggested by leading experts during the committee was also taken up (see Georgiou and Edler in House of Lords Select Committee on Science and Technology, 2010a) and is currently being implemented by an external contractor.

¹⁸³ See Connell, 2010.

¹⁸⁴ Source: interview – SW.

¹⁸⁵ See Box 74.

¹⁸⁶ See House of Lords Select Committee in Science and Technology (2010a) on Public procurement as a tool to stimulate innovation.

Initiated in 2011, another similar process dealing with the issues of the Valley of Death and related commercialisation challenge followed in 2013 which involved a similar pool of experts and identified SBRI (and de facto SBIR) as a good policy practice to bridge the Valley of Death. Other sources of Strategic Intelligence kept flowing in parallel of the committees, in a context of organisational resistance by the ministries which was partly linked to an inadequacy between the technologies and markets (for example, large Defence systems) dealt with and the conditions of SBRI.

However since the 2009 uptake of the initiative by the Strategic Health Authority in East England NHS, the NHS appeared to show a growing and proactive interest in SBRI which is perceived as a mechanism that can effectively improve health services (NHS, 2012). The success of the integration of SBRI was correlated with the advice and support (also institutionally formalized through board membership, etc.) from the lead SBRI expert. Further progress could also be observed as the Government “*took a step change in SBRI spending*” (NESTA, 2013) with the introduction in 2013 of real mandatory targets¹⁸⁷ for 2013-2014 applied to the six main government ministries¹⁸⁸ (HMT, 2013). Strategic Intelligence issued by BIS (2014) and making use of showcases justified the SBRI expansion in Departments, but still impressions remained by the time of the field research that the targets would not be achieved and that inter-ministerial negotiations would lead to reconsider their achievability. The main role taken up by TSB (re-baptized Innovate UK in March 2014) is therefore quite focused on raising awareness about the benefits of SBIR and SBRI (making use of domestic and NAS Strategic Intelligence) across ministries, coordinating and co-funding competitions for which challenges are identified by the ministries, but also evaluating the initiative by 2015 (TSB, 2014).

Strategic Intelligence and SBIR/SBRI integration: 15 years of (difficult) cross-temporal learning.

Field research shows that monitoring plays an important role in terms of agency-level cross-temporal policy learning. Overall, Strategic Intelligence greatly influenced SBRI policy change over time, through a combination of intertemporal and Transnational Policy learning taking place through it in several ways: instrumented in the political game, Strategic Intelligence also played a structural role through the setting up of platforms and fora, some of them further described in Annex 2, Section 3.2.2.

¹⁸⁷ See George Osborne’s Budget speech in full, 2013 - the Chancellor of the Exchequer to the House of Commons ; also available at <http://www.telegraph.co.uk/finance/budget/9942779/George-Osbornes-Budget-speech-in-full.html>.

¹⁸⁸ Namely MoD, NHS, DfT, HO, DECC and Defra.

If Strategic Intelligence frameworks¹⁸⁹ and related methodologies were not inspired by foreign Strategic Intelligence but drawn from policy and organisational priorities, references to the American model were made in many instances and success stories taken up from the SBIR experience were pushed forward as illustrative of the benefits of the scheme and why and how to better emulate it. Also conceptual guidance was provided, from the “*soft company*” model (Connell, 2004) to the procurement and presumably Valley of Death-crossing functions of SBRI as understood from the American experience. As for the American SBIR, the SBRI progressively shifted towards a more commercialisation-oriented nature (see Box 82). Strategic Intelligence is also used as the main repository for advocates (whether at Innovate UK or specific individuals) to promote SBRI.

However, the integration of the initiative into ministries and agencies remained difficult all along (Connell, 2009) as no dedicated budget was allocated and organisational resistances (both cultural and material) hampered the utilisation of the initiative by the Departments (see Box 83). On the other hand, political and policy learning took place, both embedded through Strategic Intelligence which also had a transmission chain nature in the policy process. Political learning mainly took place at the level of the executive branch and later on in Westminster (while in the US, political learning mainly took place in the arena of the Congress). This had an impact on how the transferability of SBIR was shaped as the British model was refined on the basis of discussions between experts, stakeholders and policy makers. The transfer of SBIR to the UK was that way focused on main building blocks and features¹⁹⁰ rather than technical details which were tailored to the national context.

1.2.3 Role of Strategic Intelligence in Transnational Policy Learning: understanding the UK SBRI “emulation” process of SBIR

Strategic Intelligence and transnational uptake of SBIR in the UK: forms and conditions of the uptake. Emulating the British government initiative, each of the UK devolved governments (Wales¹⁹¹, Scotland¹⁹² and Northern Ireland¹⁹³) got involved in at least one SBRI competition and even pursued the integration/adoption of the mechanism (see Box 84). Such process greatly benefitted from Strategic Intelligence as a source for informing politics and policy.

¹⁸⁹ Approaches, questions, criteria, indicators, descriptors and sources.

¹⁹⁰ Rationale, challenges addressed and objectives.

¹⁹¹ See <http://business.wales.gov.uk/news-events/news/funding-public-sector-work-welsh-businesses>.

¹⁹² See <http://business.scotland.gov.uk/view/funding/small-business-research-initiative-sbri>.

¹⁹³ See http://www.detini.gov.uk/dt1_13_0160607_sbri_-_evidence_pack_-_final.pdf and <http://www.niassembly.gov.uk/Assembly-Business/Committees/Enterprise-Trade-and-Investment/Reports/End-of-Session-Report-1-September-2012---31-August-2013/>.

The high share of SMEs in the Northern Irish economy (FSB, 2009), the fact that it was the first devolved government to adopt SBRI (FSB, 2013 and Northern Ireland Executive, 2014), as well as recommendations from a number of interviewees led to consider the devolved government as a focus case for studying the issue of sub-national SBIR/SBRI policy learning through Strategic Intelligence. In a context of political awareness about PCP, the launch of SBRI in Northern Ireland (NI) benefited from an opportunity window with three main dimensions: 1) appointment of a new Finance Minister 2) bad procurement performance calling for solutions to grow companies, improve commercialisation and public services and 3) 2009 national re-launch of SBRI.

The Matrix Panel report in 2008 entitled *“Public procurement of innovative science and technology solutions”* (which benefitted from the contribution of the author of the “Secrets Report”) was released and took stock of EU trends in the use of procurement for innovation but especially referred to the SBIR as “universally recognised as the main inspiration for” these developing policy trends¹⁹⁴, recognizing at the same time the failure of SBRI and the needs identified by the Sainsbury Review and based on the Secrets Report (Matrix, 2008).

Describing the Dutch SBIR experience and referring to the State Aid issue, the report aimed towards an emulation of the Dutch and American models which progressively took place, with first competitions which did not lead to follow-ups but also (and especially) through structuration and capacity building across Departments facing critical mass challenges from a procurement point of view. The initiative was driven by the administration and did not involve any political opposition or agreement. Similar resistances than in the US or at the UK level were found in Northern Ireland which correlated with the ones found in Wales (see Box 86), mainly expressed through legality (compliance with the EU State Aid Framework) and resource arguments but were also perceived as cultural (conservatism and risk aversion). However, specific policy entrepreneurs (officials) sourcing their knowledge in domestic Strategic Intelligence were highly instrumental in pushing the SBRI through, leading to permanent HR positions which were put in place by 2013. Their advocacy work was supported by Strategic Intelligence produced at the devolved government level such as the 2012 Briefing Note published by the Northern Ireland Assembly Research and Information Service on SBRI (which made use of success stories to illustrate its success potential), and a DETI paper published in 2013/2014 in which a section was dedicated to evidence from SBRI and SBIR experiences. Also knowledge issued from EU projects was used in the policy reflection on SBRI. Learning also took place bottom-up, from NORTHERN IRELAND to Defra for instance which drew lessons from the Northern Irish experience. The knowledge base paved the ground for the policy entrepreneurs using it to ground SBRI as a mechanism ministries can call upon.

¹⁹⁴ In that regard, the report mentions that the benefits of SBIR have been « *extensively described elsewhere* », taking as main examples two papers authored by D. Connell (2004 and 2006).

If the understanding of the main building blocks and how to mobilize them was inspired from abroad, management and implementation modalities remained entirely based on TSB material. In practice, TSB, Invest NI and DETI coordinate the implementation (TSB, 2012), benefiting from NORTHERN IRELAND political endorsement and all working on raising awareness across Departments to promote the utilisation of the scheme so that these would make use of the mechanism either at the Department level or through Innovate UK. The 2014-2025 Innovation Strategy for Northern Ireland even committed to *“provide further investment (...) and investigate the development of a central fund, to co-fund SBRI projects”* (Key Action N°15) as recommended by Connell in his latest contributions in Westminster hearings. Two new actions (D9 and D10) in the new strategy formalized this commitment, and optimistic views are dominant as policy entrepreneurs keep working on SBRI integration.

This process of sub-national uptake of SBRI sheds light on how Strategic Intelligence was instrumental in the process of Transnational Policy learning beyond (or rather through) the national borders of the UK. The SBRI is benchmarked to SBIR¹⁹⁵ and comes as an answer to missing blocks in innovation policy mixes as well as to foster growth. Success here remains a key reason to benchmark SBIR as a product of the US contributing to the competitiveness of the country. But the process of transfer in se is not questioned by anyone. It is clear from the first case study that the US played a passive (*“export”*) role in the diffusion of SBIR to other countries, including the UK. The second case study shows that the British scheme was tailored to the national (destination) context through Strategic Intelligence initiated and pushed through all policy steps and lines by a key policy learning entrepreneur in the lead with the cooperation of other entrepreneurial change agents.

Domestic Strategic Intelligence in the UK linked back to American Strategic Intelligence as a repository from which to source arguments stored in the form of evidence. The role of the expert as depicted by Connell (2006) is here to guide the sourcing in order for the *“right”* information (transparent and accessible) to be channelled, but also to diffuse through his involvement in boards and other Strategic Intelligence exercises. The expert therefore filters policy-relevant knowledge and arguments. Strategic Intelligence also opens inter-personal learning channels as it led Sainsbury, Connell and others to exchange with SBIR experts and policy makers in the US to learn from them. Also a very limited promotion effort could be observed from the American side which led the NAS lead evaluator to make recommendations to the House of Lords Select Committee on Science and Technology (2010a). But the Transnational Policy learning dynamic was driven by *“expert demand”*, real engine for importing SBIR. Obviously the process of Transnational Policy learning was here embedded to the cross-temporal dimension as Strategic Intelligence was used to design, re-shape, and monitor the SBRI.

¹⁹⁵ Source: Bound Volume Hansard - Written Answers, 26 Jan 2006 : Column 2350W—continued, available at <http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo060126/text/60126w32.htm>.

As the main piece of the SBRI repository, the Secrets Report benchmarking the scheme to its American counterpart appears to remain central. Learning from other countries than the US did not take place except for one personal channel leading NORTHERN IRELAND to draw some of its inspiration from the Netherlands. As for the US, in the UK learning from countries with shorter experiences in PCP and limited capacities were key reasons for such restricted learning. Success is also a key decision factor as the US are seen as leading performers/innovators. However, collaborations with EU partners seems to progressively open (inter-agency, etc.) to more learning-oriented cooperation. Some steps could be identified along the learning journey associated to SBRI:

1. Detection (Screening and identification of SBIR as good practice during a committee and on the basis of experience)
2. Sourcing (mainly building blocks and key features rather than technical aspects of SBIR)
3. Reception and uses (translation of SBIR into SBRI as well as political and technical utilisation forms, leading to a policy knowledge uptake driven by the idea of “success” and turned into action)
4. Cascade integration (overcoming barriers through Strategic Intelligence utilisation and diffusing to sub/extra-national entities)

Box 12: Transnational Policy learning entrepreneurship as the corner stone of SBRI

Both the American and British cases emphasize the critical role of “Policy Learning Entrepreneurs” proactively undertaking inward and outward policy learning actions through or on the basis of their Strategic Intelligence experience. More than instrumental, the role of the lead SBRI expert in the UK was even central in that regard. Characterized by an absence of economic interest in the TRANSNATIONAL POLICY LEARNING process and a strong belief in the value of the instrument transferred, Transnational Policy learning entrepreneurs are also partly driven by achievements and symbolic retributions as well as the acquisition of social capital, which they mainly use in order to promote SBIR-like initiatives domestically, sub/supra-nationally, or abroad. In both cases, the proactivity of the experts playing an interface role between knowledge and policy came to the edge of advocacy and was a main factor in the learning processes observed, whether in their home country (see Box 89) or abroad (see Box 87 and Box 90).

Perspective on the role of supra-national organisations. The Organisation for Economic Co-operation and Development (OECD) and the European Commission (EC) which acts on behalf of the European Union are known for their influence over national innovation policies.

Among others, they play the role of “*informal*” and “*official forums for cross-national learning*” (see Rose, 2005) bringing altogether expert, stakeholder and policy communities. Institution such as the EC also mobilize “*soft*” instruments such as the Open Method of Coordination (OMC)¹⁹⁶ or even Strategic Intelligence which shows new ways of governing and is very often underestimated (Kassim and Le Galès, 2010) and even fosters “*isomorphic processes*”¹⁹⁷ in a catalytic way (Radaelli, 2000). In the process of strengthening transnational relationships (Evans, 2009b) organisations like the EC tend to use expertise for different purposes, expertise which instrumental nature has been little explored (Radaelli, 2009). This is also the case of PPI and PCP issues which were “*picked up*” by both the EC and the OECD as highlighted by Lember et Al. (2014), aiming to the diffusion of such policy models (Edler, 2013; Uyarra, 2013a). As a forum (Rose, 2005), the OECD especially emphasizes the learning dimension in its activities. But its influence in the present case was definitely limited as the demand-side of innovation came to the organisation’s agenda late after the initiation of SBRI in the UK.

Although it came to study SBIR and SBRI as good policy practices¹⁹⁸ (though in a less positive way than what could be observed in domestic Strategic Intelligence studied in the US and in the UK in the context of the field research), the first Project on Demand-Side Innovation Policies was launched in 2008, followed by a second one (entitled “*Demand-side Innovation Policies*”) in 2011. However, the OECD follows a tradition of mobilizing national experts (mostly academic) in the process of drafting its key reports. In that sense, the OECD sourced knowledge on “*intelligent demand*” from UK-based experts (from MioiR but also others¹⁹⁹) but also others with knowledge of both SBIR and SBRI in the context of the OECD work on “*Intelligent Demand: Policy Rationale, Design and Potential Benefits*” (OECD, 2012).

At the EC level a multiplicity of functions and Strategic Intelligence exercises play a role of identification and promotion of SBIR and SBRI as good policy practices to learn from by the Member States²⁰⁰.

¹⁹⁶ See http://europa.eu/legislation_summaries/glossary/open_method_coordination_en.htm.

¹⁹⁷ According to Radaelli (2000); this concept was borrowed to organizational sociology and emphasizing the external influences on internal change.

¹⁹⁸ See the policy brief entitled “*Public procurement programmes for small firms – SBIR-type programmes*” mainly based on Connell’s and NAS reports; or the on-going work being conducted on measuring the link between public procurement and innovation. However these elements of the OECD Strategic Intelligence repository did not reach officials and most of the experts involved in the British SBRI according to the interviews.

¹⁹⁹ One could for instance mention “*Public Procurement of Innovative Solutions A policy tool for the service sector?*” by Dr Patries Boekholt, Managing Director Technopolis Group in Amsterdam in the context of the OECD Expert Meeting KNOWINNO on the 20 March 2012; noticing that the Technopolis Group headquarters are based in Brighton – UK.

²⁰⁰ See for instance the “*Exchange of good policy practices promoting the industrial uptake and deployment of Key Enabling Technologies*” (KETs) to which the author of the present thesis contributed in 2011 and 2012 http://ec.europa.eu/enterprise/sectors/ict/files/kets/ex_of_practice_ket_final_report_en.pdf.

If they are also seen as instruments to promote the market uptake of key technologies, PCP/PPI instruments are conceptualized along a clear red line through expertise at the EU level, rooted into the Aho report (2006)²⁰¹ which was followed by a number of studies²⁰², briefs²⁰³, conferences, focus groups²⁰⁴, guides²⁰⁵, and platforms (including to exchange best practices²⁰⁶) but also EC-funded projects (see Box 94 and Box 95) such as “SILVER”, “CHARM”, “PRACE” and “OMC PCP” that led to a progressive distinction between PPI and PCP²⁰⁷ and some better operational learning (at the technical level). These sources tend to identify effective PCP practices and fed in some policy developments such as the 2008 Communication on “*Pre-commercial procurement: Driving innovation to ensure quality public services in Europe*” but especially served as conceptualisation support to the PCP framework (see Figure 38 and Figure 47) which development was steered by DG INFSO (now DG CONNECT). As for the studies, this framework inspired by the SBIR and SBRI schemes aimed to better disseminate a PCP model based on the American SBIR concept to governments. Other factors also contribute to the influence of the EC over national policy making processes (see Box 93 and Box 94). All tools developed by the EC make it primarily a platform where experts with links upstream and downstream (from national to EU level and the other way round) process to intelligence imports and exports.

Also EU-legitimized expert knowledge can be used in an expert’s home country to push one or other development²⁰⁸ or show influence over the European agenda. In that sense, the European platform model also serves as relay for Strategic Intelligence from Member States to the EC and other Member States.

²⁰¹ See http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm ; other pre-existing references can be mentioned, such as the “Public Procurement for Research and Innovation” Expert Group Report (on Developing procurement practices favorable to R&D and innovation) published by DG RTD in September 2005.

²⁰² The main studies were conducted by external experts and usually launched through EC procurement.

²⁰³ See the Innovation for Growth – i4g Policy Brief N°2 on Public Procurement of Innovation by Lena Tsipouri.

²⁰⁴ Workshops, round tables, expert panels... Such as for instance the HIGH LEVEL EXPERTS WORKSHOP “*Public Procurement of Innovation: Towards a European Scheme*” which took place in Brussels by the 31st of March 2011 under the supervision of DG ENTR.

²⁰⁵ See the “*Public Procurement as a Driver of Innovation in SMEs and Public Services*” guide and the handbook developed under the OMC-PTP project “*Exploring Public Procurement as a Strategic Innovation Policy Mix Instrument*” funded under FP6 but also the “*P3ITS Handbook – A Guide for PCP Actors*” handbook from the EC-funded “*Pre-Commercial Procurement for Intelligent Transport Systems*” project.

²⁰⁶ See <https://www.innovation-procurement.org>.

²⁰⁷ See <http://ec.europa.eu/digital-agenda/en/innovation-procurement> and http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index_en.htm.

²⁰⁸ See for instance the leading role of a British academic expert (from the Manchester institute of innovation Research) who was involved as Rapporteur in the Aho report (2006), and initiated but also ‘brought back’ procurement-related developments to his home country as highlighted by an interviewee.

However, the EU soft learning channels (Strategic Intelligence, EU projects, etc.) remained of limited interest in the UK as the country is perceived as one of the European PCP lead adopters, and interviewees only evoked some interest in Swedish and Dutch initiatives.

But the prime influence of the EC over the SBRI process in the UK was of a legal nature. After the Dutch and British SBIR-like schemes caught the attention of the EC between 2004 and 2006, discussions were engaged to make sure State Aid rules (not allowing 100% cost coverage through direct R&D support) would not be circumvented. It is to be reminded that the argument of State Aid compliance was central to organisational resistances in UK ministries and agencies. Following Connell (2006), the solution was found to place the British scheme under procurement legislation (Connell, 2010a; TSB, 2011), restricting its implementation to contracts (no grants). However restricting SBRI competitions to SMEs only or domestic companies was therefore not possible anymore. The tailoring process of SBIR to the UK framework was therefore highly constrained by the EU rules, whether on State Aid or Procurement. But also national discussions on SBRI and the Dutch SBIR contributed to the initiation and development of the EU PCP framework (which is now a reference grid for approaching PCP) and in a longer run the further uptake of PCP into the European Framework Programme for Research and Innovation (the European policy supporting research and innovation) Horizon 2020²⁰⁹ (H2020). Also the use of British Strategic Intelligence contributed to EU conceptual and legal developments which are now a reference frame for any Member State willing to work on PCP (see Box 91 and Box 92).

Beyond the role of the EC in terms of inward policy learning, no or very few references to other experiences than the American SBIR could be found through the field research. The very few examples appear to be non-significant in terms of influencing the SBRI trajectory. Although willingness from officials and most interviewees to better learn from abroad could be observed, the effective uptake of knowledge and operationalisation of the lessons derived from it remains limited if not for policy knowledge from SBIR-related sources. From an outward-looking perspective, also little or no promotion of the SBRI could be observed despite of many international learning platforms (see Box 96), with one key exception.

The EC launched indeed its own three-phase “*SME-instrument*”²¹⁰ (see Box 97) under H2020, inspired by the SBIR and SBRI experiences and currently running with a €3 billion for 2014-2020.

²⁰⁹ See for instance the 2014-2015 Work Programme of Horizon 2020 available at http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annexe-inproc_en.pdf.

²¹⁰ However, it is to be emphasized that the absence of procurement in the scheme itself (driven by “Grand Challenges”) makes the EC-instrument not fall under the PCP category.

Oriented towards overall business rather than only focused on technological aspects in practice, the scheme remains different from SBIR as it involves no link to procurement and does not call upon procurement mechanisms to externalize R&D activities because of the resulting IPR retention by the EC; also, important aspects such as the co-funding nature of the support (70% of cost coverage instead of 100%) or the TRL orientation of the programme²¹¹ appear to diverge from the American or British models (which however tend to evolve towards a common commercialisation-oriented shape). The SME-instrument was the result of expert promotion of SBIR and SBRI (see Connell, 2010a and NHS, 2012) and political demand for a new instrument²¹². After reaching the EU Commissioner for Enterprise through British MEP networking efforts (see Box 99), the British lead expert on SBRI willing to promote SBIR and SBRI formulated a proposal for what would later become the SME-instrument. Although the idea and key building blocks were derived from Strategic Intelligence relayed by EC presentations (see Connell, 2009 and 2009a), internal dissensions to the EC (inter-DGs confrontations) over the implementation modalities as well as political lobby influences at the European Parliament (reminding of American dissensions around SBIR since its creation) influenced its design as explained in Box 98.

1.3 Synthesis of the case studies: an informative overview

The table below (Table 9) already highlights some of the features of Strategic Intelligence which enabling role for cross-temporal and transnational policy learning was described in Sections 1.1 and 1.2 of the present Chapter. The table is a simple collection of facts derived from the case studies and illustrating the role of Strategic Intelligence in a non-exclusive fashion. Some of the insights provide basic information but a full cross-case analysis is necessary to approach the role of Strategic Intelligence in Policy Learning, which will follow in Section 2/ of this Chapter.

The table compares the role of Strategic Intelligence in terms of its contribution to policy learning in both SBIR and SBRI cases but is not exhaustive. Differences but also commonalities can be observed between the two cases. It does not hold any explanatory function but is rather presented here as to illustrate the fact that Strategic Intelligence effectively played a role in both cases as a vector of policy learning.

²¹¹ Which is rather oriented towards the latest TRL stages and commercialization than towards seed funding functions.

²¹² Which mainly emanated from Antonio Tajani, who was European Commissioner for Industry and Entrepreneurship and Vice President of the Commission at the time, and Máire Geoghegan-Quinn, who was European Commissioner for Research, innovation and Science.

Table 9: Evidence highlighting the role of strategic intelligence in policy learning

Case	Role of Strategic Intelligence in terms of enabling/fostering...	
	Cross-temporal policy learning	Transnational policy learning
Small Business Innovation Research Program (SBIR), US	<ul style="list-style-type: none"> ▶ Strategic Intelligence framed the shift towards a growing focus on commercialisation; ▶ Strategic Intelligence was used in a conceptual fashion (issue framing), even to legitimize SBIR ex-post; ▶ Strategic Intelligence was used as control instrument over the implementation of SBIR; ▶ Strategic Intelligence was used as a resource by actors fighting over key controversies to orient the SBIR trajectory; ▶ Strategic Intelligence was the area for reaching compromises, but was also used unsuccessfully; ▶ Strategic Intelligence was used as a platform to link politics and policy; ▶ Strategic Intelligence was used by organisations in an instrumental way to defend their ground or argue in favour of specific positions; ▶ Strategic Intelligence was used to overcome organisational resistance; ▶ Strategic Intelligence shaped a repository of beliefs, values, etc. 	<ul style="list-style-type: none"> ▶ Strategic Intelligence was instrumental in problematizing issues and conditions in the American context, using a comparative perspective and by reference to foreign sources; ▶ Transnational Policy learning was very limited and mainly took the form of passive export of policy knowledge and advice; ▶ Strategic Intelligence was an output provided by the US to the UK and other country governments in a passive manner; ▶ Strategic Intelligence used external information to legitimize SBIR in the USA; ▶ Strategic Intelligence was actively exported by leading Expert(s).

	<ul style="list-style-type: none"> ▶ All levels of SBIR (rationale, objectives, implementation modalities, etc.) were influenced by Strategic Intelligence but in different ways. 	
Small Business Research Initiative (SBRI), UK	<ul style="list-style-type: none"> ▶ Strategic intelligence was used as main ground for policy formulation (including the framing of issues and rationale for the initiative); ▶ Strategic Intelligence framed the evolution towards a growing focus on “<i>uptake</i>”; ▶ Strategic Intelligence was used as to overcome organisational resistance; ▶ Strategic Intelligence was the campaign field for SBRI advocates; ▶ Strategic Intelligence was used as a platform to link politics and policy; ▶ Strategic Intelligence was used as a resource for reaching political agreements and initiatives in the direction of SBIR emulation; ▶ Strategic Intelligence was used in a conceptual fashion and at a higher level of abstraction, even to legitimize SBRI ex-post by linking it to specific issues; ▶ All levels of SBRI (rationale, objectives, implementation modalities, etc.) were influenced by Strategic Intelligence but in different ways. 	<ul style="list-style-type: none"> ▶ Strategic intelligence plaid several roles: detection, sourcing, reception, integration but also exportation towards the EC; ▶ Strategic intelligence was the central pillar of the emulation and adaptation of SBIR in the UK (and in Europe) under the form of SBRI; ▶ Strategic Intelligence was both actively imported from abroad and actively exported to other levels of government by leading expert(s); ▶ Strategic intelligence emulated the technical components of foreign Strategic Intelligence that frame policy (indicators, rationale, etc.); ▶ Strategic intelligence was used as a filter for information processing into domestic policy making; ▶ Strategic Intelligence channelled strategic knowledge through various levels of government (e.g. EU).

2/ Analysing cross-temporal and Transnational Policy learning through Strategic Intelligence: a cross-case analysis

2.1 Guiding the reader through the analysis of policy learning through Strategic Intelligence

A quick overview of existing relations between the analytical findings and initial research questions can be found in Table 10. Although some of the questions find their answers in several of the analytical conclusions presented below, it seemed helpful to include such scheme. The selected links that are presented are only the ones that are the more straightforward. The reason why some findings are valid for both cross-temporal and Transnational Policy learning research questions (RQ1 and RQ2) is that the research confirmed that both are intrinsically linked: although they can be dissociated conceptually, in practice Cross-Temporal and Transnational Policy learning cannot be dissociated as any learning happens over time. Table 10 presents indicative (non-exhaustive) correspondences that are only listed here as to guide the reader through the analysis. They do not present any analytical value *in se* and cannot be used as a summary of the findings and answers to the research questions.

Table 10: Relations between analytical findings and research questions

Research Questions		Analytical conclusions
RQ1: How do soft and hard features of Strategic Intelligence enable cross-temporal policy learning?	->1.1 – <i>What has been the role of Strategic Intelligence among the drivers of policy change over time?</i>	POLICY LEARNING through Strategic Intelligence requires external and competitive conditions co-defined by SI
	->1.2 – <i>What type of learning occurred that was enabled/facilitated by Strategic Intelligence?</i>	Strategic Intelligence greatly contributes to policy conceptualisation and problematisation
	->2.3 – <i>Do specific features of Strategic Intelligence lead to particular types of policy learning in functional terms (structuration; policy repository; channelling)?</i>	POLICY LEARNING through Strategic Intelligence requires some degree of Policy Learning Readiness to overcome resistance to change Technical features of Strategic Intelligence foster Policy Learning

		POLICY LEARNING happens through the political instrumentation of SI
RQ2: How does Strategic Intelligence trigger or supports transnational policy learning?	->2.1 – <i>What are the policy changes that are due to foreign experience vehicled by Strategic Intelligence?</i>	Strategic Intelligence owns a variable position in different national systems and leads to policy adaptation
	->2.2 – <i>What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (e.g. instrumentation/utilisation and policy –learning– entrepreneurship)?</i>	While passive TRANSNATIONAL POLICY LEARNING was also observed, active TRANSNATIONAL POLICY LEARNING dynamics are embodied by Policy Learning Entrepreneurs active transnationally
	->2.3 – <i>To what extent does Strategic Intelligence allows the circulation of policy?</i>	Complex sets of relationships result in diffused Policy Learning spill-overs enabled by SI

2.2 Strategic Intelligence as a vector of cross-temporal policy learning

2.2.1 POLICY LEARNING through Strategic Intelligence requires external and competitive conditions co-defined by SI

“External” pressures to show result are a prerequisite to learning through Strategic Intelligence.

It was highlighted in the literature review that context and conditions matter to policy learning (see Bennett, 1997; Egan, 2009; and Massey, 2009). In that sense, policy learning through Strategic Intelligence takes place in a context which perception of is to some extent shaped by Strategic Intelligence itself.

A number of conditions were identified during this research that would have enabled and later fostered policy learning. First of all, external pressures are to be highlighted. Initially, the SBIR was launched in the context of the “*Rust-Belt Recession*” (Tibbetts, 2008) with raising competition of other countries such as Japan and Germany in the automotive sector threatening American manufacturing. The same context of budget cuts and financial crisis seems to have been favourable to SBRI in the UK, which was re-designed in a post-financial crisis context, which comforted a number of budget cuts in the private and public sectors.

These elements also explain from a decision-making point of view why in the context of both SBIR and SBRI some trends grew faster and in favour of certain types of changes: more pressure on policy makers so that they would show results would lead to more pressure from policy makers over the delivering administrative bodies to show results. The context of economic pressure tends here to partly explain the rise of the “*commercialisation*” trend. The European austerity context was referred to by some interviewee (SB) who made the link with the need to promote technology commercialisation. The pressure for commercialisation grew in the US (CW) as well as in the UK (FH) where it could even be seen at the organisational level (for instance when considering SBRI implementation by CDE or its coordination TSB/Innovate UK). In the European context in which SBRI was implemented, the financial crisis went together with other factors such as the European Paradox²¹³ or the so-called “*Democracy Crisis*”. An interviewee from a British ministry referred as others to the budget cuts which implied for administrative bodies to show results on a short-term perspective, fostering the increase of attention paid to commercialisation as a short-term sign of success (IB&NL).

Competition(s) is a cause and a stimulus for policy learning to take place through Strategic Intelligence, which is mainly embodied by policy discourses that are co-shaped by Strategic Intelligence. In this case, both economic competition and policy competition were identified as key stimuli of policy learning through Strategic Intelligence. Very often in the literature is a confusion found on competition, which is made a form of diffusion as learning is (see for instance Walker et Al., 2007; or Dobbin et Al. 2007). The present thesis supports the idea that competition is rather a cause while learning remains a form of process. Some existing research confirms competition as a key factor for diffusion or even transnational policy learning, but it is argued on the basis of empirical evidence that competition can be direct but also indirect. This is in line with intra-US conclusions on inter-state competition as key vector of policy diffusion such as studied by Berry and Baybeck (2005) or Lendon et Al. (2005). But while most of the students of competition in an emulation context considered direct reactions from a State to the actions of another (or others), the findings are here more nuanced results that involve the notion of perception, part of which is shaped by Strategic Intelligence.

As already suggested above, the notion of a threatening rising competition mainly coming from emerging countries (such as China, India, Japan, Singapore, etc.) has been built as the main reason why “*knowledge-based economies*” such as the US or the UK should improve their innovation and commercial performances in order to keep up with their current leading positions on global markets. This argument was made the basis for both SBIR and SBRI to be launched and re-conducted/extended. Somehow, “*national interest*” combined to “*competition*” were identified as two key drivers in the UK to justify the first version of SBRI to further develop for about 15 years.

²¹³ See European Commission (2005), “*Green Paper on Innovation*”, available at http://europa.eu/documents/comm/green_papers/pdf/com95_688_en.pdf.

The argument is even valid for the European Union: the *“EU decided to implement a similar programme because we lag behind in terms of Innovation behind US, Japan, and other countries as well”* (RA). Therefore competition came as a legitimate argument justifying innovation support.

Competition can also be viewed in terms of policy instrument²¹⁴. Several interviewees referred to the model of France which uses its procurement market to fund big industries (Defence, Transport, Energy...), generating a competitive image of the country, which resulted in an incentive for some to start using procurement mechanisms for innovative purposes. In order to present how the SBRI was perceived when proposed in the UK, an interviewee explains that *“there was a more textured view that countries like France and Germany were better at channelling R&D fundings at their own leaders (automotive) so that when procurement is made, respecting Procurement rules, it would go to French big leaders. They were tech superior because government had invested in them over time”*. Policy assets of countries seen as a source of their economic power therefore catch the attention of *“competing countries”*: for instance, key features making the success of the American model compared to the limited success to the British one were referred to in policy arenas such as hearings (see for instance the comments from Crocker in House of Commons Science and Technology Committee, 2013²¹⁵; or the interventions from the lead SBIR evaluator at the Senate²¹⁶). Another interviewee explains about the EU case: *“Why SBIR? Because the UK and NL were already doing things on that. And because they put together some experts (Aho report) and these experts concluded that indeed some good things came out from SBIR in the US, that it was an important programme in the US to get products on the market. They wanted to do it the European way”* (RA).

Box 13: Policy competition – an illustration.

“He agrees that the UK programme got off to a somewhat stuttering start but believes that over the next three years SBRI in the UK will rival the US SBIR scheme which has been in development for the last 30 years. Indeed along with the Netherlands, the UK can be credited with being one of the first European countries to develop an SBIR-type scheme.”

Source: NHS, 2012

²¹⁴ The argument lies in the idea that the adoption of SBIR and SBRI-like programmes by other countries or entities (such as the European Commission as extensively described in NHS, 2012) is a confirmation of the programme’s success.

²¹⁵ The comment is as follows: *“SBRI, as we have it, is not quite the same as the American SBIR. The American instrument is probably quite crude, but it is the one that works best. That is what most of the survey information says (...) What they say in the States is that they get round that because they are not afraid to fail. If you have blanket SBIR funding, the exciting projects, which may have been hidden, will still come out”*.

²¹⁶ Referred to in Chapter 3, Section 2.5.5.

The competitive discourse takes different forms, and especially references to foreign Strategic Intelligence sources to legitimate (through objectification) SBIR and SBRI in domestic settings were spotted during the field research and documentary review. Competitive arguments are found in the main pieces of Strategic Intelligence such as for example the 2006 “Secrets Report”²¹⁷, the 2007 Sainsbury Review, or the NAS evaluations and were relayed during hearings and conferences. Experts calling upon competition-based arguments always tended to justify SBIR/SBRI and legitimize their respective “*raison d’être*”. Strategic Intelligence was used as to highlight the relevance/importance of SBIR/SBRI in terms of the necessity to correct for market failures or support SME innovation. References to foreign sources were particularly mobilized in that respect (see Annex 1, Section 3.2.1). But although Strategic Intelligence appeared to be a relay of such argument in many instances (for instance in Congress and Westminster hearings or in the supporting studies and evaluations), only the UK case shows interest for other countries’ performance, with a focus on the US as key benchmark to which compare SBRI.

Both policy continuity and awareness are key factors for policy changes issued from learning processes to take place. Continuity is also understood in terms of consistency with the broader policy framework. Conditions for policy learning to take place also included some forms of policy awareness. Policy awareness was not about the SBIR itself when the initiative, coming as an innovative pilot to be implemented at the NSF by the end of the 1970s, was thought and brought to policy making the first time. However, some conditions were present for the uptake to take place: first, recognition of the challenges identified above; second, broader policy orientations that allowed change to take place. The political desirability of SME support is part of it. It was acknowledged by the field research that the development of SME policy in the US took place in a context of confrontation of large industrial entities development in the USSR. On the other hand, the Thatcher government was known as supportive of SMEs. As the political positions regarding SBIR and/or SBRI were not related to party affiliation as such neither in the US nor in the UK, the political context was mainly illustrated by interest-driven positions of philosophical oppositions between individuals belonging to specific institutions (Chambers, Executive branch, etc.). However, the case studies highlight changes in broader policy orientations which related to economic and political issues: crisis times indeed (such as the 1970s Rust Belt recession as explained in the US cases study, or the more recent 2008 financial crisis referred to in quite some occasions in the UK case study) came together with other incentives for political actors to emphasize job creation and maintaining as a key priority on their agenda.

²¹⁷ For instance: “*much more radical policies are needed which reflect the realities of building new businesses to exploit our science base against competition from China and India on the one hand, and the United States and Japan on the other*” (Connell, 2006).

The SBIR and SBRI schemes were therefore launched and implemented in the context of broader policy orientations. For instance in the US, the Bayh-Dole University and Small Business Patent Act, as well as the Stevenson-Wydler Technology Innovation Act (both passed in 1980) were already in place while SBIR was in the process of upscaling from a pilot form to a fully-fledged programme. In the UK, such relations between SBRI and the broader policy framework was more visible through the integration operated by status reports such as ministerial reviews. Some of the British White Papers clearly provided SBRI with a political touch as highlighted by an interviewee (DE). Also European policy developments impacted SBRI, such as through the development of the PCP Framework or the broader awareness about demand-side innovation: an interviewee from a stakeholder organisation clearly pointed out the under-development of demand-side instruments in the UK, which was identified by a British expert in the context of European Strategic Intelligence (Aho Report, 2006). The same goes for Northern Ireland where PCP discussions were already on-going before SBRI came to the agenda, pushed by the Matrix Report released in 2008. Awareness about the demand-side of innovation and PCP was to be combined with the increasing importance of the Valley of Death in Europe. This goes together with a broad understanding of the benefits a technology can have in terms of double use (not referring here to military dual use, but rather to the possibility for a technology to reach private market and respond to public needs at the same time) as explained by an interviewee.

The Northern Irish experience as depicted in Annex 2, Section 3.1.1 shows that some factors such as a new Minister in charge can foster the existing awareness about the need to change (EmF) but also about the solution (in the NORTHERN IRELAND case, PCP). The same sub-case also shows that continuity matters, as a link with previous policy discussions were referred to but also with the discussions on-going at the national level. In the UK and in the US, such positioning was also observed: the SBIR was mainly positioned vis-à-vis the STTR programme, while the SBRI was put in regard to the Procurement Framework. Continuity is therefore an element that can have importance, when considered at the level of the broader policy framework but also at the level of policy cultures: two interviewees (both of them experts) when questioned about the broader trends and conditions that allowed SBIR/SBRI to take shape referred to policy making traditions: the fact that SBRI did not become a law would therefore be due to a tradition of the British Government that tends to regulate itself.

Strategic Intelligence co-defines the context and the success benchmarks that shape the perceptions of socio-economic realities by the actors involved in policymaking. As already suggested several time, one fundamental role of Strategic Intelligence was to provide a view on the challenges to be addressed by policy makers and in that regard, Strategic Intelligence relayed a number of messages related to the competitive context in which both US and UK economies are evolving. Competition-related arguments were especially pushed towards policy makers through hearings and conferences in the US as to define a context justifying the upscale and reinforcement of SBIR. In addition, the use of SBIR-like models abroad was used in several instances as a main argument towards decision/policy-makers to legitimize SBIR/SBRI domestically in both US and UK (external threats to unite home), such as highlighted in Box 55.

A similar rationale is to be found in the UK where contextual positioning of SBRI usually relates to the competitive state of global economy such as observed in several reports (whether White Papers or studies). Other challenges were also introduced via Strategic Intelligence, such as the challenge of the Valley of Death and the related discourse introduced in both SBIR (by the NAS evaluations and relayed by Congress hearings) and SBRI (through Westminster hearings) contexts. If the spotting takes place through reports, the outreach is indeed made more effective through hearings.

Several examples could be listed showing the role of officials and experts' interventions in flagging key issues to decision makers in order to orient their views, but also which success benchmark(s) to consider²¹⁸. All Strategic Intelligence sources in the UK that referred to the US example pointed out missing elements in the UK compared to the successful American system (such as the lack of prototype and demonstration support for SMEs highlighted by HM Treasury, 2008). The reports in the UK -most of them referring to the 2006 "*Secrets report*"- see the US as successful in terms of supporting SME innovation and achieving technology uptake. Similar arguments are used by experts willing to promote US-like procurement-oriented mechanisms, especially in crisis time as suggested by Connell and Robertson's oral comments to the House of Commons Science and Technology Committee (2013). Following this line, Connell during this hearing also highlights that one way for UK policy makers to pick out winners "*is through an SBIR programme*"²¹⁹.

²¹⁸ See for example the following quote: "**Lord Willis of Knaresborough**: (...) Well, the Government spends £160 billion to £180 billion in buying and procuring services. It is a huge power. In the United States it drives innovation. What is the barrier to stopping us doing it here? **Brian Collins**: I think there are a number, one of which is cultural; second is scale." (Oral evidence submitted to the House of Lords Select Committee on Science and Technology, 2010a).

²¹⁹ And to add: "*We have had a broadly similar "SBRI" programme in the UK, as you will probably be aware, for the past three years. It is quite small, about £20 million per annum. It would need to be worth about £250 million per annum if it was going to be equivalent to the US programme, bearing in mind the relative sizes of the economies*" (Source: Connell in House of Commons Science and Technology Committee, 2013).

Box 14: Using the American SBIR as a benchmark for SBRI

“Interestingly, the evidence from the US with their SBIR programme shows that, where they have tried to use large prime contractors as part of the process and SMEs as a means of developing small parts of much larger projects for which primes are responsible, in general it has not worked very well. You find that these companies are not always attuned to the needs of the prime contractor; they don’t see the bigger picture in terms of the scale of the project. I would not want to experiment with SBRI in that way. (...) The other thing about SBRI is that 900 companies won SBRI contracts. That should be the first port of call for venture capitalists looking at the kind of businesses they should be investing in. That is what happens with SBIR in the States. We need to talk positively about it and about the companies that have been successful in it. We need to scale it up and provide the end market opportunities.”

Source: Iain Gray in House of Commons Science and Technology Committee, 2013 - Extract from the House of Commons hearing on “Bridging the Valley of Death – improving the commercialization of research”, 2013

One could quote other examples in that regard. To the question “*Is it your view that some other countries do that better?*” the Head of TSB answered the House of Commons S&T Committee Chair by a 2013 hearing²²⁰: “*Probably, the most visible public sector example in the US is related to defence, SBIR and the DARPA type of scheme (...) from a US perspective, I would cite the way that the defence budget is used to stimulate innovation and growth through SBIR and DARPA as a prime example*” (source: House of Commons Science and Technology Committee, 2013). In a previous committee, the same contributor already highlighted this view, in line with the thinking supported by the Secrets Report as well as subsequent papers published on the emulation of SBIR in the UK: “*The big thing that the US scheme offers that we now need to work on, other than the scaling up that I’ve already talked about, is in the US scheme there is a step that can then take you from that second phase, and a number of companies that then go on to full scale major multi-million pound procurement programmes. So making that linkage between the early phases of SBRI and the opportunity for full blown procurement, I think, is the important link that we need to make*” (Iain Gray in House of Lords Select Committee on Science and Technology, 2010a).

2.2.2 Strategic Intelligence greatly contributes to policy conceptualisation and problematisation

Strategic Intelligence impacts policy at a high level of abstraction that can be associated to social learning; such form of learning takes place at the level of the assumptions and rationale underlying policy and is inherently cross-temporal. By its own focus the present thesis was most likely to show instrumental forms of learning (lesson-drawing): the emphasis was indeed placed on a policy instrument.

²²⁰ Hearing on “Bridging the Valley of Death – improving the commercialization of research” (2013).

However, more abstract type of learning took place that was driven by Strategic Intelligence, which could be associated to “*social learning*” – when values and beliefs are affected by external influences. What was mainly taken from the American model in the UK were the objectives, key features, and the “*effectiveness*” (performance-oriented) focus of SBIR as highlighted by several interviewees (see for instance FH). Another interviewee stated that “*SBRI was a label but not a substance. (...) Key elements picked up: there should be a genuine competition for procuring services above and beyond the kind of standard work they were doing, there was something specific about innovation, and real competition has to take place. It’s not only about reporting, it’s about creating a competition for which SMEs are equipped to compete. Even if we could not limit to SMEs, idea was to make competition in which SMEs could compete.*”

In order to understand how Strategic Intelligence fostered such type of learning, let us remind ourselves that any policy starts as a set of assumptions (Fischer and Mandell, 2012) and follows a process of problematisation (Howarth and Griggs, 2012). This is along that process and over time that Strategic Intelligence played a role, allowing for some adaptations of SBIR and SBRI in their domestic context in relation to the broader context and issues on top of the policy agenda. The repository of concepts and beliefs in which SBIR and SBRI are respectively grounded is not monolithic at all, and is even evolutionary as it evolved in a cross-temporal fashion which is inherent to the process of learning. Perceptions of this repository can even differ from a group of people to another: although some interviewees attribute a certain function to SBIR in line with the vision of its founding father (early stage and high-risk innovation support), others see it as a scheme to support technology uptake. Strategic Intelligence contributes to foster a vision of SBIR/SBRI, co-constructing the perceptions of the scheme(s) such as for SBIR (see NAS, 1999 and 2005), identifying success benchmarks for the programme and reducing the space for surrounding controversies. Even in the terms used Strategic Intelligence plays a role: for instance Connell (2010a) introduced the distinction between SBRI Mark 1, 2 and 3 which are now commonly used to distinguish between the different development steps taken by SBRI.

Strategic Intelligence introduces conceptions that delineate policy in a co-evolutionary fashion.

The cognitive framing function of Strategic Intelligence was perceived in many instances, starting from the key reasons to set up/re-conduct SBIR/SBRI which were mainly related to key challenges. For example, many interviewees acknowledged the importance of SMEs for innovation systems (such as indicated in HM Treasury [2008] or FreshMinds [2008] in the British case). Also Annex 1, Section 1.1 clearly depicted how the vision of innovation underlying SBIR in the US was re-defined and adapted through Strategic Intelligence: the vision of the innovation process was re-conceptualized by the NAS in order to align with the non-linear innovation model (NAS, 2004a) while it could have also been related to the linear or systemic models of innovation. In line with Lascousmes and Le Galès’ (2004) assumption, such introduction of the non-linear innovation concept came as to de-legitimize the previous vision of innovation in which the programme was anchored. The process appears to be a continuous one, as observed in Annex 1, Section 2.2 where the iterations between Strategic Intelligence and SBIR leading to a “commercialisation focus” were brought to the attention of the reader.

This shift from a technology-push towards a user-driven perspective was also associated to a shift in the vision of what the objectives of the programme should be. In that sense, Strategic Intelligence provides policy with a cognitive adjustment, which would explain why many contacts relayed the idea formulated by the NAS evaluations *“that the SBIR program is sound in concept”* (NAS, 2008).

This is also true in the UK, where the submissions to the House of Lords Select Committee on Science and Technology (2010a) show that the concepts underlying SBRI are more than supported and validated by contributors though evidence at this time was still missing to evaluate the success of the initiative. The beliefs in SBRI potential for success relied on key conceptual elements developed by or transmitted through Strategic Intelligence (and mainly the 2006 *“Secrets Report”*). It is observable in many instances: the arguments developed in this Secrets Report are taken up in almost all subsequent contributions ranging from the Sainsbury Review to NESTA papers. This could be by chance if most of these were not using the same wording or order in their argumentation. As for more concrete examples gathered from the British case study, one should bear in mind that the first contributions from the SBRI lead expert in the UK were grounded in the importance of an initiative such as SBIR for the so-called *“soft companies”*. This argument appeared to be recurrent from Connell (2004) to Matthew Bullock’s intervention to the House of Commons Science and Technology Committee (2013). The 2006 *“Secrets Report”* also called upon a similar frame to consider what SBIR is, what the needs and policy opportunities viewed from the expert’s perspective are. The report refers to elements such as the soft/hard companies’ typology²²¹ to analyse the (possible) benefits of SBIR in the US (while the concept is not brought forward in SBIR studies).

Strategic Intelligence also appeared as a way to draw lines: the procurement issues studied mainly by the Office of Government Commerce (OGC) under the British Cabinet Office have been quite distinct from the SBRI discussions centred around the field put in place by Strategic Intelligence (Secrets Report mainly) – see Connell, 2010a. However, following the 2008 Innovation Nation White Paper, Innovation Procurement Plans were drawn at the Department level (see Fergus Harradence’ oral contribution to House of Lords Select Committee on Science and Technology, 2010a). These plans however only linked with SBRI in a superficial way, referring to the possibility to make use of it (no significant strategy vis-à-vis the scheme was formulated)²²². What *“SBRI is not”* is therefore also a matter of the vision presented through Strategic Intelligence. This has also be done in comparison with SBIR which is less Government service-oriented as highlighted by David Willetts in his oral contribution to the House of Lords Select Committee on Science and Technology (2010a).

²²¹ With the conclusion that « *An effective UK SBIR programme would help stimulate a wider range of soft companies in the UK, often linked to specialised centres of academic scientific excellence. This would have both direct and indirect economic benefits to all parts of the UK.*” (Connell, 2006).

²²² See for instance the Department for Culture, Media and Sport (DCMS) 2009 Innovation Procurement Plan.

In the US, similar distinctions were operated between SBIR and STTR but also other related measures such as the matching or fast track programmes.

Box 15: The “procurement” identity of SBIR and SBRI in Europe

SBIR and SBRI in the UK but also in Europe have been mainly viewed from the viewpoint of their link to procurement. Starting from the idea of government as “lead” and “intelligent” customer, several reports emphasized the identity of the programme in line with the notion of innovative procurement first²²³, and progressively -after a few years of SBRI implementation- lining up with the European Pre-Commercial Procurement (PCP) Framework. The PCP framework as depicted in Annex 2, Section 0 was the result of interactions between Strategic Intelligence and policy at several levels of government and was even inspired by the British experience of the SBIR-inspired scheme. Changes were observed with the shift from soft company model to PCP, with echoes found in visible Strategic Intelligence reports such as the “Buying Power” report from NESTA (2007).

Discursive²²⁴ oral contributions of Luke Georgiou and Jakob Edler by the 21st of December 2010 to the House of Lords Select Committee on Science and Technology illustrate how hearings can relay such conceptual framing: the experts made some pedagogical distinction between PPI and PCP in order also to position the relative advantages of SBRI as a scheme compared to others (House of Lords Select Committee on Science and Technology, 2010a) before discussing with David Connell (third member of the panel) the role of SBRI and what it can achieve²²⁵.

The post-design introduction of the Valley of Death in SBIR and SBRI shows the cognitive adjustment role of Strategic Intelligence through its repository function. The most exemplary evidence comes from the introduction of the concept of Valley of Death, which in both US and UK cases was operated after SBIR and SBRI were launched. In the US, the NAS studies re-conceptualized the role of SBIR, renewing the perception of its role after 20 years of existence. In doing so, two fundamental concepts were introduced: the one of non-linear innovation was already evoked; the second is the so-called Valley of Death challenge. Such introduction operated in the 2008 NAS evaluations linked the old scheme to contemporary preoccupations (venture funding gaps, upscaling issue, commercialisation, etc.).

²²³ In NI after the first SBRI competition (in the field of tourism), the permanent secretary pointed out the SBRI as best practice of innovation procurement and pushed in that direction so that the administration would explore the competitions further.

²²⁴ The discursive function of Strategic Intelligence is also observable in Connell (2010a) whose contribution to the House of Lord Select Committee on Science and Technology gets back to notions such as “lead customers” (notion to which an entire section is dedicated in the expert’s submission) in order to highlight the conceptual relevance of SBIR to the UK context and beyond.

²²⁵ Other sources identify the American SBIR as procurement best practice, mixing up PPI and PCP (see for instance NESTA [2007a] or FreshMinds [2008]).

The concept of Valley of Death came a posteriori as a justification of the function occupied by the programme as well as its overall rationale as explained in Annex 1, Section 1.1.5 and in particular Section 3.1. The Valley of Death was therefore introduced as a key element of the SBIR repository to which benchmark the scheme and integrated into subsequent Strategic Intelligence exercises²²⁶. Also the use of specific aspects (commercialisation indicators, the Technology Readiness Level Scale²²⁷, etc.) technically framed the initiative towards a more commercialisation-oriented rationale. The impact of such problematisation can be observed at the level of the (implicit) objectives of the programmes as well as the analytical tools used to approach it (Technology Readiness Level [TRL] scale, performance –commercialisation-oriented– indicators, etc.), which were integrated into administrative routines as well.

Box 16: Introduction of the notion of valley of death to the SBIR repository

The leader of the NAS evaluations of the SBIR Programme at that time Director of the Program on Technology, Innovation, and Entrepreneurship commented on the introduction of the concept of Valley of Death in the NAS evaluations:

“Valley of Death was not used as a term. But the concept was understood. There are two things: first, awareness that SMEs are sources of innovation. This contrasted with the idea that only large corporations have the money for innovation (...) Valley of Death comes out from the VC industry in the Silicon Valley. Some exactness is that NAS plaid an instrumental role in bringing policy makers in DC to recognize that there is a Valley of Death. The objective was to bring Congress to recognize the Valley of Death. It came from the venture community; in terms of policy, I can point at efforts of the NAS work in the early 2000s. We helped driving this path” (CW)

The origins of the introduction of the concept of Valley of Death in the SBIR context is somehow more difficult to frame as the concept has been explored and diffused in many occasions across Europe²²⁸. However its introduction mainly corresponds to two main factors: agency learning to some extent (as the TRL scale is used as a reference grid by Innovate UK in policy implementation), but above all Strategic Intelligence. Already with the soft/hard business typology developed by the lead SBIR expert and positioned as a key reason for supporting the emulation of SBIR (see Connell, 2004 and 2006), financing gaps in the innovation “chain” were made a key reason why implementing a SBIR-like initiative.

²²⁶ However the introduction of such concept was not presented as fully linear, as it should fit the concept of non-linear innovation also made part of SBIR cognitive ground.

²²⁷ See NAS, 2009.

²²⁸ See for instance the “Exchange of good policy practices promoting the industrial uptake and deployment of Key Enabling Technologies” to which the author contributed in 2012 on behalf of the European Commission.

And it is here interesting to note the interplays with American sources: the challenge of the Valley of Death and similar concepts were referred to in several sources such as House of Commons Science and Technology Committee (2013)²²⁹ or Connell (2014) where a policy perspective is adopted. A key contribution from the American SBIR NAS evaluator even referred to this challenge and dedicated two of his arguments (arguments 6 and 7) to this notion in order to explain how SBIR (can) stimulate(s) innovation (House of Lords Select Committee on Science and Technology, 2010a). In 2013 the House of Commons Science and Technology Committee launched a report entitled *“Bridging the valley of death: improving the commercialisation of research”* taking up the concept and positioning SBRI as a relevant measure to bridge the so-called Valley of Death (though a lack of funds is recognized in that report). Such a rationale co-evolved with the increasing importance given to technology uptake, potentially matching political expectations from decision-makers pressed to show success. The latest report published on the subject in the UK has been entitled *“CREATING MARKETS FOR THINGS THAT DON’T EXIST - The Truth About UK Government R&D and How the Success of SBRI Points the Way to a New Innovation Policy to Help Bridge the Valley of Death and Rebalance the UK Economy”* (Connell, 2014²³⁰).

One should notice that this higher-level of policy learning could be secondary. However, it appears to be the main cause (together with other factors such as the longevity of the programme) why SBIR is seen as *“sound in concept”* in the US despite all controversies that took place since several decades already. This argument is also valid for the UK, where the SBRI scheme received persistent support after 10 years of “official” failure. One interviewee from Northern Ireland involved in local policy making even explained the following: *“when I came across SBRI as a concept I thought that intuitively made sense”*. Therefore, perceptions of the potential of the programme based on its conceptual understanding clearly matter and can make a difference when coming to the issue of whether or not to terminate such an initiative.

Strategic Intelligence shapes policy learning at an intermediary level, translating concepts into policy objectives and criteria. Strategic Intelligence provides in that way a cognitive frame and associated references to which a programme is being benchmarked. In that way it also played the role of *“adjustment factor”* for the SBIR model to be in line with Congressional expectations while providing an intermediary reading grid to approach the programme. Whether consciously instrumented (for a posteriori legitimization) or not (simple use of concepts for analytical purposes), Strategic Intelligence is already a tool for experts to shape a policy proposal while being *“supposedly”* external to the policy making process.

²²⁹ Connell in House of Commons Science and Technology Committee (2013) refers to one funding gap along the innovation process (up to commercialization) that he positions at the level of exploratory development.

²³⁰ The report was prefaced by Lord Adonis, who authored the 2014 case report on SBRI as a driver of *“growth and innovation”*.

A less abstract way to look at the interrelations between Strategic Intelligence and policy is to observe as in Annex 1, Section 2.2.2 the influence of Strategic Intelligence over the definition of the objectives and key performance criteria of SBIR in the US: one of the ways to observe the evolution of SBIR from a *“high-risk R&D support”* programme towards a *“commercialisation”* mechanism was to have a look at the objectives of the programme and observe a shift in the priorities driving the initiative. This shift was clearly correlated in the American case with a progressive change in the scope of Strategic Intelligence looking at performance rather than impacts and progressively focused more and more on commercialisation performance, partly as a response to political demand for such information. Such a move was especially visible in the mid-1990s as the Congress started to integrate and strengthen the commercialisation objective of SBIR in the legislation itself (see SBIR 2000 Reauthorisation and NAS, 2008 and 2014). In that perspective, Strategic Intelligence was instrumental as it highlighted certain aspects of SBIR (for instance when making commercialisation the focus of the NAS evaluations in the first half of the 2000s; or dedicating study resources to the SBIR Phase 3 challenge²³¹) and opened the door to new initiatives such as the DoD Fast Track (NAS, 2009c) and Phase 3-related initiatives at both State (matching programmes) and Federal (Commercialisation Readiness Programs, Phase 3 preference...) levels. The Strategic Intelligence particularly comforted the orientations of the political leadership by emphasizing specific indicators (such as sales, etc.) and orienting data collection operated at the Department level, mainly through GAO guidance but also through the commercialisation benchmarks (see Annex 1, Section 2.1.1 and in particular Box 40).

2.2.3 POLICY LEARNING happens through the political instrumentation of SI

Strategic Intelligence is a source for legitimate political arguments used to promote policy change, especially in a context of confrontation between policy entrepreneurs. If learning in the common sense can happen when integrating and processing information, it is associated in policy studies to the idea of action (or inaction). Therefore, more than the notion of knowledge uptake, it is its *“translation”* into practice that matters the most to social scientists. This can take place as one-shot changes or alterations of agents’ behaviours. From that perspective, policy and political²³² learning were fully embedded in both cases, the interactions between both leading to the socio-construction of both SBIR and SBRI.

²³¹ Other examples include the 2000 Fast Track initiative assessment and the 2003 NIH SBIR Evaluation.

²³² Political learning was mainly viewed as the uptake of policy knowledge by political actors and entities (electives and stakeholder organizations and advocates mainly).

While in the US political learning mainly took place in the legislative arena, in the UK political learning was first concentrated in the executive branch with only support from legislative players (in the context of the 2004 SBRI campaign for example), before Westminster Committees started to express themselves more on the topic of SBRI in more recent years. In both cases, policy entrepreneurs remained at the centre of the decision-making stage as suggested by the literature review.

Understanding the politics of Strategic Intelligence and SBIR/SBRI is therefore essential to understand the process of policy learning through Strategic Intelligence, and mainly considering policy changes issued from political decisions. One should not stop at the bi-partisan nature of SBIR/SBRI support in both UK and US (no one party is behind the respective schemes – support is brought by both dominating parties). However, conflicts and oppositions were present and in a much greater way in the US case than the UK one as the process in the latter case was essentially in the hands of the executive branch (whatever side its leadership). The US controversies -which led to the 14 successive resolutions temporarily reauthorizing SBIR between 2008 and 2012- showed complex mixed coalitions, with dissensions between House and Senate Committees but also between members of a same party. Strong beliefs and strong interests led to non-receptivity to the arguments drawn by Strategic Intelligence, which were only selected as long as they served already established positions. But the UK case also highlighted the fundamental role the relations between Strategic Intelligence and politics can have. Cross-party work was for instance recognized as “*crucial*” in Connell (2014) and allowed SBRI change happen without being blocked by any opposing coalition in the political arena²³³.

Conflictual or not, in the UK as in the US, clear legitimation through expert knowledge²³⁴ was sought²³⁵ by policy entrepreneurs. One should notice that while in the US the leading expert on SBIR gained his reputation as such from his role in the NAS evaluations, in the UK the SBRI expert gained his legitimacy using Strategic Intelligence to make his point. Expert knowledge and its recognition (or recognition of its holder[s]) can therefore be decisive in setting/shaping up power relationships. An interviewee even explains about the American political area that “*in the Congress they don’t pay attention, do not do real analyses*” (CW).

²³³ The proposal which initially emanated from Connell and was supported by MP A. Cambell during the 2004 campaign for a new SBRI “*was rapidly adopted in principle by the Government of the day and has been endorsed by all subsequent governments and major political parties*” (Connell, 2014).

²³⁴ “According to Mr Connell Health Enterprise East and NHS Midlands and East are “*the role model for SBRI in the public sector in the UK.*”” (NHS, 2012).

²³⁵ In both cases, Strategic Intelligence contributed indeed to some “*scientification of politics*” as presented by Schout’s study on RIAs (2009).

The battle for credible arguments (most likely evidence-based, but not only) is therefore key to understand the utilisation of Strategic Intelligence in political arenas. Several interviewees referred to made up figures or Strategic Intelligence in both US and UK (see Congress staffers and officials who testified on this specific point)²³⁶. In that respect, Strategic Intelligence could be seen as filling two key functions in political intercourse:

- ▶ It is an instrumented resource in many instances (legitimacy, argument, etc.)
- ▶ It is a structural mechanism of political control

These two functions are in both cases mainly observed at the level of the interrelations between experts, political representatives (and associated staffers), stakeholders and administrative bodies. Target groups/beneficiaries play a very minor role from a policy perspective²³⁷: companies and entrepreneurs learn about the existence of the programme through their existing networks (for instance in the UK, one of the interviewed beneficiaries explains: *"We heard about SBRI from Knowledge Transfer Network, component of TSB (now Innovate UK). KTN also involved in directing companies towards TSB calls"*). Only in a very few marginal cases (RK and LS)²³⁸ the entrepreneur was involved in policy issues or had enough international background to check possibilities outside the home country²³⁹. Other entrepreneurs focus on their business and only when called to testify before the Congress or in Westminster are they mobilized to provide feedback to decision-making entities. Another way to integrate SME's feedbacks is clearly practice (formal/informal contacts with officials and project officers) and consulting studies (whether supporting the companies and therefore building internal capabilities or doing policy-oriented studies).

²³⁶ In that respect, the field research led to the conclusion that the resulting "fake" figures and related arguments did not lead to anything in the US, and only blocked policy change in the UK. In the US Congress, they did not lead to relevant changes or even negotiation points, while in the UK made up figures presented by administrative bodies contributed to the stagnation of SBRI which was useless and totally not effective until recently.

²³⁷ When considering the EU, all UK companies interviewed referred to the constraints of EU funding (administrative burden and delays combined to amounts that are not attractive enough to compete with Member States) such as summarized by one of them: *"We made a deliberate policy: AVOID EU funding. Looks like a lot of money, but by the time you manage to bring things together, it is already a nightmare. Not much, disclosing clause, rules, etc. Too dangerous and too constraining so we avoided EU funding"* (RK).

²³⁸ An interviewee highlighted some possible operational use of Strategic Intelligence in the UK case: *"I don't think anybody reads the reports etc. but I've read them all to scan them, tendencies, see where it goes (...)* NHS is a big player, we also have to find our way in" (source: SBRI beneficiary)

²³⁹ *"I know about SBRI in the US, Singapore (I went there for a review) where they have a similar programme (SPRING), less attractive, 70% co-funding and £500 000 funding. For Singapore, you just meet people etc. so I got to know it, because I worked during 15 years in this. I was at the Treasury last year, talking with a company there, and they told me about the American SBIR"* (LS).

One of the interviewees (LS) refers to a “*lack of awareness*” but also to other constraints such as time and resources to go to other countries or apply to several programmes; this point of view was confirmed by the interviews with beneficiaries. Another interviewee (RK) also highlights the differences in the “*languages*” spoken by entrepreneurs compared to officials and policy-oriented forms of language.

Strategic Intelligence as an instrumental source of policy arguments is particularly perceptible in the decision-making sphere where the actors turn policy arguments into political arguments. The main field for studying the integration of policy and political forms of learning was therefore the decision-making instances involved in both SBIR and SBRI-related negotiations.

Unlike Freeman (1985) or Menzel and Feller (1977) who considered officials as main source of policy ideas, this thesis shows how experts can bring in ideas or arguments that shape the orientations of policy (see Annex 1, Section 3.1.2) but can also make them weaponized arguments for negotiations to take place in the political arena. Several utilisation strategies could be listed, such as some uses by stakeholder organisations (in both US and UK) which made use of Strategic Intelligence as a way to get to policy makers (see the use of NAS evidence by the SBTC during the last SBIR reauthorisation process, or the IET position with regards to SBRI as depicted in Box 74). Also uses by officials and political representatives should be highlighted, as well as some advocacy positions adopted by experts and based on their Strategic Intelligence-based legitimacy. Though the US is clearly a case of controversies bringing entities of the Congress against each other, the UK is an example of a more consensual (though still difficult) process. One of the key differences to be observed between both cases is the weight of the institutional structure over the policy process: where policy is driven by the executive branch, lobbying through Strategic Intelligence seems to be easier. When the legislative branch is in the driving seat, the democratic game implying confrontations of interests can make the journey quite troublesome.

An illustrative example of utilisation of Strategic Intelligence as a resource for political negotiations could be observed in the UK, for instance during the 2004 Campaign to further emulate SBIR led by the lead SBRI expert and by then the MP for Cambridge (see Annex 2, Section 0 and 2.3 as well as Box 63); but also between 2004 and 2005 as Strategic Intelligence was used as a resource to convince political representatives at the ministerial level in a context of administrative resistances to SBRI integration. Based on the 2004 Connell report, the campaign was pushed through political channels by the Cambridge MP who arranged meetings with 2 ministers and “*special advisors*” but also persuaded other MPs (88 MPs in total) to sign the Financial Times letter to support the emulation of SBIR. The expert and his political allies here instrumented Strategic Intelligence, in order to reach the highest level of the government. Another advocacy position adopted by the expert could also be observed in the following quote: referring to the 2006 “Secrets Report”, Connell (2014) stated that

“The US SBIR programme has been endorsed by Congressional committees and independent reviewers at intervals throughout its 32 year history, and is highly regarded by government agencies, entrepreneurs and policy makers”. However, a better view at the history of the programme shows that the American SBIR has been subject to quite some controversies (some of them which seem endless). Strategic Intelligence in that case plays the role of filter, and instrumentation therefore starts at the stage of the research strategy. Biased information gathering strategy can for instance be observed as the controversial nature of SBIR is never referred to in any of the British reports/studies, except for a brief reference to the “*Mill Riding*” issue -as fixed by GAO in 1999- in the 2006 Secrets Report²⁴⁰.

In the UK, the “*Secrets Report*” was consequently used by all reports and non-academic papers dealing with SBIR or SBRI as to back arguments (for instance SBIR as best procurement practice such as in NESTA [2007a], FreshMinds [2008], HM Treasury [2008] and other reports). The Secrets Report plaid the role of both information filter in that respect (providing a positive perception of SBIR²⁴¹) and lobbying argument (instrument to push SBRI UK change). All reports authored by the lead SBRI expert from that perspective are clearly to be viewed as oriented towards a positive view of SBIR and the potential of SBRI (all reports are clear about the position adopted).

Box 17: Political support grounded into win-win opportunities

After losing the general elections, the first MP supporting the SBIR campaign had to leave a white spot in the advocacy leadership steered by the lead SBRI expert. However, a newly elected MP took over, foreseeing an opportunity that would advance the UK economy as well as her political trajectory:

“MP in last parliament (2005 – 2010) in Britain. My background is in economic and industrial policy. When I was quite new, one of the most junior parliamentarians, I had a friend of mine former MP (who lost her seat for Cambridge for Labor party); she is a scientist, I have known her for many years. A Cambridge-based scientist and policy expert sold it strongly that we should have such programme. She asked if I could help and as we were new, there was an opportunity here. Clearly it was a good idea, no political risk as such. I represented a constituency/manufacturing area in Britain, so I was looking for ways to campaign for my constituency to look good and get votes, etc. (...) First I used an option available to MPs to introduce it in 2006 (...): It was never going to be legislation, but an advocacy tool (present draft piece of legislation for 5 min). Because Government controls legislative timetable.” (KU)

²⁴⁰ The expert confirmed his argument later on: “*There have been several independent reviews of the US SBIR, all positive*” (Connell, 2010).

²⁴¹ For instance in the 2008 Matrix report, all information about the US SBIR come from non-US sources and relayed the SBIR views from the Secrets Report except for two references made to an NIH and an SBA webpages.

The outputs from Strategic Intelligence can also be used in political negotiations such as highlighted by this interviewee from a British stakeholder organisation referring the reports authored by the lead SBRI expert: *“DC produced endless reports for us; he filtered. Lots of evaluations of SBIR in US. We were aware of that. DC’s reports were very influential: we used them to persuade ministers and eventually the Treasury minister that SBRI was a good thing. I did not use it in operational sense, but trying to get political support”* (DE). Another interviewee referred to the “legitimation” by Strategic Intelligence sourced in the US to support SBRI set up and implementation (DC). Such instrumental auto-justification is also found at the level of the Sainsbury Review: *“In 2007 Lord Sainsbury’s review of UK innovation policy recommended that SBRI be revamped using a model much closer to the US SBIR programme and responsibility was given to the Technology Strategy Board for coordinating implementation through spending departments”* (Connell, 2010a). Another interviewee from a stakeholder organisation explained for instance the following: *“when I started chairing the innovation policy panel, it was a lot of responsive work (if government writes something, we write a response); that was a bit passive, not active enough. We decided to run conferences and meetings on subjects we’re interested in. The first was on SBRI”*. Another way for political actors to make use of Strategic Intelligence was to integrate Strategic Intelligence into position papers. In Northern Ireland, SBRI did not appear to be a *“political”* subject as such; and Strategic Intelligence was mainly used as to convince officials to make use of the mechanism rather than to get through the decision making process. However, consensus is not synonym of *“apolitical”*: stakeholder organisations relayed the position of the 2008 Matrix Report recommending the use of SBIR/SBRI.

Resistance in administration can trigger political resistance at the decision level: referring to his first meeting with Lord Sainsbury, the lead SBRI expert explained during an interview that the first reaction of the Minister when lobbying for SBRI in the early 2000s was about the illegality of a UK SBIR due to EU rules (see Annex 2, Section 3.2.2). The interpretation of this reaction by the expert was clear: *“ministers are busy, dependent on advisors, and in this case officials are full time civil servants against any risk; here they said nothing could be done”* (DC). However after the first bill at the origin of SBRI mark 2 was drafted on the basis of solutions presented in the Secrets Report, the feedback from Lord Sainsbury became optimistic enough to channel it to Gordon Brown in order to be made a new SBRI announcement by March 2005. Therefore, Strategic Intelligence to be integrated into some administrative repositories such as the one of the TSB can reach some political dimension: another interviewee previously heading a public agency explains that *“DC had written very convincing paper about elements required. I did not follow it 100% but that was a Framework as to what those elements should be. So how to design the programme to match that. That was a valuable input for sure, something to get back to, to test the implementation against to see if it matched the vision”* (NH).

Political utilisation of Strategic Intelligence in the process of decision making is even more visible in the US.

Already at the time of setting up SBIR in 1980/1982, the role of the Office of Advocacy (SBA) played a role in supporting the initiative, for which basic Strategic Intelligence was made an argument for some entrepreneurial officials to push the programme through the Congress to the White House. Although SME support could publicly be perceived as consensual, in practice it took policy entrepreneurs' (including electives such as Edward M. Ted Kennedy and Warren Rudman but also President Reagan) willingness to drive change (see Annex 1, Section 2.2.3). More recently, the utilisation of Strategic Intelligence could be analysed through the process of the last Reauthorisation of the SBIR programme. The controversies depicted and analysed in Annex 1, Section 2.3 leave the analyst with two main results. As observed in the SBIR case, Strategic Intelligence can be used as a resource for political advocates (including some experts) and other actors from the policy-making arena. This was for instance the case when the NAS stepped in the "*mill riding*" debate, presenting a position that was going against the House' vision of SBIR accessibility (see Annex 1, Section 2.3.2).

The field research also highlighted the use of Strategic Intelligence-based arguments by stakeholders and Congressional actors, showing that there was limited learning as the arguments would only be used to support pre-defined positions in order to provide them with stronger legitimacy. Utilisation strategies in that sense were only calling upon Strategic Intelligence as a repository of possible political arguments (that one could call "*argumentarium*"; see Box 47), although the Senate was perceived as more receptive to the positions suggested by Strategic Intelligence and performing experts. The arguments related to the Valley of Death were for example pushed forward by the Venture Capital community willing to have a regular access to SBIR. Several interviewees referred here to a "*philosophical*" confrontation rather than an evidence-based debate, which should be served by Strategic Intelligence-based information. On the other hand, Strategic Intelligence could be used as to establish compromises or even as a source of arguments for powerful lobby organisations to influence decision-makers in the process of campaigning and gathering political donations (see Annex 1, Section 2.3.3).

At the administrative level, Strategic Intelligence plays a powerful role of control mechanism. Second, and probably more interesting, is the way Strategic Intelligence was instrumented by the Congress in order to exert control over the executive branch and secure positions with regards to policy change (or stagnation). Again this was particularly visible by the latest SBIR Reauthorisation, which was included under the 2012 National Defence Reauthorization Act as the result of a coalition's strategy (led by Senator Landrieu and her Head of Staff K. Wheeler) as to overcome Congressional 4-year lock-ins and highly emotional controversies. As an input to but also output from the policy cycle, Strategic Intelligence (and in particular shaped by the relevant NAS studies and associated recommendations) was clearly called upon by the Congress in order to ensure control over SBIR implementation by the Federal Departments and agencies. For instance, the Venture Capital controversy led to the production of additional Strategic Intelligence (the VC NIH report released in 2009) which was aimed at fixing a compromise among opposing coalitions.

The resulting decisions inspired by the study's recommendations led to additional Strategic Intelligence modalities which should ensure Congressional control over SBIR access granted by the Departments in charge of its implementation. In that sense, Strategic Intelligence was chosen as a way to enforce the compromise illustrated by the decision, which was itself based on the main recommendations from the VC study released in 2009. Based on Annex 1 (Section 2.3), Table 11 analyses the different uses of Strategic Intelligence as a result of political negotiations, which took place in the context of the 2012 reauthorisation process.

Table 11: Overview of the uses of Strategic Intelligence as a result of SBIR negotiation processes

Key issues	Main supporting coalition	Main opposing coalitions (issue-specific)	Instrumentation ²⁴² of Strategic Intelligence as an output of negotiations
Initiation and implementation of SBIR	SBA, NSBA/SBTC as representative of the Small Business Community, Society for Optics and Photonics (issue-specific), Senate SBC, NAS	NIH, DoD, NASA, NSF, related industry and Universities, OSTP	<i>Control / Awareness raising</i>
Controversy 1 (set aside and size)		NIH, DoD, NSF, related industry and Universities (represented by the Association of American Universities or the Federation of American Societies for Experimental Biology, etc.), OSTP	<i>Control (guidance over set aside calculation and control and [GAO] monitoring)</i>
Controversy 2 (“mill riding”)		House STC, University Community	<i>Control (Transition and Commercialisation benchmarks)</i>
Controversy 3 (VC)		House SBC, NIH, NVCA and BIO as well as supporting industries (including partly Defense industry)	<i>Relay to compromise (VC & NIH SBIR study²⁴³) and “objectivation” / Control (25% VC access to SBIR) through DB-based monitoring (see Box 53)</i>

Source: The author, 2015

²⁴² Strategic Intelligence and evaluation in particular led to better identify the particular role of SBIR (for instance with regards to the Valley of Death); Establish better combinations or complementary measures; Identification/delineation of SBIR contours – to which Strategic Intelligence contributed to an important extent; Assessment of the potential needs for complementary actions or links with existing policy making (less the latter); Recommendations (mainly rooted in stakeholders’ discourse) and identification of best practices to include SBIR in the broader policy setting (policy making would not be appropriate as innovation policy is fragmented in the US, not under one particular umbrella).

²⁴³ See NAS, 2009d

One can understand from the above that regardless of the confronting coalitions/issue content, most of the controversies led to the setup of additional Strategic Intelligence allowing Congress some control over the implementation of SBIR in line with Public Law. The core instrument for such control to be effective remains the GAO under the leadership of the Comptroller General. As a result of most of these controversies, monitoring mechanisms were established:

1. Monitoring modalities to control the expenses and awards made at the Department level (first controversy)
2. Transition and commercialisation benchmarks to regulate SBIR access to possible “*SBIR mills*” (second controversy)
3. Transition and commercialisation benchmarks to regulate VCOC’s access to SBIR (third controversy)

Whether consensual (UK)²⁴⁴ or politically “*hot*” (US), SBIR/SBRI was learnt with difficulties in Departments and Ministries in both US and UK. The administrative resistances to policy learning through Strategic Intelligence are analysed more extensively in the next section (see the upcoming Section 2.2.4). But it is necessary to highlight the growing role of Strategic Intelligence in power relationships between the executive and legislative branches: this came as a result of the increasing use of Strategic Intelligence in policy decision, implementation, and control. In the US, officials (including SBIR managers) did not consider the NAS evaluations useful but rather assimilated them as a repetition of what was already known from a management perspective; also a perception observed among some officials was one of better learning by doing than by studying. In the UK, most of the administration came in confrontation to the orientations provided by Strategic Intelligence. In both countries, Strategic Intelligence influenced change in practice (lowest level of abstraction in policy change) through political changes or changes that were eventually the result of political decisions. The use of some (socio-economic) Strategic Intelligence at a higher management level in American Departments such as NSF and DOE in order to define SBIR support areas appeared to have limited influence over the programme itself.

But the utilisation that had the most impact in terms of power relationships was the utilisation of Strategic Intelligence by the administrative bodies willing to defend their position and legitimize their action. In the US, the case of NIH survey-based studies (released in 2003, 2007 and 2009) illustrates such view.

²⁴⁴ One interviewee ex-MP stated that “*People looking for a modern way of doing industrial policy would find it attractive programme. I don’t see any opposition to it except for the Far Right*”.

A similar trend could be observed in the UK, but which was rather directed at showing success to gain support from policy makers such as in the case of the annual SBRI Healthcare reports (KL). Strategic Intelligence also had a role of “relay” of stakeholders and officials’ discourses and positions.

Several such messages were identified in Annex 1, Section 0 change in practice. And in particular the role of hearings which generated (sometimes new) story-telling and were fora for negotiations as well as relays of other forms of Strategic Intelligence (through the interventions of stakeholders, officials, but also experts). Hearings were a space for opposing views to be expressed, justified, positioned, and argued (see Box 48) in the US, while in the UK (where Westminster’s agenda is decided by the executive branch) they appeared as a mean for the Chambers of appropriating the issues at stake.

Political demand for policy change and opportunity windows enable effective policy learning through Strategic Intelligence. Last but not least: the role of demand for policy change appeared to be critical for policy change driven by decision-making. Some of the abovementioned forms of instrumentation already suggest the existence of opportunity windows. When combined to demand for policy change, these opportunity windows proved to be powerful vectors of change through decision-making. Demand for policy change is therefore critical (see Box 82).

For instance, the Sainsbury Review had its impact because of the on-going 2007 Comprehensive Spending Review. But more visible, the 2004 SBRI Campaign led by the lead SBRI expert in the UK was clearly organized as to exert pressure on policy makers about to run the 2005 general elections. The shift in political leadership²⁴⁵ of the campaign also illustrated the opportunity window associated to a newly mandated MP in search of a policy flag to lead on the political front. In the case of Northern Ireland, the PCP discussion was already going on as explained by an interviewee; the re-launch of SBRI in 2008 was an opportunity to jump in and develop it further at the level of the devolved government.

A similar strategy was adopted by SBIR advocates in the US when Stakeholders pressured Congressmen in the context of the three SBIR controversies in order to influence their positions. Whether lobbies with the critical mass to influence politicians such as in the context of the VC issue, or less powerful advocates from the small business community, they mobilized Strategic Intelligence as “*argumentarium*” in order to influence policy making. In that sense, the small business community would target politicians belonging to States with an important amount of (tech/SBIR) SMEs (This was the case since the creation of SBIR, from Ronald Reagan –California- to John Kerry –Massachusetts-).

²⁴⁵ Again only from a political standing point; it is to be reminded here that the campaign itself was steered by the lead SBRI expert who adopted a strong advocacy position with regards to the scheme and engaged in the political game to promote the emulation of SBIR.

But electoral opportunities are to be combined with the search for solutions. One interviewee explained for instance that SBRI *“is the great hope of policy makers for several reasons: Low direct price –money that would have been spent anyway (...) evocative and easy to understand”* (SW). Another interviewee explained that *“For long the idea was that we needed to make better use of procurement. But we did not know what we could do to do that. When DC came along to present the programme and the success, we decided to get a UK version of that”* (source: interviewee from a stakeholder organisation with previous policy background). Similar demand existed in the US. Several times the founding father of SBIR explained (during the interviews or in written contributions which are publicly accessible) that the upscale of SBIR could take place as Congressmen were in search of new policy solutions to fight the recession and perceived relative decline of American competitiveness. A similar demand emanated from the European Commission, which was confirmed by several interviewees, as the European Commissioner for Research, Innovation and Science was looking for a new instrument to complete the Framework Programme for Research and Development to become Horizon 2020. Interactions with the SBRI lead expert on the topic of SBIR/SBRI led to the seed of the SME-instrument.

2.2.4 POLICY LEARNING through Strategic Intelligence requires some degree of Policy Learning Readiness to overcome resistance to change

Reluctance to change is observable in resisting organisations. It is to be underlined here that the topic of resistances to policy learning already integrates the overlaps between cross-temporal and Transnational Policy learning by its own nature: resistance to change is here perceived from the perspective of the organisations resisting to external pressures for change. In both UK and US interviewees pinpointed the importance of ministerial and Departmental resistances to SBIR and SBRI. The cases present quite some common features from that viewpoint. However, in the US the mandatory status of SBIR did not allow resisting actors block for long, while in the UK the voluntary nature of the programme allowed ministerial units be impermeable to the SBRI scheme for a longer period.

These resistances illustrate several characteristics: path dependency, mismatch between the targeted change and the existing organisational structure (even from a cultural point of view), as well as conflicting interests and perceptions. Starting from the latter, it is to be understood that most of the Departments and ministries in both US and UK long acknowledged SBIR/SBRI as an *“R&D tax”*, fact that was reported and confirmed during the field research in both countries. This negative perception illustrated some resistance to SBIR/SBRI integration as an external input, whether coming from abroad or another sphere of the domestic policy system.

Change itself can be badly perceived as a disturbance of administrative routines: this was already the case when the first SBIR pilot encountered in 1976 a unanimous reject by NSF officials used to fund fundamental research.

Several interviewees referred to violent reactions, such as several attempts to have the founding father of SBIR fired from the NSF at that time²⁴⁶. By the end of the 1970s, NSF, NIH, NASA and DoD together with relevant industries and university community (NAS, 1999) were against SBIR as well due to reasons that are mainly depicted in Annex 1, Section 2.2.

Complementing the reluctance from opposing stakeholders and associated administrative bodies, came the perception of SBIR as an “*R&D tax*”, perception that has been extensively reported (RAND, 2006; NAS, 8007a and 2008). The expression of resistance could be found in the discourse of interviewees but also in barriers identified in the literature such as the opposition of some Departments or reluctance to proceed to a neat implementation and monitoring of the SBIR (see for instance GAO, 1985). Opposing coalitions to SBIR found of course their political counterparts (political representatives willing to support their cause). Political resistance was also expressed from the side of the Congress at a more philosophical level: the “*Mills*” issue (See Annex 1, Section 2.3.2) illustrates a resistance to learning that developed when the suggested cognitive change went against some interests but especially what Sabatier would call 1st to 2nd degree beliefs of the actors involved in policy making (in that case, House representatives).

In the UK, the resistance to policy learning was only observed at the level of administrative bodies and was identified by experts as expressed by an underuse or misuse of the SBRI mechanism (Connell and Probert, 2010) by public entities such as the UKRC²⁴⁷, the MoT or the MoD among others. The lead SBRI expert authored several reports (see in particular Connell, 2010) and contributions (to Westminster hearings, administrative entities, etc.) on the (lack of) use of SBRI by the Research Councils since several years, followed by criticisms of the inaction of the RCs (see House of Commons Science and Technology Committee, 2013) and now ending up with recommendations so that the Research Councils “*re-introduce*” SBRI (Connell, 2014). Right from the start of TSB management of SBRI, convincing departments - even the ones considered as the leading ones (health and defence) - was a very difficult argumentation exercise as described by an interviewee who was instrumental in setting it up (NH). In Wales but also at the UK national level, resistance was for instance expressed through similar arguments to the ones expressed by high-level officials in UK ministries: the use of EU rules was the main reason for resisting SBRI integration (see Box 86 as well as Box 93).

²⁴⁶ Even personal interest was mentioned by several interviewees as a source of resistance, for example from the side of the OSTP.

²⁴⁷ The case of the Research Councils UK for which a study on SBRI benefits was conducted (see Connell, 2010) showed an important resistance to SI-based learning as recommendations were not taken up to an extent satisfactory to their author (see Connell in House of Lords Select Committee on Science and Technology, 2010a)

Resistance factors can relate to programme integration but also learning from Strategic Intelligence.

Organisational resistance and underlying factors in the context of SBIR in the UK were quickly depicted in Box 83. But among the factors leading to such resistance, a number of elements were found to be common to both SBIR and SBRI implementation bodies. These factors account for both cross-temporal and Transnational Policy learning resistance, the latter being observed mainly through the lack of organisational resources to look for foreign information and learn from sources or experiences from abroad.

It is to be noticed that resistances to programme integration could be overcome in the US as SBIR is mandatory and based on a legal mandate defined by Public Law, unlike its British counterpart which was until recently purely voluntary, in line with the policy culture of the country.

1. Resistance to programme integration

- First is the nature of SBIR/SBRI as a set-aside scheme. First, it defines conditions for the use of extra-mural R&D expenses by public entities, which is a first level of constraint. Second, it comes as an additional burden from a resource point of view. Indeed, until recently none of the two initiatives comprised a dedicated budget, or even an additional/share of the budget to be invested in the management of the programme. Therefore, the programme was considered an additional burden over the Departments' shoulders, leading to its "*R&D tax*" image across ministries and federal entities. It is to be reminded that the implementation of both programme got through constraining contexts of budget cuts and limited organisational capacities.
- Second is the mismatch between the SBIR/SBRI and the missions of the departments and ministries or the industries these public entities deal with. Officials are first dedicated to the missions of their department²⁴⁸. In both countries, this issue has been and remains problematic, leading today to some relaxing of SBIR rules in the US so that they appear to be more flexible and adapted to Departments which naturally deal less with SMEs for instance. One illustrative example in both US and UK is the one of Defence (see Box 78): DoD and MoD use to work with more concentrated industries on larger systems (aircrafts, tanks, carriers...), making the implication of SMEs through SBIR/SBRI challenging. In the US, an implicit way out was found as SBIR-supported SMEs would most likely be absorbed by larger companies later on. However the procurement mechanism does not always naturally fits with the "*SME target*".

²⁴⁸ One interviewee from the UK explains that "*we do not focus on the mechanism but on our markets*" (AN)

Health also came up as a problematic area, which explains why in the US the NIH plaid in the SBIR opposition team for so long. Even in the UK where NHS has a different role compared to NIH²⁴⁹, health can be a sector where reaching the market or procurement is difficult.

One of the beneficiaries in the UK (RK) explained for instance that on top of its SBRI investments (14 million Pounds in total), the majority went to clinical trials, while additional (financial) efforts will then be required for the solution to be sold/procured. But in both cases, SBIR appears to be more integrated today: NIH progressively developed its ownership of the programme, and the NHS literally stepped up to become the “*SBRI champion*” of the British government.

- Cultural factors are to be highlighted, which are in the UK linked to risk aversion²⁵⁰. Several interviewees designated in that regard the fact that SBRI was mainly implemented by procurement units, while innovation and procurement would be “*like oil and water*”. Another interviewee explains that “people were intimidated by funding innovative things” This specific line of resistance is not really valid for the US (or to a much more limited extent) as SBIR is mainly implemented by dedicated units or at least human resources, while in the UK, an interviewee explains that “*most Government Departments did not think innovation was their job*” while another one highlighted the difficulty some had to understand the concept of SBRI. The mind-set appears to be fundamental for change to be dealt with at the organisational level²⁵¹.

²⁴⁹ Although the NIH supports health research, the NHS are involved in the delivery of health services

²⁵⁰ One interviewee from Northern Ireland explains that “*many Departments are not looking for the best solutions because it takes high risk and government is particularly risk averse, people are concerned, they fear of being brought to committee. The culture is about making sure there is no problem, not taking risk*” (JC)

²⁵¹ Interviewees acknowledged this organizational resistance to change and mindset shift. Connell (2006) summarizes this situation as following: « *Part of the problem in the UK seems to be a fundamental difference in the way that government departments see their responsibilities in relation to innovation compared with their US counterparts (...) There is a view that innovation is not their responsibility, but that of the private sector and DTI. In contrast, US federal agencies regard it as a key part of their role to stimulate and finance innovative R&D which will help them achieve their strategic goals and improve their effectiveness*” and adds that “*Conflicting departmental objectives*”, “*small amounts of money involved, compared with other departmental expenditures*” make innovative funding through SBRI a challenge at Department level as initial missions are most likely to dominate”.

- Connected to the previous cultural factors but only valid for the UK, comes the skills issue which was referred to by several (see Box 77). For instance, one of the interviewees referred to *“Procurement people in the Department whose basic role is compliance with EU rules²⁵²; they indicate to the Department the modalities (timing, criteria, etc.)”*.

Risk aversion across procurement units has been acknowledged as a structural issue by several interviewees and made a reason why SBRI should get a proper budget by some. This aspect was complemented with several inputs from interviewees referring to some of the officials in charge who would gain from having technical skills.

- As to support their resistance to change, several interviewees from the UK referred to the lack of consultation of Departments by HMT (several referred for instance to the targets upon which disagreements led to discussion between secretaries of State and the Chancellor more recently).

2. Resistance to learning from Strategic Intelligence

- In both countries structural organisational capacity was referred to: time and money were clearly identified as hampering factors to learning from Strategic Intelligence. All organisations in charge of coordinating SBIR/SBRI (whether SBA, TSB, NI, etc.) were concerned with the challenge of building enough critical mass from an organisational point of view.
- Again cultural aspects are to be considered. In both countries some reluctance to Transnational Policy learning was observed at this level: in both cases, several interviewees referred to the fact that they were not eager or incentivized to promote SBIR/SBRI abroad, but also (for most of them) that they did not see the interest of other initiatives: several interviewees involved in SBIR implementation expressed no or limited interest in learning from abroad; the same result came out from the UK, where one of the interviewees explained the sole focus on the US and highlighted *“overseas posts to send short reports, no point in examining the details of the other programmes because the only one interesting was the American model”*; another interviewee explains also the following: *“From my perspective I just adopt Innovate UK and NHS England models (...) not to reinvent the wheel”* (JaA).

²⁵² In that respect one interviewee explained that the *“EC does not help because of PCP and PPI, makes it more complicated”*

Two reasons were usually given by the interviewees reluctant to learning from Strategic Intelligence or from abroad: 1) longevity (justifying more experience)²⁵³ and 2) in the American context only, the unique scale of the programme that makes it difficult to compare with similar initiatives.

Also in the American case, some broader cultural factors were identified, such as the self-centred culture of most American officials (who already have to deal with/look at a number of States in their own country)²⁵⁴.

- Finally, an interviewee pointed out a transferability issue: *“In the US reports, there is not much that you can transfer. (...) Problems with the US, conditions do not allow us to make transfers like that”* (AN); this connects with the low benefits perceived by SBIR managers vis-à-vis the NAS evaluations.

Depending on the level of “policy learning readiness” observed, Strategic Intelligence can be a mean to overcome organisational resistance. Based on the findings regarding resistances to policy change and learning through Strategic Intelligence, this thesis proposes the concept of *“Policy Learning Readiness”*. The resistances described and analysed in this dissertation clearly point towards several dimensions of what makes an organisation *“ready to learn”* (see Box 18). This starts from the confirmation of Borins (2008) who stated that the diffusion of an innovation in the public sector *“depends on knowledge of the population within which an innovation might diffuse”*. But such a view should be refined as not only knowledge but also perceptions and cognitive readiness to undertake actions that would mean *“change”* or *“innovation”* are necessary. This implies of course that the change does not conflict with the core objectives of the organisation, and that it relates to existing practices. Policy Learning Readiness can be referred to as a status which is about the *“readiness”* to learn, learning being here understood in simple terms, such as when an organisation or a system integrates, processes and uses knowledge that would possibly lead to change. Four main dimensions can be identified (see Box 18).

²⁵³ Longevity is very often quoted as an indication of success, whether by the interviewees or in reports: *“The US has a long-standing set of policies to favour small businesses in public procurement including the Small Business Innovation Research programme and “Set Asides”. It is generally acknowledged to have a more enterprising culture which is, as a result, more encouraging of SMEs”* (FreshMinds, 2008).

²⁵⁴ Some similar argument was heard in the UK case but which did not find any echo. An interviewee explained that he *“visited many countries. More difficult to find traction in the US. Not much at federal level; then go to triangle (silicon valley, etc.); better to learn from EU countries, Germany for instance”*.

Box 18: Four dimensions of policy learning readiness

1. Alignment of the proposed/upcoming change with the core missions of the organisation
2. Perception of a need to change, and understanding that the needed change requires learning (justifying inclusive and participative processes)
3. Available organisational capacity (human resources and budget mainly) including absorption and adaptive capacity (for the latter, mainly at the level of the organisational process, or how knowledge is being processed in order to be turned into decisions and actions)
4. Human resources readiness to understand and support the proposed/upcoming change from:
 - ▶ A functional point of view (function of each official)
 - ▶ A skill perspective (skills should be either adapted or in the process of being adapted to the upcoming change)
 - ▶ A cultural dimension (officials should be trained and culturally formed to accept and even welcome change)

Note 1: Inspired by Chun Wei Choo (2006)²⁵⁵, such an approach to organisational learning relies on the idea that it takes place as a process of turning information from the inside out outside the organisation in order to turn it into action. The theoretical (and implicit) steps of such an approach would therefore be the following: 1) detecting 2) selecting/filtering 3) integrating 4) processing 5) designing 6) deciding 7) implementing 8) reviewing.

Note 2: Policy Learning Readiness should not be confused with Absorption Capacity²⁵⁶; although both are intrinsically connected, absorptive or proactive capacity refers to a property of a system or an organisation, while policy learning readiness relates to the broader “change readiness status” of an organisation (in the broad sociological term).

²⁵⁵ Chun Wei Choo (2006), “The Knowing Organization”, Oxford University Press.

²⁵⁶ See Cohen and Levinthal (1990), “Absorptive Capacity: a new perspective on learning and innovation”, Administrative Science Quarterly, Vol 35. No.1 128-152; and George and Zahra (2002), « Absorptive Capacity: a review, reconceptualization, and extension », Academy of Management Review, Vol 27. No. 2 185-203. A simplistic definition of absorptive capacity based on these two references could be here said to encompass the capabilities of an organisation to assess, acquire, assimilate, process and use knowledge to achieve a position (George and Zahra [2002] refer to “acquisition, assimilation, transformation and exploitation”). However, absorptive capability is a topic *in se* that is in a constant evolution and discussing its grounds and applications is out of the scope of this dissertation.

Strategic Intelligence flagged the above resistances in different occasions, in both the US and the UK. The NAS reports and self-initiated studies that influenced both policy processes the most quoted such resistances indeed. However, if stakeholder organisations defend the interests of their members against all odds, administrative bodies do not follow the same rationale and some of the above resistances were progressively overcome. SBIR units in the American Departments even progressed towards some proper ownership of the mechanism (NAS, 2008), and the number of competitions in the UK grew over the past years, with some noticeable initiatives from organisations such as the NHS or Northern Irish bodies willing to develop their utilisation of SBRI.

But although several forms of resistances expressed as a result of non-readiness to learn were identified, initiatives to overcome these resistances were somehow limited to certain initiatives or mechanisms. In the US, a clear way to force the executive branch to bend to commercialisation objectives established by the legislative branch in the US went through the definition of transition and commercialisation benchmarks to be applied in both the implementation and the monitoring of SBIR. It has been confirmed in several instances that the benchmarks changed and from a “*stimulation*” focus turned to an “*innovation*” one (Rand, 2006). But apart from the mandatory mechanisms in place in the SBIR context²⁵⁷, the key instrument used to overcome the abovementioned resistances was Strategic Intelligence.

Specific advocates and leading organisations with coordination duties (essentially SBA and TSB) mobilized the repository of Strategic Intelligence providing arguments about the benefits of SBIR/SBRI in order to bring these arguments to ministries to convince officials to make use of their respective scheme (in the UK) and in both cases demonstrate the benefits of the mechanism. Such information in the UK was even sourced from American Strategic Intelligence, as explained by an official who referred during its interview to the contacts between TSB and the American administration: *“On particular issue, we find case study material from them. SBA sent material (after a teleconference in 2012) and we show how departments can benefit from it [SBRI]. Innovative procurement is seen as risky, so we have to provide material to convince. We inform ourselves on management and how they promote it (awareness raising); the benefits; and use SBIR reports (evaluations)”*. A similar form of outsourcing was observed as DEFRA officials specifically referred to Welsh Strategic Intelligence used to convince senior colleagues in their organisation to use SBRI and convince them about its benefits.

²⁵⁷ Resistance is clearly overcome by “force” through compliance requirements (through OIG recommendations and Comptroller General Statements in the US for instance); in the UK, HMT targets which come through Strategic Intelligence or as a result of it have long been considered as not constraining for the ministries.

Another interviewee explains that in Wales, a mixed approach was adopted and illustrates with a specific example: *“What we did there is that we had a meeting with the chief executive to explain how it [SBRI] operates. We presented our work since 2009, examples of SBRI in the United States, etc. (...) We have a meeting with 20 people with responsibility for agriculture, water, metal lines etc. (...) We do the informal workshop to explore their challenges, problems (...) Then we move them from problem statements to challenges. It starts with getting the senior to buy in, so that there is a push for budget, then good managers”* (GB). In both SBA and TSB, testimonies from interviewees as well as second-hand sources confirmed that the mission of convincing Department and Ministerial officials was long but progressively successful as an understanding of the benefits of SBIR and SBRI was building up.

Not only the arguments can be used to convince ministries and Departments during face-to-face meetings, but also other uses of Strategic Intelligence can be identified. One of them was the problem-solving nature of a Strategic Intelligence exercise that led to overcome organisational resistances and allow the re-launch of SBRI through the Sainsbury Review and resulting uptakes (by DIUS and the Exchequer). At that time, a main reason for officials to position themselves against SBRI was that it would not comply with EU regulations²⁵⁸. The solution was found through Strategic Intelligence, which recommended to place the initiative under Procurement legislation in order to avoid the constraints of the State Aid Framework²⁵⁹.

Another –far more incremental form of– learning process could also be observed at the operational level as suggested by Box 95: technical learning would indeed take place through inter-agency cooperation but also (and mainly) in the context of sector-specific European projects supported for instance by the European Framework Programme for R&D.

²⁵⁸ For quite some time, the argument of the Departments was that using SBRI would be illegal given the state of EU laws and regulations; However, *“By carefully studying EU Regulations on State Aids and Procurement we were able to refute the assertion by some officials that the approach we proposed would be illegal”* (Connell, 2014).

²⁵⁹ The expert explains among other things (see also Annex 2, Section 2.2.2) that *“ministers are busy, dependent on advisors, and in this case officials they are full time civil servants against any risk; here they said nothing could be done. When the bill produced, he mentioned ‘maybe it can be done’, Gordon Brown had to be persuaded to include it in the budget”* (DC).

2.3 Strategic Intelligence as a vector of transnational policy learning

2.3.1 Strategic Intelligence owns a variable position in different national systems and leads to policy adaptation

SBIR diffused through Transnational Policy learning processes that took place in different timeframes. The previous section shows how Strategic Intelligence contributes to cross-temporal policy learning. As a cognitive frame subject to instrumentation strategies that are established in the context of power relationships, Strategic Intelligence shows some content and form values that make it an important building block of policy change in both SBIR and SBRI cases. In analysing cross-temporal policy learning, the previous section also showed how embedded cross-temporal and Transnational Policy learning are. In a way, it appears that the transnational dimension of policy learning can only be observed over time as a form (or sub-segment) of cross-temporal policy learning: it is this share of policy learning that presents transnational characteristics. Come then the questions of what is transferred, how and by whom. Strategic Intelligence is in that regard at the core of the transnational learning taking place in the SBIR and SBRI contexts.

The diffusion of SBIR to the world only took place about 20 years after its initial launch in the US. In Europe, the UK was the first adopter of such model and the SBRI case study clearly illustrates the critical role of Strategic Intelligence in emulating SBIR, at the earliest stage of SBRI but also all along the life of the scheme. Similarities and differences were found between SBIR and SBRI that were tracked along the field research and linked with the role of Strategic Intelligence. Overall the evolution of both SBIR and SBRI tend to move towards a certain form of convergence. But variations were observed that are also most likely to crystalize the divergent features of the schemes.

Box 19: Convergence through Strategic Intelligence – presentation of the “what” is being learnt through SI

It is to be reminded the aforementioned quote from an expert asked by the European Commissioner for industry 1) What works and 2) What process SBIR/SBRI is about. What is provided by Strategic Intelligence in that respect: “In fact the key features of SBRI represent best practice in relation to innovation management generally, and they are equally applicable to larger projects. These features include: defining public sector customer/specifier requirements based on challenges and outcomes; a competitive awards process; a phased approach to manage risk and focus expenditure on the best projects; and transparency in terms of funding.” (David Connell’s 2011 Supplementary written evidence to complement his submission to the House of Lords Select Committee on Science and Technology, 2010a).

There is clearly a time difference that explains some of the dissimilarities observed between both schemes, as well of important contextual factors, which have been extensively reviewed in sections such as Annex 2, Section 0. This time difference also explains the difference in policy knowledge cumulated in the respective countries as well as the establishment of policy/administrative practices (well-established in the US while they are still structuring in the UK). Other factors also explain some divergence aspect which are inherent to the nature of the innovation system: for instance, the slight variations in the size of the awards when comparing US and UK, or even the scale difference between both countries²⁶⁰ explain many of such variations.

In the UK, the journey of SBRI started by a simple indicative target of extramural R&D expenses and thanks to Strategic Intelligence combined to lobbying/advocacy strategies became a scheme almost comparable to the American one on the paper, with of course fundamental and superficial differences to be noticed as a result of the tailoring process and adaptation to the domestic context (to which Strategic Intelligence was a first-range contributing variable, under the leadership of mainly one central expert but also other entrepreneurial actors, for instance at Northern Ireland and Wales levels). Domestic Strategic Intelligence in the UK served as a transnational sourcing tool, accessing the SBIR repository (US) and filtering information and arguments in order to further process it so that the output is tailored to the domestic context and underlying objective of the Strategic Intelligence exercise(s). Strategic Intelligence also opened some transnational channel (Sainsbury's visit to the US, NAS evaluator in Westminster –see Box 87. and Box 20, the lead SBRI expert in the US...).

²⁶⁰ According to Connell (2014), total SBRI spending should “*be increased to £250m a year*” to be in line with the US while taking into account the differences in size between the two economies.

The SBIR lead evaluator even contributed to the legitimisation of SBRI in the UK by contributing to domestic Strategic Intelligence, advising Lord Sainsbury in the context of the “*Race to the Top*”²⁶¹ review but also submitting written evidence to the House of Lords Committee on S&T: “*The United Kingdom and the United States face common challenges in using public procurement as a tool to drive the results of research to the market, and there is much to learn on both sides of the Atlantic. U.K. policymakers could draw on the nearly thirty years of experience of the U.S. Small Business Innovation Research (SBIR) program to improve the operation of some elements of the U.K. innovation system*” (C. Wessner in House of Lords Select Committee on Science and Technology, 2010a).

Box 20: Intervention of the SBIR lead evaluator in Westminster Committee – nuancing the “myths” about US procurement

“While the SBIR program is a proven mechanism to facilitate the development and market entry of new technologies, processes, and products, it is important to avoid some of the European myths about the role of U.S. defense procurement and, to some extent, the potential of procurement as a technology driver. Statements such as “17% of European GDP involves public procurement” may overstate the potential (...) Changing the incentives in procurement to accept greater risk is more difficult than is commonly believed, as the U.S. experience in defense procurement sadly illustrates. (...) This is not to say that public procurement cannot benefit enormously from new, innovative products but the traditional procurement process does not easily support innovation, hence the importance of multi-gated programs such as SBIR”.

Source: C. Wessner in House of Lords Select Committee on Science and Technology, 2010a

Convergence and divergence are found in mixed ways, leading to the conclusion that Strategic Intelligence leads to policy adaptation or policy tailoring. The SBIR case study illustrates the absence or very limited “*learning from abroad*” (not) taking place in the SBIR context (see Annex 1, Section 0). Therefore, the process of convergence was to be observed from the perspective of SBRI and its progressive alignment with its American model.

²⁶¹ When working on SBRI and following up on the Secrets Report, Lord Sainsbury by then Minister of Science and Innovation went to the US in order to know more about the original SBIR. The American lead evaluator of SBIR explains: “*Lord Sainsbury came for a series of interviews, mid-2004/2005, funny exchange, I say you do not do well on SBRI, Sainsbury mentioned ‘yeah I know we got it wrong and this is why I’m here’; A group of technocrats there, only took off one wheel. Point at this time: it was not mandatory! It was a private briefing with 3 of my staffers, me, him, and his team. He identified the problems with DC, worked on it for years. And agrees with me that the problem is that the programme was not made mandatory (...) Careful notes, took things seriously*” (CW).

The British case study shows that the key features borrowed from the American model were mainly belonging to a more abstract level of policy design one could point at as ‘rationale level’: the main principles are indeed the ones which relate to some *“SME technological innovation support in the form of both direct and indirect incentives coupled with the possible link to public procurement”* SBIR would or should be. These main elements of rationale are either perceived from the viewpoint of the formulation of the needs or of the objectives of the programme, but can also be implicit: all of it starts for instance first with a recognition of the role of the State in the economy. Such a role was more recently analysed and promoted by academics in both countries working on SBIR and who recently theorized the role of the Entrepreneurial Government or State²⁶². Other common building blocks such as some of the challenges to be addressed (see Annex 2, Section 1.2), key objectives and key elements of the SBIR design (phasing, mix of direct and indirect support, possible link to procurement, etc.) can be referred to. Also the Northern Irish (see Annex 2, Section 3.1.1) case highlights that the main elements taken up were building blocks and pieces of the rationale as explained by an interviewee referring to the *“outcome-based specifications”* as the main lesson to be retained from the US model.

Such converging features have for some of them already been spotted in the previous sections: the so-called Valley of Death (see Annex 1, Section 3.1) or the commercialisation and technology uptake emphases of both schemes have been presented (see Annex 1, Section 2.2 and Annex 2, Section 1.2.1 but also Box 80). The combination of both *“technology push”* and *“demand pull”* principles are being followed in the UK in line with the American programme, incarnated by the idea that public authorities can be lead customers and better pursue their missions in doing so. SBRI also follows a phased process involving several types of (hard and soft) instruments, which is competitive and leads to IP retention by awardees as well as explicit and implicit links with other instruments from the policy mix and the possibility to link up with public procurement. Some of the key differences even drive towards convergence: although the British initiative had only 2 phases, some progressive convergence was observed that was not related to any form of Transnational Policy learning but appeared to be self-initiated by an agency willing to create a third phase to better link prototyping and development to commercialisation. Surprisingly, this third stage in the SBRI Healthcare would integrate technical support such as in the American case²⁶³. In the same way, the Valley of Death challenge entered the SBRI arena quite independently from American developments, although the awareness of some experts led to further links with these developments (see Box 87).

²⁶² See Link and Scotte (2008), *“Government as entrepreneur - Evaluating the commercialization success of SBIR projects”* for the US; and Mariana Mazzucato (2013), *“The Entrepreneurial State: Debunking Public vs. Private Sector Myths (Anthem Other Canon Economics)”* for the UK.

²⁶³ The initiator of this third Phase in SBRI Healthcare expressed the following astonishment: *“Nothing as a Phase 3 in the US, do they?”* (KL).

One common aspect to both governance structures lies in the coordination of the schemes which are both centralized in the hands of public entities (SBA and TSB respectively) exerting some repository setting and ‘control’ (gathering and centralizing strategic information on SBIR/SBRI) function. These entities also play the role of nodes in their respective networks (first-line contact for SBIR/SBRI). The decentralisation (which is *de facto* in the US) progressively takes place in the UK but on a voluntary basis. In both cases, the clear leadership made things more “credible” (see Annex 2, Section 1.2.3); TSB also makes use of NAS evaluations to convince about SBRI potential for success, demonstrating its connectivity and links to the American repository.

Remaining differences between the two schemes are mainly related to the British system and the need for SBIR as an imported policy initiative to be tailored to some of the constraints this system entails. The structure (governance and process) of SBIR and SBRI are therefore different. In the US SBIR is a Congressional programme steered by the legislative branch, while in the UK SBRI belongs to the executive branch. That also impacted how Strategic Intelligence could or could not have an influence on policy and on which aspects (see for instance the control value of American Strategic Intelligence such as highlighted in Section 2.2.4). On top of the coordination activities, TSB has also the possibility to run and co-finance competitions of interest to some public bodies: as there is no legal mandate for SBRI to be implemented by ministries (voluntary participation), this was made an incentive for ministries to make use of the mechanism at their disposal. This links to a fundamental difference between UK and US: the role of Public Law, which is a fundamental basis for SBIR but has been avoided in the SBRI case for reasons that have mainly to do with policy making culture and traditions. The outreach is also different, as only a selection of Departments with sufficient critical mass should implement SBIR in the US while all public entities are invited to make use of SBRI in the UK. That obviously impacts the strategies of sub-national entities: while NORTHERN IRELAND and other UK entities call upon the existing SBRI mechanism, American States tend to set up complementary measures to facilitate the access and/or performance of their local companies willing to become awardees or benefiting from SBIR. Differences were also identified that directly relate to the European Framework (and mainly regarding the fact that SBRI cannot make use of grants because of the State Aid regulations, and that no scope or access restriction was possible vis-à-vis the target group or the geographical scope of the programme because of the Procurement legislation).

Other differences appeared to be less significant, such as the slight variations in the timing (duration) and size of the awards, as well as the possible scale the British scheme currently has or can achieve which is obviously constrained by the size of its overall economy and fundamental differences between the American and British innovation ecosystems. These differences are mainly reported in Table 19. What is to be noticed at this stage is that every step towards further SBIR emulation along the SBRI journey was driven by Strategic Intelligence and its utilisation by key advocates at appropriate times.

Each wave of further integration of the recommendations formulated and pushed forward by Strategic Intelligence and its master(s) in the UK drove SBRI from a simple expenditure benchmark (SBRI mark 1) to the more recent version of SBIR-like scheme (3 marks after).

The role of Strategic Intelligence is different depending on the domestic context. Strategic Intelligence was the key translation vehicle to make a foreign programme fit the British context. It was for example used as a way to overcome some constraints over pure emulation of the programme, addressing specific resistances (see Section 2.2.4) or acting as a problem-solving tool (role played by the Secrets Report when clarifying the European framework to facilitate the implementation of SBRI). Strategic Intelligence already influenced divergence and convergence through the filter represented by the research strategy which presents the needs and main reasons for setting up an SBIR-like initiative in the UK. Here the divergence effect was in the rationale, initially with the role of *“soft companies”* etc. which presents a biased rationale for the recommended scheme itself. That was the first stage of tailoring SBIR to UK, linking to destination needs. But before exploring the functions of Strategic Intelligence in such a transnational context, one should first distinguish before the relative role of Strategic Intelligence in SBIR and SBRI systems.

Strategic Intelligence related to SBRI appears to be less structured when regarding the programme (while well-developed at the level of the national system where Strategic Intelligence modalities are well-established at the ministerial level for instance). On the contrary, about 35 years of SBIR implementation with the accumulation of knowledge from GAO made SBIR-related Strategic Intelligence quite advanced and developed at the programme level, until the recent development of benchmarks (see Annex 1, Section 2.1.2). Beyond the structural aspects, one should however notice that no significant difference was found at the technical level: Strategic Intelligence in both US and UK is based on rather simple approaches (by opposition to *“complex”* econometric or network approaches for instance) and make use of common criteria and indicators/descriptors but not by emulation between Strategic Intelligence exercises: indeed, the judgment criteria are rather derived from domestic preoccupation rather than copied from other (foreign) exercises. Methods employed in comprehensive Strategic Intelligence are for instance usually mixed-method approaches making use of basic quantitative and qualitative methods as well as administrative data. One of the key characteristics of comprehensive intelligence is here the extensive use of case studies, which are rather presented as *“success stories”* (see Section 2.3.2 where this issue will be further explored).

When relatively positioning the different types of Strategic Intelligence identified in SBIR and SBRI contexts, one can notice that some of key influence from Strategic Intelligence lied in control. In the US, there is a clear control function of Strategic Intelligence in that regard (through OMB and GAO reports and the newly introduced benchmarks in particular) which has been missing in the UK to constrain change. This role was not picked up in the UK where studies are more self-initiated when specific, and when higher-level such as Status reports they do not come from a legal mandate.

However, one should note that the capital role of such control exercises did not lead to any form of learning from abroad and so far did not contribute to the promotion of SBIR beyond the US borders. In the UK, monitoring impacts affected SBRI at the operational level only as it is used as to adjust the implementation of the programme (see Annex 1, Section 2.1 and in particular Figure 44); however data to be used in the on-going evaluation of SBRI²⁶⁴ will mainly be provided from such sources, as presented already in Figure 43, and some technical learning at the operational level takes place as presented in Box 81 which shows that learning at the project level allows adjustments for a better implementation of the mechanism. In the US the value of monitoring is similar, although it is associated to some more constraining mechanisms (GAO, etc.) as suggested above. In both cases, monitoring does not come up as a vector of learning from abroad as it is focused on domestic programmes, their implementation and performance.

There is a particular role of evaluation in the US, with only one recent attempt (still on-going exercise at the time of the writing of this dissertation) in the UK. But the use of self-studies which adopt a comprehensive position (like the NAS studies) were also the most influential in the SBRI context. In that respect, it is interesting to underline that the 5-point proposal²⁶⁵ made by Connell (2004) after many iteration rounds between Strategic Intelligence and policy over more than 12 years making finally ended up completely taken up by policy (see Box 73). The support of different changes by the SBRI expert/advocate eventually led to SBRI Mark 3 (Connell, 2010a and 2014) coordinated by TSB (Innovate UK) which endorsed the change towards an SBIR-like scheme with relevant process etc. (not limited to a simple spending target) and later on enforced by mandatory targets set by HMT (2013) for 6 ministries for 2013-2014. The same goes for the NAS evaluations in the US which proved to be the ground for many policy (non-)decisions (see Annex 1, Section 2.3). The common “*comprehensive*” nature of both sets of studies appear to be the reason of their impact, although one (the NAS evaluations) is legally grounded into a Congressional mandate while the other (self-initiated studies) comes as voluntary contributions from one or more experts.

²⁶⁴ Which originated from experts’ suggestions relayed by Westminster hearings. Referring to the contribution of two academics to hearings by the House of Lords Select Committee on Science and Technology, the Government response to the House of Lords mentioned that “*BIS is planning an evaluation of SBRI and FCP in 2012. Professor Georghiou and Professor Edler told us that such an evaluation would be challenging. The Government should ensure this review is robust and takes into account the issues raised by Professor Georghiou and Professor Edler. We look forward to seeing the outcome of the evaluation*” (Source: Government Response to the House of Lords Science and Technology Committee Inquiry into Public Procurement as a Tool to Stimulate Innovation, 2011). Currently the evaluation is on-going, conducted by the MioIR which has also been one of the EU leaders on demand-side innovation and PCP (see contributions from Georghiou to the Aho report, as well as Edler’s contributions to OECD intelligent demand work).

²⁶⁵ 1. Delineating fields at agency level (technical goals to be met); 2. Evaluation of SBIR proposals through a consolidated process (simplified, standardized, etc.); 3. Phased approach; 4. 100% cost funding; 5. The role of IPR.

However, the legal mandate did not make the NAS more impactful (in terms of policy change) than its British counterpart. Several reasons can be listed.

First of all, the context clearly hampered the outreach potential of the NAS evaluations, as confronting coalitions were at stake in a legislative (and therefore more pluralistic) arena. In addition, one of the strengths of the British studies lied in their ability to benefit from the consensual political context in order to 1) State what failure is (see Box 72 and Box 66 as well as Connell, 2009) and what success is (see for instance Annex 2, Section 3.1.2); and 2) make clear recommendations over the changes to be made and how²⁶⁶, while the position of the NAS evaluations in the US remained lighter from that perspective due to the controversial nature of the programme. Also the challenge was not the same: in the UK, Strategic Intelligence contributed to the structuration process of SBRI, while SBIR is well-established since decades in the US. Finally, solution-drawing was also seen in the role of the 2006 “*Secrets Report*” when explicating the way to implement SBRI while complying with EU legislation, making the resistance argument of Ministerial officials obsolete and allowing the Minister take a step further in pushing SBRI emulation through the Sainsbury Review (see Box 70 and Box 71) to be taken up by DIUS (2008) and the impacted 2008 Budget. Finally, hearings in both cases were identified as platforms connecting several world (experts, stakeholders, officials and decision makers) in order to relay their discourses and positions, as well as stories from beneficiaries/target groups but also stakeholder organisations willing to defend certain orientations. Both Congress and Westminster hearings (through written and oral contributions such as Box 76) were platforms for experts to relay Strategic Intelligence while setting up some parts of policy makers’ cognitive perceptions of the scheme(s) and the needs to be addressed as depicted in Box 75. Also, the role of hearings as public space of confrontation is also to be highlighted, as one contribution or question can trigger an immediate response²⁶⁷. While Strategic Intelligence proved to be a relay of discourses in the US, it concentrates one discourse in the UK which is the one of policy learning entrepreneurs.

From a TRANSNATIONAL POLICY LEARNING point of view, comprehensive intelligence is the most influencing form of Strategic Intelligence. Strategic Intelligence clearly fostered and sometimes even enabled cross-temporal policy learning as analysed in the previous section (See Section 2.2). The influence of Strategic Intelligence in practice varies from US to UK but one can easily understand that in both, comprehensive/explanatory studies were the most central forms of influencing Strategic Intelligence in addition to the control-oriented Strategic Intelligence such as GAO reports and benchmarks.

²⁶⁶ The SBRI case study shows that the recommendations even presented budget calculations, and approximate break-downs regarding the expected outcomes of the emulation proposed by Connell (2006).

²⁶⁷ See for instance the 2011 UK Government Response to the House of Lords Science and Technology Committee report on “Public Procurement as a tool to stimulate innovation” (2011)

A similar trend might arise in the UK with the new targets established in 2013, although current negotiations between ministries (and ministers) with HMT leaves a number of interrogation marks about future compliance of British entities with these targets (considered as unrealistic by some of the interviewees).

From a Transnational Policy learning perspective, control-oriented Strategic Intelligence did play neither an enabling nor a fostering role. Comprehensive Strategic Intelligence did. First as a resource, as highlighted in the synthesis table below (Table 12); second, in the British case as a structural instrument for networking as both the Secrets Report (2006) and the Sainsbury Review (2007) led to meetings overseas and further discussions between British and American SBIR/SBRI players.

Table 12: Strategic Intelligence influence and its “resource” value for transnational policy learning

Type of Strategic Intelligence and related influence	US →	TRANSNATIONAL POLICY LEARNING Value	← UK
High influence (policy design)	<ul style="list-style-type: none"> ➤ Comprehensive (NAS) Evaluations ➤ Normative (GAO) studies 	<ul style="list-style-type: none"> ➤ Export resource (NAS, only a <u>very</u> few times GAO references) ➤ Import vehicle (Self-initiated studies) ➤ Structural value (visits and networking) 	<ul style="list-style-type: none"> ➤ Self-initiated studies ➤ Status Reports
High <u>domestic</u> influence (policy design)	<ul style="list-style-type: none"> ➤ Normative (GAO) studies ➤ Metrics and reporting 	<ul style="list-style-type: none"> ➤ Highly limited due to domestic focus 	
Lower (operational) / Low influence	<ul style="list-style-type: none"> ➤ Forward-looking assessments ➤ Internal Intelligence ➤ Socio-economic studies ➤ Privately initiated SI 	<ul style="list-style-type: none"> ➤ Highly limited due to domestic focus ➤ Data used in comprehensive exercises leading to Transnational Policy Learning ➤ Operational learning from abroad (sector-specific, agency level and not policy level) 	<ul style="list-style-type: none"> ➤ Metrics and reporting (influence limited to technical adjustments) ➤ EU Projects and related SI ➤ Monitoring (management-oriented) ➤ Strategic Intelligence from the legislative branch
Relay (connection / structural influence)	<ul style="list-style-type: none"> ➤ Hearings ➤ Conferences 	<ul style="list-style-type: none"> ➤ Link to decision making and broader outreach 	<ul style="list-style-type: none"> ➤ Hearings ➤ Conferences

Source: The author, 2015

Based on the case study results, the above table (Table 12) presents a grouping of Strategic Intelligence by type and influence, in order to highlight their Transnational Policy learning value. One can observe that both domestic and Transnational Policy learning dimensions are integrated in the case of the UK when considering influencing Strategic Intelligence as both processes were entirely embedded, while the impermeability of the SBIR case made necessary the distinction between the Strategic Intelligence with a high influence on policy from a domestic perspective only, and Strategic Intelligence which proved to matter in the process of Transnational Policy learning (in this study, the emulation of SBIR in the UK). The explanatory value of Strategic Intelligence seems therefore to foster Transnational Policy learning while other forms of intelligence fulfil other functions.

In both the US and the UK, Strategic Intelligence was instrumental in many (Policy Learning) regards. However from a Transnational Policy learning perspective, the role of Strategic Intelligence in the UK was even more outstanding as the evolution of the British initiative was fully bended to the orientations defined by self-initiated studies authored by the Lead SBRI Expert. Every failure (from the first “*advertisement/reporting bias*” to the “*EU regulation*” and “*target*” issues) was flagged and solutions proposed by Strategic Intelligence which ended up on the policy agenda either in full or in part²⁶⁸ as a result of the emulative recommendations proposed by these self-initiates studies. Of course, this is not like if every Strategic Intelligence exercises referring to the American experience generated new information or knowledge, but was rather a way of re-appropriation and re-shaping of this knowledge domestically to make it impactful. The iterative sourcing only took place to a limited extent (self-initiated studies, Sainsbury Review, NAS intervention in Westminster) but led to important changes in the SBRI trajectory.

2.3.2 Technical features of Strategic Intelligence foster Policy Learning

Tracking “*meaningful*” Strategic Intelligence meant to assess the impact of Strategic Intelligence in a comprehensive way and first of all from the viewpoint of the interviewees. One challenge was for this thesis to identify more precisely which technical features of Strategic Intelligence could have an impact on policy learning and how. Therefore, it appeared necessary to identify Strategic Intelligence that was perceived as having an impact. Social learning was in that sense difficult to frame and trace as it most likely takes place at a more abstract level and is most likely to take place on a longer run, but the research led to conclude that Strategic Intelligence was indeed influencing policy at a higher level of abstraction (see Annex 1, Sections 3.1.1 and 3.1.2).

²⁶⁸ The willingness to make SBRI mandatory in line with its American counterpart was only recently echoed by the setting up of mandatory targets for 6 Departments by HMT.

In particular when considering transnational policy learning, this notion of “meaningful SI” appeared to be of importance: when assessing the perceptions of interviewees and drawing on the analysis of the documentary review, it became possible to make a clear distinction between the most influencing forms of Strategic Intelligence (as presented in Section 2.2.3 and Table 12) and find that some very specific reports had very specific functions. Schematically, one could draft a caricature of the process explaining that the use of the NAS evaluations as main repository for the Secrets Report led to further policy integration through the Sainsbury Review and the subsequent reports and decisions (see Box 21). In that sense, specific repositories are mobilized, and some specific Strategic Intelligence exercises contributed to Transnational Policy learning while other might have been used as content support (data sourcing, etc.) or not even used at all. The field enquiry was therefore useful in tracking back changes to Strategic Intelligence and other influencing factors (such as demand, etc. see Section 2.2.1).

Box 21: NAS as the main part of the SBIR repository mobilized in the SBRI context

The Secrets Report (2006) mainly refers to the NAS publications available at that time, and among others referred to Lerner’s and Tibbetts’ contributions to NAS (for instance Lerner on behalf of NAS, 1999²⁶⁹). Other reports and transcripts refer to these sources to highlight evidence corroborating the success of SBIR (such as in Adonis, 2014). Also, through the interviews conducted in the context of the present thesis, the author accessed some reflections under development for the NAS evaluation²⁷⁰ (still running by then) and which constitute the reference repository regarding SBIR –also the one that public authorities point at when orienting active importers-. References are also made to the NIH surveys and a few (selected) academic and GAO publications backing key arguments on the achievements and effectiveness of the programme. An interviewee with a strategic position at Innovate UK listed the main references taken up from the US and provided by the SBA to the British agency; the main references listed were here the “DoD SBIR evaluation from NAS in 2014”, and the “NAS 2008 evaluations mainly” (SB). This material is used by the agency in order to convince public entities to make use of SBRI.

²⁶⁹ Joshua Lerner (1999), “Public Venture Capital: Rationale and Evaluation” in The Small Business Innovation Research Program: Challenges and Opportunities; Board on Science, Technology and Economic Policy, National Research Council, National Academy Press.

²⁷⁰ Started with “SBIR: Program Diversity and Assessment Challenges: Report of a Symposium” and “SBIR Challenges and Opportunities, Edited by Charles Wessner, National Research Council, National Academy Press 1999”, both edited by Charles Wessner (at that time on behalf of the National Academies) in 2004 and qualified by Connell (2006) as preliminary to “the most comprehensive attempt to assess the economic impact of SBIR”.

As an example it is possible to evoke that in the SBIR case and against initial expectations, the involvement of academics or the publication of academic papers on SBIR (listed in Box 37 but also observable in Annex 1, Section 2.1) did not play any role or only a secondary role in terms of policy learning (no policy maker was aware of the contributions, and references to these papers were barely found in the policy-related literature, including when touching upon Strategic Intelligence such as the reports listed in Annex 4, Sections 9 and 10). Attention to the perceptions of the actors was critical in that regard.

Several examples of Strategic Intelligence in both UK and US were encountering some negative reception by officials, stakeholders, etc.; it is to be noticed that such perception was linked reluctant recipients to underuse or not use the Strategic Intelligence in question. It was therefore of main importance to assess the value attributed by interviewees to Strategic Intelligence. On that basis it became possible to make the distinction between the different impacts of Strategic Intelligence and even understand its functions. And it is through this functional approach to Strategic Intelligence that one can understand how some of its features might contribute to (transnational) policy learning.

Strategic Intelligence owns a repository setting function that supports policy learning in a structural way. Altogether, the American and British SBIR/SBRI experiences have led to the constitution of a very large repository of studies, papers and reports, as well as media files available online (such as Congress hearings etc.). Some of these sources are key to the topic of the present thesis: the repository function was indeed validated by the field research as Strategic Intelligence produced over the lifetime of both US and UK schemes led to the setup of a repository of studies and data accessible online and world-wide. By repository it is meant here the set of values, beliefs, information (conceptual, technical and practical) related to one or more issues. In the present case, two repositories can be referred to (SBIR and SBRI repositories) which are considered as part of one transnational policy repository.

As highlighted by the case studies, the NAS evaluations not only fed in a transnational policy repository but also made the initiative(s) visible to the world (see also Rigby, 2013). Access to this repository, whether directly through Internet or through inter-agency communications, is easy and permanent. One could however distinguish between SBIR and SBRI repositories, the first one not being open to foreign references beyond the few referred to in Annex 1, Section 3.2. It was noticed in the American case that the SBIR repository was focused on American experience, monolithic and not connected to other sources, while the British one is based on using the US as a benchmark and connects to it through referencing, quoting and listing exemplary cases from the US.

An interesting aspect that links to Section 2.2.2 is that the American repository reflects specific visions regarding innovation and SMEs, as well as a highly positive image of SBIR (regardless of the controversies underlying it). In the contrary, the British repository, if it relays this SBIR positive vision, emphasizes the deficiencies of the SBRI as it targets more directly decision makers in order to push change.

The advocacy rationale underlying the self-initiated studies (and representing an integration of policy and politics) was itself processed into the repository. References to both US and UK but also the broader SBIR-related repository were used to legitimize the role of SBIR/SBRI as evoked in Section 2.2.1 and depicted in Annex 1, Section 3.2. Foreign references used in domestic Strategic Intelligence as well as references to similar programmes abroad (see Box 55) are used as a marks of success.

In that sense, Strategic Intelligence also contributes to the conceptualisation of the global situation in which needs for boosting competitiveness arise as explained in Section 2.2.1. One can finally notice that the SBIR/SBRI transnational policy repository resulting from the availability of both repositories world-wide means that a source for policy and political arguments is available that could be and was used in many occasions.

But the repository function is a static one and dynamic uses of this repository are necessary to make policy-relevant information circulate, whether in a domestic context or a transnational one. This implies that human resources (people) call upon the arguments from the repository under the scope.

Technically, an emulation of indicators was observed that highlights another structural value of Strategic Intelligence for PL. The starting point for Strategic Intelligence to trigger

Transnational Policy learning is obviously the integration of an international scope in its objectives and by correlation in its approach (the first could also be optional). This was the case in the UK, while in the US the possibility was open but never seemed to be of interest to the NAS evaluators, policy makers or stakeholders (see Box 56). Comparisons to the US raw model were made in many of the Strategic Intelligence sources considered in the UK as emphasized all along Annex 2. This was not the case for the US as one could have understood from Box 56. Beyond that distinction, the approaches remained quite similar in both US and UK cases. No participative process like the ones usually depicted in the evaluation literature could be found²⁷¹, and mixed-methods approached were going the same way: in order to add to quantitative assessed facts, qualitative methods would complement correlations with causal explanations and contextualisation of the study results. But it was surprisingly not at the level of the approaches or methods (except for one technique) used that Strategic Intelligence appeared to have an impact on policy learning.

“Usual” criteria and indicators were found in both cases, starting in the case of SBRI from the six monitoring criteria used by TSB which according to an interview are complemented by effectiveness, output, commercialisation, IPR, and sales indicators (FH).

²⁷¹ The NAS evaluations remained what the evaluation community points at as “expert evaluations” (ref). The same goes for other studies and consultations considered during this research. Therefore, one could have hardly expected Strategic Intelligence to play here a structuring role or connecting role between systems through its process. It is however a connector through its repository design nature.

One should also not forget the one criteria that is considered together with commercialisation performance: the one of job creation. These are in line with the American reading grid which itself and in practice are expressed through a number of key performance indicators such as the ones reviewed in the NAS evaluations.

Box 22: SBIR-related performance indicators viewed by the European Commission

“Various studies have attempted to measure the impact of SBIR on sales, employment, growth, R&D and innovation, or project costs. These studies are unanimous in considering the SBIR programme has had positive results. Several of them succeeded in measuring a quantifiable impact on sales and employment. 30 to 40% of SBIR projects generated products that have reached the market, and that would not have existed without it. One study found that sales growth for companies that received SBIR contracts, compared to ones that didn’t, was twice as fast, and employment growth three times as fast”.

Source: European Commission, 2011²⁷²

But indicators become critically meaningful when one understands the role they can play as a translation of broader policy meanings and directions (see Section 2.2.2). In that respect, additional criteria and indicators could also be referred to, and especially one key indicator used in the UK to argue that SBRI should be scaled up and which is the amount of expenditures going through SBRI as compared to the amounts dedicated the SBIR Programme in the US²⁷³. This endorses the argument of competitive alignment with the US such as expressed in the policy competition argument of this thesis (see Section 2.2.1). Another example could be quoted as FreshMinds (2008) refers for instance to administrative process efficiency to compare the UK to more successful American counterpart. Another interviewee makes an interesting reference to the use of the American evaluation grid: *“Which matrix to use to evaluate the success of the programme and how it has been successful? So we looked at the US scheme to see how they evaluated it: jobs created, additional investment leverage, turnover, turnover as result of sales, exports, etc. So we looked at the US evaluation to see what matrix they were using and adopting similar sets (...) We originally commissioned an external economic evaluation of the programme (...) We pointed them in the direction of the American model, because we want evaluators to make recommendations on the matrix to be used and how to make the programme a success”* (AB).

²⁷² European Commission (2011), « Study on pre-commercial procurement in the field of Security” conducted by Ecorys, Decision, TNO, MioIR and Corvers Procurement Services on behalf of DG ENTR.

²⁷³ See for instance NESTA (2012): *“SBRI accounted for £27 million in 2010 (...) all of this is a far cry from the \$5.3 billion that flows through DARPA and SBIR every year. What can be done?”.*

A similar use can be observed at the EU level: in its attempt to assess the potential of SBIR for Europe, the European Commission (2011) study on PCP in civil security refers to *“impact on sales; impact on employment; impact on growth; impact on R&D and innovation; impact on project costs”* (referring mainly to the NAS evaluations but also two academic publications – from Lerner and Ege). The simulation applied to assess the potential impact of SBIR in the EU did not take into account the specific causal mechanisms underlying the programme and critical factors framing its performance in the US.

Another form of exploitation of indicators was observed in the ex-ante and ex-post justifications of SBIR emulation in the UK, like one can understand from the following: *“As noted by the Sainsbury Review of science and innovation policies, the U.S. Small Business Innovation Research (SBIR) scheme has been successful in promoting innovative SMEs. It is estimated that SBIR funding is at least as important as conventional venture capital in the U.S. for early-stage technology firms. SBIR firms generated five times as many new jobs as those not funded by SBIR over a ten-year period”* (HM Treasury, 2008). Another ex-post judgment is justified on the same ground, as suggested by the following: *“One reason for this disappointing response is that the 2.5% target was interpreted by DTI as a target for the percentage of all external R&D expenditure to be spent with SMEs, rather than the value of development contracts placed through the SBIR scheme. Based on US experience an appropriate target for the former figure would be very much larger than 2.5%, probably by four or five times”* (Connell and Probert, 2010)

The old adagio “speaking truth to power”²⁷⁴ could be turned into speaking “success” to power as case studies rather play the role of supportive success stories than neutral methodological tools. Argumentation matters, and is the basis for any Strategic Intelligence exercise observed during this research. Success is in that regard the key benchmark. Meseguer (2006) already highlighted the importance of *“success”*; but success here is seen not in normative terms but as a perception criteria: what matters is to present/understand something as a success whether it is or not in actuality, or whether the perception ends up consensual, or not. It is to be reminded here that while a number of publications express doubts about the effectiveness of SBIR (OECD publications, academic papers, etc.), the SBIR programme still benefits from a highly positive image internationally.

Success can be perceived at different levels: at a broad policy level for instance, as highlighted by Bound and Puttick (2010) who stated that *“US is a common benchmark for practice in pre-commercial procurement”*; also at the organisational level, as the DARPA inspiration suggests (see for instance Sainsbury de Turville, 2007).

²⁷⁴ Metaphor from Aaron Wildavsky (1989), « Speaking truth to power – The art and craft of policy analysis », Transaction Publishers.

But also at the programme level for which success is a key criteria for emulation²⁷⁵: SBIR is indeed usually presented as “*highly successful*” (see for instance Connell and Probert, 2010) as well as “*visible*” (Connell, 2014). Success was essentially pushed forward through case studies, which proved to be the more impactful method in all influencing Strategic Intelligence studied in the context of both SBIR and SBRI. Case studies, success story and storytelling were perceived as particularly impactful over decision makers: success studies were relayed during hearings and decision-makers prove to be particularly receptive to testimonies from entrepreneurs and stakeholders. As highlighted in the US case study, the role of anecdotal evidence (presented in both reports and hearings) has a particular influence over decision makers.

The NAS evaluations of the American SBIR extensively relied on in-depth case studies conducted by high-level academic experts, case studies that were relayed in hearings. An interviewee from NORTHERN IRELAND involved in policy developments related to SBRI said the following: “when I was developing the paper I read American reports and their online case studies” (JC)²⁷⁶. Connell (2004) made use of company case studies (success stories) as the core technique of his study and pointing to the success of American R&D support. The 2006 “*Secrets Report*” also makes use of key case studies in the form of success stories. Qualcomm and Symantec are often quoted as SBIR success stories that were even reported in British studies (others as well, such as Owlstone Nanotech, etc.). Companies being regularly presented as success stories include “*successful companies*” like Amgen and Genzyme which are also recurrently highlighted in British studies (see for instance NESTA, 2012 or Adonis, 2014), usually derived from the case studies found in Lerner (1999) and the NAS SBIR evaluations. The same goes for the companies that are usually showcased in the UK context as successful SBRI companies, such as Eykona, Pneumacare or Polyphotonix (see TSB, 2011; House of Commons Science and Technology Committee, 2013; Adonis, 2014, BIS, 2014; SBRI Healthcare, 2014; and Connell, 2014) identified in the “*Secrets Report*” as well as in subsequent showcases from TSB, NHS etc.

Case studies were used as to convince decision-makers about certain policy arguments (see for instance beneficiaries’ contributions to Congressional hearings listed in Annex 4, Section 9) but also by SBA, TSB and experts in order to convince administrative bodies and foreign entities about the value, benefits and interest of SBIR/SBRI. A British interviewee explains that depending on the issue, case study material would be sent by the SBA to the demanding British organisation. In that specific case, the material sent was highlighting the benefits from SBIR in the US through case study material issued from the NAS evaluations.

²⁷⁵ See The Royal Society, 2013.

²⁷⁶ The same interviewee explains: “*we had case studies to use and show the benefits when competitions arise that more companies would response, we showed the link to job creation and economy (...) Looking at differences in case studies between US and UK I looked at information desktop research, and PPI/PCP in the NL*”.

The same interviewee also explains that they “look at EC reports on demand-led procurement”, referring to the “value of case studies and demonstrate the process works” (SB). The vulgarisation function of case studies is therefore to be understood as its main strength. Pedagogically used, anecdotal evidence also becomes a powerful tool for decision-makers to make the link between real-life experience and policy discussions. This could however be badly perceived by some experts as case studies became quite central to existing SBIR/SBRI-related Strategic Intelligence: in the supplementary evidence they submitted in 2010 to the House of Lords Select Committee on Science and Technology (2010a), Georghiou and Edler stated indeed that “there was a need for rigorous evaluation of the SBRI because much of the present debate was founded upon anecdote and vignettes”.

2.3.3 While passive Transnational Policy Learning was also observed, active Transnational Policy Learning dynamics are embodied by Policy Learning Entrepreneurs active transnationally

Active and passive push and pull dynamics underlying TRANSNATIONAL POLICY LEARNING through Strategic Intelligence were identified, starting from passive administrative responses to foreign queries. It was noticed earlier that policy learning did primarily take place not at the level of target groups and beneficiaries²⁷⁷ but at the level of the political and administrative areas in which experts were involved via Strategic Intelligence. Resistances to learning were already analysed in Section 2.2.4 where organisational barriers to policy learning were treated²⁷⁸. These included resistances with regards to Strategic Intelligence and learning from abroad. In addition, it seems important here to highlight that in both US and UK, only a few interviewees were aware of similar programmes (to SBIR/SBRI) abroad, and those who were only knew about their existence (only a very few knew more). An exception remains the US model, which everyone is aware of as being the original role model at the source of all other initiatives worldwide.

From a Transnational Policy learning perspective, this is a starting point to put forward an argument that is supported with a number of examples by the US case study (see Annex 1, Section 0 and in particular 3.3): the SBIR case shows very limited active SBIR promotion and no active sourcing internationally.

²⁷⁷ Beneficiaries do not transfer or relay any transnational policy knowledge as such; however they have some “radar function” (though this function does not interfere with policy change). In that sense, one beneficiary stated about the challenge he dealt with -digitalization of healthcare- the following: “This is an issue they have in US. I know about that. But I talk to people connected to US, I read UK stuffs. Reading reports. I do talk to BIS regularly and talk to Cab office sometimes”; an American official also mentioned that one SBIR awardee was aware of some support programmes abroad.

²⁷⁸ These barriers were also mentioned in other interviews such as suggested by the following quote: “We did study a number of other similar programmes, but we did not have a great deal of time” (NH).

Passive response to foreign queries is observed in the US case and the field research confirmed the highly limited outward perspective. Only active players sourcing knowledge abroad and exporting the SBIR model outside the US were identified as being a very limited number of experts, among which the only influencing one was the lead SBIR evaluator. Passive exports are operated at different levels, although the administrative one appears to be the most significant. Through the diplomatic corps, several administrative nodes with strategic SBIR knowledge and positions can be reached by foreign delegations (which can mix political and administrative representatives) on a regular basis. These nodes also include the NAS. Especially the SBA and the DoD are targeted, with SBA being the more exposed and involved in transnational exchanges (mainly home visits) through a dedicated HR which mission is partly to cover such aspect. Strategic Intelligence is provided by the administrative contacts, which is usually mainly constituted by the NAS evaluations of SBIR considered as “*benchmark*”. Also Strategic Intelligence can be screened beforehand by visiting delegations.

Exchanges are about main features and building blocks of SBIR and its benefits. The little active export operated by the NAS lead evaluator of SBIR takes place through international conferencing during which arguments drawing on the NAS evaluations are used to promote SBIR and its success (see Box 58) while tailoring the messages to the receiving country. Therefore, active promotion of SBIR is based on Strategic Intelligence outputs rather than structured by Strategic Intelligence (no international expert panel, no benchmarking, etc. creating connections with foreign context). Key nodes for transnational learning remain the embassy (passive contact point) and the SBA (passive exporter of policy-relevant knowledge, including Strategic Intelligence), while one node in the network seems to exert the only active function: the NAS lead SBIR evaluator. A second layer of passive response was obviously the level of the Federal Departments and agencies, with on the front line DoD, DoE and the NIH. The political area appeared to be quite closed although some contacts were established without further follow-up by Congressional representatives.

On the other hand, the SBRI case study builds on a very active import dynamic, which benefited from a strong push by the SBRI lead expert. The all SBRI initiative was shaped by iterations and through interactions between Strategic Intelligence and policy as an emulation of SBIR that was sourced from the American repository (see Annex 2, Section 1.1). Every “*mark*” illustrated a step further in the emulation of the programme as a result from the uptake of recommendations derived from self-initiated studies, which were used as advocacy instrument to foster policy change. However the administrative learning happened to vary from a ministry to another: while the NHS eventually took a leading role in integrating SBRI further, another ministerial interviewee explained that although he belonged to one of the main ministries targeted by SBRI, he did not have direct connections with its American counterpart to exchange on SBIR (AN).

Like for the American case, officials in the UK also proved not to be actively or even passively promoting SBRI abroad, although some presentations are sometimes made in international conferences or EC workshops²⁷⁹. One interviewee finds indeed that in his organisation, they “are not active in sharing” (SB). Another one reacts the same way: “Promote SBRI outside UK? No. Not part of our operating model” (SW) while another one explains that she sees in her administration “no promotion outside” (KL). One surprise is that several interviewees explained that they were not much involved in international conferences and fora.

Connections are operated through EC-funded projects such as the ones in which NHS or DfT are involved in, as well as through the embassy or the Internet. Informal contacts exist between Departments and agencies (for instance TSB/InnovateUK and VINNOVA in Sweden). But active promotion of SBRI outside UK remains highly limited²⁸⁰.

However both SBIR and SBRI case studies had in common the existence of what this thesis points at as a “Policy Learning Entrepreneur” willing to actively promote SBIR/SBRI internationally. The SBIR case study extensively reports evidence of the promotion operated by the NAS lead SBIR evaluator of the American model in many countries through conference presentations but also bilateral policy advice. The SBRI case study also highlights the instrumental role of the SBRI lead expert in the emergence of what would soon become the European SME-instrument currently ran by the European Commission under Horizon2020.

Linking expertise, policy and politics, (Transnational) Policy Learning Entrepreneurs prove to be the cornerstone of active Transnational Policy Learning. Policy Learning through Strategic Intelligence is therefore particularly powerful in the hands of this sub-category of policy entrepreneurs. While Mintrom (1997) focused on policy entrepreneurs as agents of policy diffusion, the present thesis highlights the structural role of Strategic Intelligence as an enabler of policy learning and diffusion. Strategic Intelligence made them PLEs as it empowers the experts/entrepreneurs and in that sense enables their capacity to influence policy change.

The SBIR Programme was the result of the entrepreneurial behaviour of first one and then several policy entrepreneurs making use of some evidence to convince about the programme and its first NSF pilot. The first change occurred under the pressure of institutional and policy entrepreneurs such Roland Tibbetts and others (see Annex 1, Section 2.2). However, the notion that is being introduced here is the one of Policy Learning Entrepreneurship.

²⁷⁹ See for instance the “Exchange of good policy practices promoting the industrial uptake and deployment of Key Enabling Technologies” (2012) to which the author contributed on behalf of the European Commission and available at http://ec.europa.eu/enterprise/sectors/ict/files/kets/ex_of_practice_ket_final_report_en.pdf.

²⁸⁰ A stakeholder mentioned however the following: “We try to get SBRI thinking into EC work; OECD demand-side report; Good to promote it in Brussels to get H2020 money. Share policy thinking is also beneficial to everyone, even though there is an element of competition”.

Policy Learning Entrepreneurs should be distinguished from Policy Entrepreneurs such as some of the interviewees from Northern Ireland, Wales, NHS or TSB in the UK, SBA, the Congress or some Departments in the US. The basic ground to point at policy learning entrepreneurs is the idea of combining an expert function with an advocacy position; but as a sub-category of policy entrepreneurs, Policy Learning Entrepreneurs (or PLEs) are not interested promoters of a policy model but promote policy learning and are empowered by Strategic Intelligence. Although they received symbolic and social retributions (recognition and social network), these were not guiding the PLEs who were not interested in any other reward than the uptake of policy lessons. In that sense PLEs supported policy entrepreneurs by orienting their actions and positions: that was the case in the US where the lead SBIR expert supported Senate staffers; a similar phenomenon was observed in the UK where the lead SBRI expert advised policy entrepreneurs active in the political area, providing them with a defined stake (or set of stakes) to defend.

Box 23: PLEs as a sub-category of policy entrepreneurs made by SI

The literature review highlighted the recommendation from Crow (2010) to investigate “the role of information entrepreneurship, policy learning among communities, and the possible role that entrepreneurs play in this learning and policy diffusion”. This thesis shows that the entrepreneurial experts seized opportunity windows and plaid with the institutional setting such as claimed by Kingdon (1995) or Baumgartner and Jones (1993). They also definitely contributed to the definition of the policy agenda while making use of their own resources in view of influencing policy change, applying strategies and making use of media. This thesis also confirms the conclusions from Mintrom (1997) on the necessity of entrepreneurial advocacy to see policy change happen. The particularity of the entrepreneurs under the scope is the absence of retribution other than symbolic (which to some extent goes against the dominant vision that entrepreneurs’ benefits from policy change drive their action) and to some extent social, as well as their unique knowledge authority and strategy empowered by Strategic Intelligence. The literature usually associates policy entrepreneurs with their formal function (expert, policy maker, etc.); the case of the British PLE shows that the PLE is not defined by his/her formal position in the policy area but by the position he/she takes which nature is defined by the nature of the resources used to build the influence strategy and their ultimate ends. In other words, Strategic Intelligence made both experts entrepreneurial individuals promoting policy lessons.

Box 89 already provides a few insights on what an advocacy position can mean for an expert willing to influence policy change beyond the simple diffusion of his academic or professional contributions. Policy Learning Entrepreneurs are particularly influential in driving knowledge-based change, especially when change happens in a transnational context as they are central nodes in international “policy knowledge” networks. Along this research, only two Policy Learning Entrepreneurs (one in each case) were identified.

Notable experts having adopted an advocacy position, they operate in conditions that might be more or less favourable to their action: in the US context, SBIR change is a Congressional subject, making it more difficult for entrepreneurial individuals to make a clear and fast difference compared to the British context where the steering of SBRI by the executive branch allowed uptakes that encountered less resistance²⁸¹. Their strong expert position was based on their legitimacy as SBIR and/or SBRI experts, which was acquired by leading Strategic Intelligence on the topic(s).

Box 24: (Self-) acknowledgment of the British policy learning entrepreneur

Connell and Probert (2010) acknowledge that DC's "research on the US Small Business Innovation Research (SBIR) programme and other US procurement based policies has had a major influence on UK Government thinking and his detailed proposals form the basis of the revised UK SBRI programme launched in 2008". In Connell (2014), the contribution of the expert to the setting up of two main SBIR-type programmes is acknowledged: "David has championed lead customer and procurement based innovation policies for a decade and his work has had an important influence on the creation of both the UK Small Business Research Initiative and the new €3 billion SME Instrument introduced by the European Commission as a part of Horizon 2020". One of the channels used by Connell was NESTA.

Whether in an active or passive fashion, both Policy Learning Entrepreneurs under the scope contributed to bring in recommendations to the European Commission process of reflecting on an SME-instrument inspired from the SBIR/SBRI schemes: one of the Policy Learning Entrepreneurs explains in that respect that he "*spoke with the EC repeatedly (...) 2 questions: what works in SBIR (SWOT), and what is the process*" (CW), while the other PLE referred to in Box 90 clearly acted on a proactive basis (see Connell, 2009 and 2010). He strategically used the political channel at both EU and UK levels and succeeded in doing so, although the available evidence only supports the "*seed*" idea as well as the outreach achieved by the expert²⁸². Annex 2, Section 3.1.2 already describes in a quite extensive way how the British Policy Learning Entrepreneur proactively held SBIR and SBRI experiences, bringing these to the Commission and using his expert legitimacy and the open opportunity window to provide the seed of the upcoming SME-instrument currently ran by the EC (see Box 98).

²⁸¹ The British Policy Learning Entrepreneur even clearly established a lobbying strategy to push change in a context in which the executive branch has the lead over SBRI while the challenge remains much greater in the American context as SBIR is a Congressional programme.

²⁸² See <http://www.cc2-live.co.uk/davidconnell/european.html>.

The British expert managed to reach and influence high-level policy makers (see for example Box 25) such as the EU Innovation and Science Commissioner Máire Georghegan-Quinn, the EU Commissioner for Industry and Entrepreneurship and Vice President of the Commission Antonio Tajani, the UK Minister for Science and Innovation Lord Sainsbury, several MPs at national and EU levels²⁸³. Advocacy was here combined with the pressure of supportive political leaders. Some integration of political contributions to Strategic Intelligence were operated by the expert in several occasions, such as illustrated in Box 25 and confirmed by another example: *“To avoid breaching EU Procurement Regulations, the Kitty Ussher/Anne Campbell Private Members’ Bill was originally drafted by the author to allow phasing implicitly, rather than explicitly”* (Connell, 2006).

Another aspect of this political channelling lies in the contributions submitted by the expert to the House of Lords Select Committee on Science and Technology in several instances in oral and written forms²⁸⁴ as well as an involvement in task forces and boards²⁸⁵. Both the American and British experts were involved in other different (though closely connected) studies/reviews and Strategic Intelligence exercises. Also their contributions to conferences is visible and play a promotion role. On top, the British expert is member of institutional boards, impacting the implementation of SBRI and its management in institutions such as NHS or the Matrix Panel in Northern Ireland. Also the American expert expressed himself as to advice Westminster on innovation policy issues and specifically on the SBIR program and the lessons to be drawn by the British authorities on this American experience. In a domestic context, the expert took position against specific coalitions on key controversial issues such as the SBIR contestation by the University community or the “Mills” issue in line with available NAS evidence but against the political willingness and force of the Congress (see Annex 1, Section 2.3). Most notably, the American rose awareness about SBIR in a large number of countries and advised governments in that regard (see Annex 1, Section 3.3).

²⁸³ For instance Lord Adonis, Anne Campbell Kitty Ussher, and MEP Malcolm Harbour.

²⁸⁴ For written contributions see for instance Connell (2010) *“Submission to House of Lords Select Committee on Science and Technology Inquiry into Procurement as a Tool to Stimulate Innovation”* and Connell (2012) *“Innovation Myths and Lead Customers: Game Changing Policies to Improve the Commercialisation of Research”*.

²⁸⁵ See for instance his participation to SME-related task forces of both Labour and Conservative Parties on <http://www.cc2-live.co.uk/davidconnell/cv.html>.

Box 25: Extract from the foreword by Ian Leslie in Connell (2010)

*"I should first explain why I became interested in this approach. I was involved in a start-up in Cambridge in the 1990s which was kick-started by an order from the US Naval Research Laboratories (NRL), and later acquired by a US company which itself had been kick-started by Small Business Innovation Research (SBIR) grants from NRL and other US agencies. Of course the NRL order to the Cambridge company was outside the SBIR scheme, but the mindset within NRL was such that acquiring innovative edge from an unheard of UK company was a completely normal practice. **So let me say upfront, I am a fan of procurement as a driver of innovation**".*

Source: Connell (2010), "Scientists are customers too - How the SBIRI can help Research Councils drive economic growth" on behalf of NESTA (emphasis added)

The Policy Learning Entrepreneurs benefit from expert legitimacy. One of the two Policy Learning Entrepreneurs is the author of the Secrets Report (2006). This publication shows the importance of expert inference, for instance when targeted arguments are pushed forward by the report (when emphasizing for instance in the SBIR positive economic success section the fact that UK public sector is a main buyer of IT products and services supplied in the UK –linking by then to the way SBIRI has been introduced and is being described in the UK; most of the statements along the same section do not refer to any concrete evidence or reference, living space for the *"expert parole"* where value judgments are operated on the basis of the expert's experience and could even be subject to disagreements, but remain at a general level and therefore not entering any practical/concrete aspect of the presented discussion). One of the three main grounds for the author's policy proposal to the House of Commons Science and Technology Committee (2013) was the *"Lessons learned from leading a six year campaign to get US style procurement based innovation policies adopted in the UK and EU and advising the UK Government on the introduction of the resulting Small Business Research Initiative"*.

Experts' advocacy positions can also be relayed by stakeholder organisations²⁸⁶ which play a connector role to the political area. This was the case for instance with the SBTC in the US relaying NAS-based arguments defended by the lead NAS evaluator of SBIR.

²⁸⁶ To the House of Lords request's question *"What lessons can we learn from successes and failures within the procurement processes of other countries to stimulate innovation within industry?"*, the first answer gathered is clear: *"The USA has a number of useful schemes, including the Small Business Innovation Research scheme, that use a procurement mechanism to stimulate and support innovation within industry. This includes their dual use procurement actions in the defence sector. Using the appropriate features of these in the UK procurement process would have a significant effect on promoting innovative solutions"* (Submission by the Association of Independent Research and Technology Organisations (AIRTO) to the House of Lords Select Committee on Science and Technology, 2010a).

A member of a stakeholder organisation in the UK stated that he organized some workshop(s) to promote SBIR in the UK and to which a main contributor was the SBRI lead expert: *“In 2010 we worked with TSB (SB) to invite most senior civil servants (lead top civil servants) to hear about the benefits of SBRI, not only promoting business but also delivering their jobs. Idea from me and TSB colleagues. Got 7 or 8 senior deputies and a minister. It ran for more than 2 hours. TSB to speak with examples; presentation only about the UK, and we got DC who was part of it. Roughly around this time that we made the SBRI policy paper”* (DE). Also the use of media to defend expert positions is interesting: the British Policy Learning Entrepreneur explains for instance that *“if you want to get heard, go through the financial times: important people read the financial times. So letter signed by really top people (about 50) that made some noise”*. Some more passive media presence is also visible in the case of the American Policy Learning Entrepreneur whose positions and activities were promoted through online media (see Zyn in the US).

But among the main features evoked above, the central one is the link Policy Learning Entrepreneurs operate between Strategic Intelligence, Policy and Politics. Interviewees referred to political connections of the British policy learning entrepreneur as a factor that could have played a role in Strategic Intelligence outreach, making it *“quite influential”* (NH). The UK case shows that when finding out about the disappointing design and implementation of the first mark of SBRI, the lead expert launched a promotion campaign in 2004 (see Box 63) to further emulate the American SBIR, supported by key policy makers (with an interest in succeeding) and finding his way through the political channels and reaching the highest level of the Government (ministerial) while somehow by-passing top officials expressing resistances to the changes proposed. The PLE here made use of Strategic Intelligence as a lobbying weapon to convince political representatives in charge, as a *“pedagogical translation”*. The involvement of MPs in the outreach, negotiations, and including their contributions to the *“Secrets Report”* (branding) was instrumental, as it was when the PLE promoted the idea of an EU SBIR soon to become the embryonic SME-instrument²⁸⁷ (involvement of MEP to reach the Commissioner²⁸⁸, then access to officials in order to diffuse Strategic Intelligence-based arguments on SBRI and SBIR as models for the EU). One of the main issue at stake was here to turn Strategic Intelligence into a *“parliamentary readable language”* (DC). Opportunity catching is also a fundamental quality in connecting the three spheres of Strategic Intelligence, policy and politics: the 2010 submission to the House of Lords Select Committee on Science and Technology by the British expert appears as a good example in that regard.

²⁸⁷ See Box 97.

²⁸⁸ *“You have to pick people individually for your work to be taken up. Why I targeted key opinion formers and politicians. You get 15 min, they might read a page, and are advised. Also the press. And these people keep changing. Especially in the UK, so they look already at the next job. Also the same for some EU representatives: because ‘Q’ was new, she needed to change policy in the EU2020 framework, so she was looking for new ideas”* (DC).

While the call for evidence was rather broad, the opportunity was taken by the expert to provide an SBRI input to the Committee (Connell, 2010a) in order for it to become part of an overall repository (House of Lords Select Committee on Science and Technology, 2010a, b and c) and extending the outreach of the SBRI repository.

Advocacy does not stop to politics but also relates to institutional entrepreneurship found in individual institutional entrepreneurs. An SBRI Lead official explains that *“DC and I do a lot of political push as well. DC and I spoke to the chancellor and business lead ministers. DC would regularly communicate with the chancellor. Especially the secrets report; that was the one that inspired”*. Another quote from an interviewee corroborates this position: *“We have done a couple of reports, from DC in CBR; produced reports on SBRI and its effectiveness and on the US scheme; (...) DC oriented us. He has long been a champion of SBRI in the UK and lobbied to follow the US scheme. He would be the one to bring that sort of things to our attention”*. As explicated by the British expert himself, *“DC is advising on implementation; more lobbying and meetings with Ministers and officials”* (Connell, 2009). The expert is today member of NHS SBRI board and other boards to orient SBRI; he also plays an expert role, advising Public Departments and agencies such as TSB. One remarkable fact is the presence of the policy learning entrepreneur in the expert teams/groups of many reviews, such as the Sainsbury Review, the Richard Report, NESTA reports, or the 2008 HM Treasury report entitled *“Accelerating the SME economic engine – through transparent, simple and strategic procurement”*. The presence of the expert ensures continuity and consistence between the recommendations formulated in the Secrets Report, the (re-)design of SBRI and its implementation closer to what has been presented in 2006 as the American model.

He authored several submissions to authorities such as the House of Lord Select Committee on Science and Technology in 2010 (Connell, 2010a) in order to ensure the continuity of the Secrets Report and its ambitions. Another aspect is by consequence the politicisation of expertise in the UK case, not in the classical sense of political parties' stakes, but in the non-pejorative sense of a connection between the expert and policy spheres. Experts also contributed to depoliticize the policy under transfer: for instance one of them advised the two dominating parties, while the other advised a mixed coalition.

Policy Learning Entrepreneurship is a sub-category of policy entrepreneurship. Empowered by Strategic Intelligence, “PLEs” promote policy lessons with no self-reward perspective and enable policy entrepreneurs' actions to achieve policy change. Not driven by interest, they advocate policy learning in the first place. It is to be noticed here that if both Policy Learning Entrepreneurs are active trying to domestically influence policy change, one of their most outstanding features was their proactive attitude towards the promotion of their arguments internationally. One should indeed note that in that sense they contributed to further integrate cross-temporal and Transnational Policy learning dynamics.

This explains why the decision was made to speak about Policy Learning Entrepreneurship without distinguishing between the two types studied in this dissertation. Both policy learning entrepreneurs were interviewed several times and additional information was gathered from other sources (including interviewees) in order to inform their role in policy learning dynamics, which appeared to be critical in more than one case. One anecdotal recognition of their unique role as experts-advocates lied in the fact that most people would refer to them by their first name and name as if it was obvious each of the two experts was “THE” first person to contact when investigating SBIR and/or SBRI. In order to draft a more accurate profile of the policy learning entrepreneurs under the scope, a few synthetic points should be made which shall highlight their commonalities. The previous sub-section already extensively illustrated the importance of the tandem expertise/advocacy which characterizes both experts. Other features should also be quoted, starting from differentiating characteristics.

First, the difference between these Policy Learning Entrepreneurs and classical policy entrepreneurs using Strategic Intelligence lied in 1) Their legitimacy grounded in recognized SBIR/SBRI expertise and 2) Power/control over the production and diffusion of related policy-relevant knowledge. Second, the difference between these policy learning entrepreneurs and other experts advising public authorities lied in their normative proactivity and their leadership. In both US and UK, the lead expert on SBIR/SBRI turned into a policy entrepreneur with clear advocacy positions. Expertise is therefore the main resource allowing the advocacy position to be held. One of the two experts explains that independence is an important factor: *“All along I’ve tried to stay independent”*.

The leader of the NAS evaluations as well as the author of the *“Secrets Report”* were both leading references in their home countries. Both also plaid a fundamental role in diffusing SBIR/SBRI outside their home country through different promotion channels (conferences, lobbying, advising, etc.);

While the American expert promoted SBIR in many international conferences and advising a number of international governments, the instrumental role of the British expert in the setting up of the SME-instrument of the European Commission comes as second illustration of their proactive role from a Transnational Policy learning viewpoint. The British expert explained about the American one that he *“is a strong transnational advocate; when governments are interested, they call for him”* (DC).

Highly educated (PhD level) and experienced with innovation policy research and practice, none of them appeared to be driven by material but rather by symbolic interests as well as strong beliefs in the SBIR/SBRI schemes²⁸⁹. In the US, the lead SBIR evaluator explains in several interviews that he and others *“would actually like to help”* while the other would refer to a *“genuine desire to see UK succeed in innovation”*.

²⁸⁹ Also personal investment finally locked the commitment of one of the two experts who explained that *“actually, I could see that I invested a lot of time to follow this, and saw it was going wrong”*.

None of them presented any conflict of interest, and even demonstrated personal commitment (sometimes personal investments) to improve policy in their country but also in other countries (and for both of them as well, the European Union). They ground their advocacy power into their legitimated expert role, which provided them with credibility and legitimate authority over policy-related knowledge and understanding (in that case SBIR/SBRI-related). Both benefit from a high visibility and expressed themselves during hearings (Congress/Westminster). The American one even contributed to one of Westminster's hearing (see House of Lords Select Committee on Science and Technology, 2010a)-although more as to provide general recommendations, which appear to be legitimate as they are external and formulated by a well-recognized expert.

Box 26: Leading by Strategic Intelligence example

The role of the success stories used in both American and British Strategic Intelligence highlights the embeddedness of PLEs and Strategic Intelligence, echoing the "leading by example" characteristic of policy entrepreneurs depicted by Mintrom and Norman (2009) not by practice here but by intelligence (not implementing a pilot but supporting with evidence).

2.3.4 Complex sets of relationships result in diffused Policy Learning spill-overs enabled by SI

Strategic Intelligence is a complex vehicle for multi-lateral policy learning at different governance levels. This is quite well illustrated by the complex interrelationships observed at the supra-national level. If conferences were instrumental in the rolling down of SBIR and SBRI to sub-national entities or horizontally to other entities in a national context, they were far less impactful as a relay for the SBIR model in transnational terms.

Also, whatever the channel sometimes learning can have taken place in a very superficial way, sometimes only consisting in one or two discussion meetings which would end up in a two-page policy brief (RA).

The present thesis however considered the role of supra-national organisations in the process of cross-temporal and Transnational Policy learning in the US and the UK. Supra-national organisations and associated Strategic Intelligence but also transnational actors (NGOs, etc.) did not influence the US programme, while the interrelations between the UK and the EU appear to be much more of interest here. As already described in Box 94, the European legal framework was an important part of the institutional constraints over learning²⁹⁰ as well as a resource for some actors to justify their resistances.

²⁹⁰ State Aid rules and Procurement legislation were key conditions that bended the emulation of SBIR in the UK (see Box 92).

That was also valid at the level of devolved governments²⁹¹ who own their own networks. In that way, SBRI-related Strategic Intelligence was used as a way to fix the issue of legal compliance of SBRI to EU legal requirements as explained in Annex 2, Section 3.2.2. But on top of these interpretation and problem-solving functions, comes the Transnational Policy learning one.

While SBRI was set up in 2001 and the EC picked up this issue in 2004/2006, the OECD came later to the issues of demand-side innovation and PCP/PPI (since 2008), making the generation of OECD Strategic Intelligence recent and with not many effects over the UK scheme (while many lessons were drawn in OECD papers and interactions with national experts on the British and American experiences). But although the OECD was not influential in the case of the British emulation of SBIR, it was acknowledged in Annex 2, Section 3.2 that supranational organisation's Strategic Intelligence was also both an output and a channel for learning: in that case European Commission Strategic Intelligence, whether emanating from projects, expert panels, studies or workshops resulted in reports and support material diffused to national policy makers and stakeholders; but it also involves national experts, policy makers and experts along its process. In that sense some interactions could be observed in both directions:

- ▶ With British experts contributing to European Strategic Intelligence before bringing back the resulting orientations stamped with the EU label²⁹² (Aho Report, 2006 and successive panels)²⁹³;
- ▶ With British and American policy learning entrepreneurs advising the Commission on SBIR-linked issues;
- ▶ With British experts advising the OECD and European Commission on subjects such as intelligent demand-side innovation (see Edler, 2013) or PPI/PCP (see studies listed in Annex 4, Section 10 but also sources referred to in Chapter 2, Section 4/ of the core thesis);
- ▶ With the EC supporting national policy makers through European Strategic Intelligence and FP/H2020 projects on the topics of PPI/PCP.

²⁹¹ Which are also affected by independent cooperation strategies, Structural Funds, and the EU legislation overall.

²⁹² The label issue has been mentioned in many instances in both in the UK and the US, as well as in NI: *"I know that if we utilize SBRI InnovateUK documents, stamped, we won't be breaching State Aid regulations"* (JA).

²⁹³ Although no information validated this assumption, one could assume or expect that European developments regarding PPI/PCP and demand-side innovation policy in broader terms might have contributed to the legitimacy of SBRI in the UK. In addition, evidence gathered along the case study shows that the British presence in European developments is also seen as a vector of diplomatic influence.

EU Studies in this case are used as channel to “spread the word”, not to import knowledge from other countries (than UK) which are considered as “lagging behind” in terms of PCP (although Swedish PCP practices seem to attract attention). This is a fact that has been acknowledged by several interviewees and is visible in content (when going through studies, project reports, etc.). One key reason is that the SBRI is seen as a leading initiative (UK being a first adopter of PCP in EU – see EC survey on PCP, 2011). This is similar to the US case (where there is longer experience of SBIR, reason why interviewees considered that there is less to learn from less experienced ‘others’). Strategic Intelligence and EU-funded projects (such as presented in Box 95) generated intelligence shared across countries, but it influenced SBRI only to a little extent (through the PCP cognitive re-framing or through FP-funded projects which led to some technical/operational learning).

Although the EU influence was somehow secondary in the process of developing SBRI in the UK and processing its emulation based on the American model, some second-degree influence can be identified here which proved to mainly apply to broad policy orientations (contributing to the demand-side innovation policy trend for instance) or at the level of technical operations (sector-specific learning at the agency level which is more related to an area than the policy itself).

Box 27: Supra-national policy learning from sub-national experiences

In his talk to the Public Procurement of Innovation – Feasibility of an EU Scheme discussion in Brussels (9th of February 2012), D. Connell stated that he “came to believe that UK and EU innovation policies would be far more effective if they adopted the procurement based approach used in the US (...) At the European level, with Malcolm Harbour, I made proposals for an EU programme at meetings with Commissioner Geoghegan-Quinn and Vice President Tajani in May 2010. And I was able to reiterate these in a speech at a meeting of the European Competitiveness Council in Budapest last April. (...) I believe we should aim to create a European SBIR on a par with the US programme within five years”²⁹⁴.

One should again remember that policy learning goes both ways. Drawing on the British and Dutch experiences, the EC also endorsed the so-called Pre-Commercial Procurement Framework (see Figure 47) to be used as a conceptual and legal benchmark for any initiative similar to SBIR/SBRI after the Dutch and British schemes were identified as attempts to circumvent EU rules (see Box 91). The EC also developed the SME-instrument as inspired by the SBIR/SBRI schemes (see Box 99). Here, domestic Strategic Intelligence relayed by the British Policy Learning Entrepreneur (at the origin of the idea of an SBIR-like programme for the EC) plaid the role of input and inspiration repository but also legitimisation role as the mandate was used, but not the substance.

²⁹⁴ The demand mainly emanated from Antonio Tajani, who was European Commissioner for Industry and Entrepreneurship and Vice President of the Commission at the time, and Máire Geoghegan-Quinn, who was European Commissioner for Research, innovation and Science.

In addition, the double-involvement of experts producing Strategic Intelligence for Government clients at both EU and (sub-)national levels appear to be key vehicles for policy-relevant knowledge transfers and spill-overs (repercussions beyond the control of initial learning agents). Beyond the possibility to carry on conclusions, recommendations or any other form of Strategic Intelligence output, they also import and export models which can even be Strategic Intelligence models. In that regard, Georghiou and Edler in House of Lords Select Committee on Science and Technology (2010a) recommended to evaluate SBRI to analyse input, output and behavioural additionalities (as usually practiced in EU evaluations) as well as appropriateness, efficiency, effectiveness, impacts and learning effects of SBRI. In the same contribution they complemented their proposal with a Monitoring and Evaluation methodology used for the EU Lead Market Initiative and based on a 2009 report they authored on behalf of DG ENTR. That illustrates how structuring models of Strategic Intelligence (such as evoked in Section 2.3.2) can be transferred which will later on shape policy.

Eventually, many other attempts to import UK SBRI knowledge can be pointed out, among which only two examples will be referred to, as they constitute Strategic Intelligence themselves:

- ▶ The 2011 Report from Technopolis on behalf of the Nordic Innovation Centre and entitled *“How Public Procurement can stimulate Innovative Services”*;
- ▶ The EC intent to transfer through an entire section of the European Commission (2011) study on PCP in civil security dedicated to *“Quantitative impact of PCP-POV on industry: US SBIR experience and its potential implication for Europe”*.

Another layer of complexity in Policy Learning through Strategic Intelligence exists when going sub-national: Strategic Intelligence supports here the complex Policy Learning relationships between the lowest levels with all higher levels of government. Last (but not least!) layer of complexity is the one of the sub-national entities that surprisingly proved to be of great importance in the transnational process of learning SBIR/SBRI. The diffusion of SBIR in the UK did not stop at the national level but rolled down to subnational entities. It is interesting to compare both American and British forms of learning in that regard.

In the US, SBIR learning at the sub-national level is mainly characterized by State strategies to play a leverage effect on SBIR support of domestic SBCs, including matching programmes and complementary measure. These strategies also imply the use of the federal SBIR as a *“radar”* for spotting promising businesses in which to invest as VCs would. In that sense, American States learnt to make use of the federal resource SBIR is. The *“federal effect”* would here find an echo (Common, 2001) such as in the context of the development of theories in line with the *“Laboratories of Democracy”*. On the other hand in the UK, devolved governments are welcome to make use of the (or even set up their own) SBRI mechanism, which is for now coordinated at the level of Innovate UK.

The main argument for American States to set up complementary measures to the Federal scheme was most likely the competition between them to access federal SME support as suggested by a Congressional staffer, while the UK format makes public entities at the sub-national level carry on competitions. In that sense, British sub-national governments are incentivized by Innovate UK to develop their use of PCP through SBRI, idea that had been pushed by policy learning and institutions entrepreneurs across administrations who called upon Strategic Intelligence to draw policy arguments in order for instance to convince devolved ministries and other entities to make use of the mechanism (see Annex 2, Section 3.1.1).

Although no solid information could be gathered on American States' uses of Strategic Intelligence with regards to SBIR, the diffusion of SBRI (but also SBIR) components to Wales (see Box 84) and Northern Ireland (see Annex 2, Section 3.1.1) proved to be based on Strategic Intelligence: the clear influence of the 2008 Matrix Report (which involved the participation of the national SBRI lead expert) channelling policy learning from national to sub-national level (relay for the Sainsbury Review and the Secrets Report such as depicted in Box 85) is illustrative of that matter. Influence came from the National level first, and was stimulated by the setup in 2009 of the NHS SBRI East by NHS Midlands and East with ERDF co-funding and additional support from other UK organisations (NHS, 2012).

This constitutes an additional layer of complexity as learning through Strategic Intelligence is here still not unilateral but multilateral. The Northern Ireland experience investigated through the SBRI case study shows how a pilot proposal was 1) pushed by national and European trends and 2) shaped on the basis of different models (mainly US, UK, EU and NL) and the lessons attached to the Strategic Intelligence around them (Sainsbury Review, Secrets Report, etc.) as to build on learning through Strategic Intelligence. Adding to this complexity, a link between NORTHERN IRELAND and the Dutch SBIR (although superficial as it led to limited learning from Netherlands) was identified and due to a random factor (one specific interpersonal connection). The diffuse nature of the spill-overs is also to be noticed as DEFRA also learnt from sub-national experiences of SBRI, illustrating the multi-directional snowball that is comforted by the existence of available Strategic Intelligence to constitute an available repository of policy information. This effect is indeed called “snowball” as one could expect that among all countries involved in European processes at regional and national levels might encounter similar dynamics of Strategic Intelligence-based policy learning.

5. Conclusions

1/ Deriving conclusions from the analysis

1.1 Repositioning the present contribution

This thesis considered policy learning from both a vertical (cross-temporal) and horizontal (across geo-administrative boundaries) perspective, using a clear case of policy circulation corresponding to what the academic community could call policy transfer. This case is a transfer among others and in that regard is part of a broader phenomenon of policy diffusion (diffusion of the SBIR model to a number of national – and sub-national – systems). Its circulation was stimulated by external pressures linked to a broad perception of competition as suggested by the literature. The literature review showed that although cross-temporal policy learning was not much conceptualised, the generic term of policy learning was taken up by diffusion students for further development. Many taxonomies were drawn to categorize the types of diffusion, transfer, learning, with various scopes but little consistency between them was found. Further steps in the literature review highlighted the fact that conditions and causes of such phenomena and policy learning in particular are quite well analysed while “*when*” and “*how*” questions remain little explored (Graham et Al., 2013). Policy learning processes (Trépos, 1996; Zito, 2009) and underlying mechanisms are therefore little known (Malik and Cunningham, 2006; Volden et Al., 2008; Marsh and Sharman, 2009; Dumoulin and Saurugger, 2010; Obinger et Al., 2013); Dolowitz and Marsh, 2000 and 2012), also because adoption has been a main focus for scholars to approach transfers (Evans, 2009b) while evaluators would focus on the sequential steps of the policy cycle as depicted by Lasswell and Lerner (1951)²⁹⁵. This thesis brings a clear conclusion from that standing point: to understand learning (including in the context of policy transfers), one should pay attention to more stages than the sole policy adoption as the implementation and re-design phases can be arenas during which learning takes place.

The particularity of the present thesis is that it highlights how Strategic Intelligence, which covers all aspects of a procedural instrument, shapes such Policy Learning from both cross-national and cross-temporal dimensions. In that sense this thesis brings an additional brick to the wall of understanding of how policy learning processes take place and in particular how Strategic Intelligence, very often seen in a normative way, contributes to these processes in a structural way. This research was based on case studies, for which generalisation is not expected to the numbers but to the theory (Yin, 2013²⁹⁶). The perspective adopted in this dissertation was an understanding of Policy Learning through policy change.

²⁹⁵ See Lasswell (1971), “*A Pre-View of Policy Sciences*”, Elsevier; as well as Lasswell (1951) “*The Policy Orientation*” in Lasswell and Lerner (1951) “*The Policy Sciences*”, Palo Alto, CA: Stanford University Press.

²⁹⁶ Robert L. Yin (2009), “*Case Study Research: Design and Methods*”, SAGE Publications, Inc.

Of course more abstract forms of learning might lead to longer-term or even more structural changes than the operational ones observed along this study. However, some analytical findings came out which related to such more abstract forms of policy change and influence.

The contribution of the instrumental approach was particularly useful in that regard as it supported the analysis of each block of what Strategic Intelligence is in order to identify some possible effects on learning and related changes. It is clearly understandable from the analysis that Strategic Intelligence is a procedural instrument and here this thesis sheds a new light on the instrumental value of Strategic Intelligence exercises such as evaluation. One particular strength of the instrumental approach was that it allowed integrating technical and social components as well as policy and politics. In that sense, no sphere influencing policy change was left aside, and both cognitive and practical aspects of SBIR and SBRI changes could be tracked and analysed over time. That way the field research depicted not only their adoption or termination but their evolution process including re-designs and policy trajectories which appeared to both converge and diverge at the same time. As explained by Eliadis et Al. (2005), the politics of Strategic Intelligence as a procedural instrument could better be approached: coalition building, legitimacy issues, and context were analysed as to better understand the political role Strategic Intelligence (which is usually called upon as an “*objective*” tool or set of tools). This is an additional contribution from the instrumental perspective adopted in this thesis which was directly supported by the notion of utilisation (or use) of Strategic Intelligence. Also the relationship between instrument and organisation(s) was explored further as to better understand how the instrument can impact organisational behaviours (or not), especially in a multi-organisational context such as in SBIR and SBRI Strategic Intelligence contexts. The procedural nature of Strategic Intelligence as an instrument is particularly visible when we observe the medium role it played in the process of the SBIR lifecycle, as a power tool from the Congress over the executive branch, a conflict resolution tool at the decision making stage, but also through its repository nature that makes it a permanent resource for all.

Taking up the concepts of import and export (“*pull*” and “*push*” dynamics) inspired by Stone (1999) and Randma-Liiv (2007), this thesis nuanced their scope by also distinguishing between their passive versus active nature. As for other concepts used in the Transnational Policy learning literature, some dynamic dimension (to be related to causal mechanisms) was missing in the directions offered by the “uploading” and “downloading” approaches. Such development also allowed better differentiating between learning and transfer from that point of view.

1.2 Answering the research question and underlying theory

This thesis constitutes an empirical contribution to innovation policy studies which focused on the following main research question:

HOW DOES Strategic Intelligence ENABLE AND/OR FACILITATE CROSS-TEMPORAL AND TRANSNATIONAL POLICY LEARNING?

The answer is of course multi-fold and guided through the sub-research questions which are reminded below (see Figure 27).

Figure 27: Reminder of the Research Questions

Box 28: Linking back to the literature review

The literature review showed that policy change can be the result of both past and external causes. Endogenous factors are usually seen as cross-temporal and very often link to policy learning because of the importance of cognitive frameworks. The conceptual research on cross-temporal policy learning remained however scarce although different explanatory frameworks dealt to some extent with it. However, policy learning was conceptually and empirically developed further in the context of diffusion research. Regarding exogenous factors, the analysis of the circulation of policy ideas and practices in a national context allowed researchers building typologies and identifying causes of policy diffusion. The related stream of policy transfer research focused on more individualized phenomena of policy transfer, contributing to a better understanding of the actors involved and directions of policy circulation. Further research on convergence stimulated the interest of scholars who reflected upon the results of transfers and came to find similar analytical features to the ones spotted in diffusion and transfer research (causes, types, etc.). Policy learning emerged in that context as a reaction to the dominant competitive approaches and a way to deal more closely with the cognitive dimension of policy circulation but also cross-temporal learning. In addition, policy learning students introduced the idea of dynamism in policy learning, closely linked to the notion of policy entrepreneur. However, many called for further research on learning processes and the role of knowledge in policy learning beyond the simple policy adoption. The impact of Strategic Intelligence on innovation policy learning was in that regard particularly targeted by the research community. Using the instrumental approach developed in the area of public policy studies, Strategic Intelligence was analysed in this dissertation in order to understand how it enables and facilitates cross-temporal and transnational policy learning. Filling a clear gap in the literature, this thesis responded to the need to better understand learning mechanisms and how Strategic Intelligence interacts with policy.

Strategic Intelligence constitutes a set of normative policy knowledge production and diffusion exercises, which have variable characteristics and are conducted in a certain context. Learning through Strategic Intelligence originates from external pressures (which are partly interpreted and diffused through and by Strategic Intelligence itself) for policy change, which are usually expressed in terms of competitive or crisis threats. The conditions in which Strategic Intelligence and related policy operate are co-defined by the filter of Strategic Intelligence itself, which tend to be a reference in pointing at issues, challenges and success benchmarks among others. The influence of Strategic Intelligence over policy change from a learning perspective is also conditioned by broader policy conditions and frameworks, and relates to the policy process at an abstract level as it is a medium for social learning to take place through the introduction of new beliefs, views and concepts that are integrated to the policy repository it is associated to. At the same level, Strategic Intelligence provides a framework to approach policy, which shapes Strategic Intelligence techniques and contributes to drawing its contours along the policy process.

Strategic Intelligence also appears to be a resource mobilised and instrumented by actors interacting in the policy area proper (but not closed) to the programme or policy focus of Strategic Intelligence. It also operates as a control mechanism that institutions can put in place in order to strengthen certain power relationships. Those roles are particularly visible when observed in conflictual situations, for instance in decision-making negotiations or through administrative resistances to policy uptake. The impact of Strategic Intelligence in terms of policy learning results in visible policy changes when responding to social demand for policy change as well as when combined to opportunity windows. It is however slower as a resource when used to overcome organisational resistances unless it is associated to the accountability mechanisms (making it a control instrument). This thesis suggests that the non-alignment between policy learning readiness and appropriate Strategic Intelligence can hamper policy learning. This remains bounded by cultural and institutional factors such as explained by Hoppe (2010) in the context of his study of boundary work. In that sense, systemic conditions will co-define the impacts of Strategic Intelligence over policy learning.

Finally the research acknowledged the embedded nature of both cross-temporal and transnational policy learning, the latter being a sub-segment of the first. From a transnational perspective, Strategic Intelligence owes however specific characteristics and is a powerful instrument for policy emulation that drives towards convergence while receiving countries' framework conditions force policy tailoring to take place (as a vector of remaining divergence). Although the role and influence of Strategic Intelligence can vary from a country to another, the most impactful appeared to be what was here called "*comprehensive intelligence*". Also, Strategic Intelligence proves to contribute to the definition of a transnational policy repository and provides different accesses to it, allowing the emulation of technical features of Strategic Intelligence such as indicators between policy systems. Such form of Strategic Intelligence frame emulation shall lead to some converging reading grid which are expected to impact the recipient's policy in turn. Another technical feature of Strategic Intelligence that also fosters policy learning is the role of Case Studies, very often showcased as "*success stories*" to influence decision-makers and to another extent administrative resistant. Eventually, this thesis shows that Strategic Intelligence is a powerful instrument which underlying dynamics prove to be both "*push*" and "*pull*" oriented as well as "*active*" or "*passive*", dynamics that depend on the positions adopted by Policy Learning Entrepreneurs which role is particularly visible in terms of their proactive promotion of policy internationally. These "*experts-advocates*" of which a first profile has been attempted occupy a unique position in the transnational Strategic Intelligence-based diffusion of policy transnationally, but also sub-nationally. The processes of learning through Strategic Intelligence also cover complex relationships, which lie in the multiplicity of governance levels and the interconnectivity between policy entities, whether national, supra-national or sub-national.

Box 29: Strategic Intelligence as a structural vector of policy learning

Strategic Intelligence structurally enables and facilitates policy learning at different levels. Using an instrumental perspective embodied by the analytical framework of this thesis, it is possible to link the socio-technical characteristics of Strategic Intelligence with its impacts on policy change from a policy learning perspective:

- ▶ Strategic Intelligence can be made a structural –and even a control– mechanism based on its rationale and related rules. When structural, Strategic Intelligence defines power relationships between the actors involved in policymaking, but also interfaces policy systems as to allow policy tailoring²⁹⁷.
- ▶ By its technical components, Strategic Intelligence orients policy learning and frames the circulation of policy ideas and practices, for example through the reproduction of criteria and indicators but also approaches (comprehensive versus other forms of approach).
- ▶ Through its filtering function which entails problematisation and conceptualisation sub-functions. Strategic Intelligence in that sense contributes to shape policy perceptions and social components in an interactive fashion.
- ▶ The very output of Strategic Intelligence which is assimilated to a “*repository*” (see Box 9) constitutes a structural resource for the actors of policy making. As an instrumented resource for policy entrepreneurs operating in the decision-making area, Strategic Intelligence owns a systemic position in the policy making process and the connections operated by Strategic Intelligence-empowered policy learning entrepreneurs between Strategic Intelligence, policy and politics.

²⁹⁷ As highlighted in the literature review, policy learning (whether from the past or somewhere else) would indeed require an “*easy access to information about what other governments are doing, and different responses to common problems*” (Rose, 1993).

2/ Theoretical implications

2.1 Theoretical developments

Some adjustments should therefore be made in the claims formulated along the literature review and which came to support the design of the conceptual components of the analytical framework used for this thesis. The above analyses show that the socio-technical components of Strategic Intelligence can clearly be linked to forms of policy learning, although these links are not one-to-one links and should be contextualized. As an instrument, Strategic Intelligence impacted policy change mainly through its technical features (rather than through its social components such as its underlying rationale) at several levels as explained in Box 29. Both technical components and outputs of Strategic Intelligence contributed to shape policy at different levels, and mainly framed its cognitive components.

Conclusions can be drawn on the relations between Strategic Intelligence instrumental components and forms of policy learning. Referring to the concept of Policy Learning Readiness, it is to be observed here that different types of Strategic Intelligence can be more appropriate (understand here “*impactful*”) at certain levels: for instance, Table 12 highlights the importance of control-oriented intelligence that proves to be particularly effective for organisational learning to take place (although forced to some extent, it clearly involves knowledge integration, processing and use for change). Another type of Strategic Intelligence which was referred to as “*comprehensive intelligence*” proved to be more impactful at the instrument level as it is less directed to managers but rather decision-makers. Four statements could be made to summarize the main results from this table:

1. Comprehensive intelligence (evaluations) in the US and self-initiated studies or status reports in the UK were reference frameworks at the policy (re-)design stage and were the main vehicles for Transnational Policy learning to take place;
2. Normative studies and control-type of intelligence and metrics are powerful at the organisational level (and in particular as power resource for an entity over another);
3. Platform intelligence (conferences and hearings) operated key links in the system such as between institutions, or policy, political and stakeholder communities;
4. Other types of intelligence such as socio-economic studies or proved to be less impactful but were valuable, for instance when data would be generated and later used in comprehensive exercises.

Also, relevant items (hard and soft) composing Strategic Intelligence contributed in different ways to the phenomena observed as observed through the conceptualisation function brought by a **soft** part of Strategic Intelligence and the role of case study **techniques**.

In all cases however, the relays remained platforms (hearings and conferences) but above all policy learning entrepreneurs (PLEs) who worked as a transmission chain between all levels of the system (**channelling** function but also **dynamic**) of the knowledge made available by Strategic Intelligence (**repository** function). The dynamic nature of policy learning was indeed clearly determined by the role of policy entrepreneurs who were enabled by PLEs empowered by Strategic Intelligence. This human dimension of the learning process constitutes the edge between the structural (see Box 29) and contingent natures inherent to Strategic Intelligence as a driver of policy change. It also alters to some extent the idea that organisational and more meta-level arrangements (above the individual level) define knowledge uptake conditions, in favour of a more individualistic type of explanatory model that should add to the existing boundary work “*in practice*” (see Hoppe, 2010). By “*more individualistic*”, it is meant here that instead of holistic approaches operationalized at a meta-level (whether systemic or organisational), more emphasis should be put on individuals (people) as change agents and their motivations to push knowledge uptake in certain contexts (micro-level). This is not an exclusive orientation of course, as both would be necessary to understand the phenomena under the scope: the approach should remain integrative.

In order to link the contributions of this dissertation to the state of the literature, it is possible to refer to the claims formulated along the literature review. As a reminder to the reader, these claims were based on specific controversies or knowledge gaps observable in the academic sphere. Some key issues spotted in the literature were addressed by this thesis in that respect: for instance, instead of opposing politics and policy, both were integrated into the instrumental framework to analyse Strategic Intelligence and Policy Learning over time. Further conceptualisation of policy learning (with the distinction made between the *Causes, Nature of the interaction, Factors influencing inter-system connectivity/receptivity, Process level, Type of process, and Results* in Table 2 but also between cross-temporal and transnational policy learning) and of Strategic Intelligence was a first step.

The first conclusion of all is here the following: Strategic Intelligence matters at different levels, and it is a governance instrument holding a procedural nature that enables and fosters policy learning. The notion of “*use*” or “*utilisation*” proved highly useful to understand knowledge uptake and link it to policy change. The literature review also reported an important knowledge gap addressed by this thesis which shed some light on the determinants and conditions of policy learning and which conditions make it most likely to take place.

- In that regard, a clear move was operated in scope: this thesis went beyond the adoption focus usually observable in academic studies to include all stages of the policy process including implementation and re-orientation/re-design. The methodological conclusion is here that no learning study can be undertaken that only refers to adoption without missing an all part of the picture.

- ▶ Another re-positioning of *competition* was also operated: while many scholars consider competition to be a type of transfer, this thesis acknowledged the role of competition as both a contextual (pressure) factor and driver of policy transfer, while the type of transfer observed was *policy learning*. An interaction can be competitive, and competition can be the cause or driver of policy learning.

Some under-studied topics were also explored for which knowledge was to be developed, such as the subjects of *resistance to learning* and of course the instrumental characteristics of Strategic Intelligence. Considering the former, new pathways might be opened towards the study of *Policy Learning Readiness* and to some extent absorptive capacity at the policy level (while the usual focus is organisational or systemic). Also Policy Learning Entrepreneurship as a newly born concept presents a new perspective on the study of Policy Learning as it clearly questions the role, motivations, strategies of the individuals involved in the policy process. Those developments should most likely be the starting points for future research.

2.2 A way forward?

This thesis empirically contributed to the understanding of how Strategic Intelligence influences policy change, and can prove to be both a resource and a transmission chain between different spheres of policy making. This echoes Busenberg (2011) whose conclusion was that the learning process “*often occurs (1) within networks of multiple organisations and individuals active in a given policy domain, (2) over periods of many years, (3) both through incremental discussions within policy networks, and through responses to political events, and (4) through the diffusion of innovations and experiences between different jurisdictions and policy domains*”. The temporal dimension is here key as some of the changes took place at a more abstract level, for instance when happening at the level of the values (such as suggested by Barrados and Mayne, 2003).

Although the main contribution of this thesis was to highlight the structural nature of Strategic Intelligence as a vector of Policy Learning, it was also useful as to better understand policy learning in particular, reviving the importance of some critical concepts such as “*opportunity windows*” or “*utilisation*” but also shifting to new emerging concepts, such as the ones of “*Policy Learning Readiness*” (PLR) and “*Policy Learning Entrepreneur*” (PLE). The latter especially confirms the importance of individualistic approaches to policy change (approaches that would pay a greater attention to individuals and be less holistic), showing that beyond the functional terms of his or her position, an individual can be distinguished by personal characteristics that explain the “*uptake*” of his or her role as to drive policy change. Along that line of thinking, some limitations of the concept of epistemic communities were also suggested as the existence of such communities in practice does not account for the dynamics that lead to policy changes.

Although epistemic communities (considered in this thesis as networked “channels”²⁹⁸) and shared beliefs (conditions) are most likely to facilitate policy learning, the key engine remained to be found at the level of individual strategies which defined the nature of the dynamic(s) underlying Policy Learning. Although one could interpret this position as pro-individualist, it is in the contrary going against reductionism to promote a co-evolutionary perspective: the dynamic role of PLEs highlights the force of individual dynamics, but the importance of PLR reminds the importance of meta-level structures and institutions as well as the factors and conditions that allow (or do not allow) change to happen from a more holistic point of view. Change happened as a combination of individual decisions and actions together with organisational and system conditions. The interlinkages between strategic intelligence and each of these levels (for instance as both a resource for individuals and a control mechanism from an institution over another) made it powerful in highlighting the articulation between both factor levels: dynamic PLEs could only push change through when broader conditions were in place, as if doors should open on the road first before cars can start to race.

This connects directly to another key issue explored in this dissertation: the one of “*uptake*”, which appears to be the critical edge for policy learning to happen as a form of policy change. Indeed, normative policy knowledge can be produced and diffused, but one fundamental question for policy change remains about the uptake of such knowledge by policy makers as to become policy change (whatever its form): in the context of this thesis, several institutions had natural authority on knowledge production (see Dunlop, 2011). The key differentiation point was the “*uptake*” and how to turn knowledge into action through it. One way to approach this uptake was in this thesis applied through the use of the concept of *utilisation* as illustrated in Box 30 which also links utilisation from the “*knowledge and policy*” literature streams to “*policy learning*” concepts. Each of these notions remains about the issue of turning knowledge into action. Some already made such links formally, such as Sanderson (2002) as explained in the literature review section (see section 2.4.4 of the literature review).

Box 30: Reminder – utilisation concepts

Key concepts in the utilisation literature covered

- ▶ Instrumental use (Knorr, 1976; Caplan, 1979; Weiss, 1998; Hutchinson, 1995.)
- ▶ Conceptual uses (Caplan, 1979; Weiss, 1998; Hutchinson, 1995)
- ▶ Process-related and interactive uses (Forss et Al., 2002; Patton and Horton, 2009; Weiss, 1998)
- ▶ Symbolic use (Knorr, 1976; Balthasar, 2006)

Linking these concepts to policy learning literature concepts, one could shape a taxonomy around the following:

²⁹⁸ According to Haas, 1992.

- ▶ Instrumental and technical/operational (related to techniques and operational changes, very often associated as take-up of knowledge production outputs)
- ▶ Process-oriented and interactive (effects of process and actors mobilisation on the social relationships setting and mediation)
- ▶ Organisational (change in organisational behaviour)
- ▶ Argumentative (political, tactical and advocacy: in the context of confrontation, which can also be symbolic when coming to legitimizing a decision)
- ▶ Conceptual (change in theories and concepts, including related ideologies)
- ▶ Paradigmatic (change in terms of the vision of the world)

Ottoson (2009) pointed out knowledge utilisation, diffusion, implementation, transfer and translation. The present thesis shows mixed forms and combinations of these enabling and fostering policy change and through policy learning in particular. Utilisation has now long been a key concern of evaluators and scientists (see for instance Weiss, 1979 and 1986; Zhang, 1989; Hutchinson, 1995; or Rich, 1997; Boswell, 2008). Beyond the goals pursued or models followed such as for example the ones identified by Weiss (1979) and Nutley et Al. (2007), this thesis was led to broaden the notion of utilisation and suggests now that it should be further oriented towards the determinants of Policy Learning Readiness on one hand, and policy learning entrepreneurs on the other hand. The reasons for connecting these notions mainly lie in the necessity to integrate knowledge, policy and politics in the study of innovation policy change.

Box 31: Policy Learning through Strategic Intelligence contextualized

It is important to remind the reader that Strategic Intelligence enables and fosters policy learning under certain conditions, which were described in the analytical part as related to external and competitive pressures, policy awareness and continuity, but also the existence of political demand and opportunity windows, all of them being co-defined by Strategic Intelligence. Especially external factors should be re-valued: in the analytical framework, external factors were perceived as vectors of influence over policy change, but this thesis clearly shows that they determine the policy learning process itself. Policy Learning through Strategic Intelligence also depends on the degree of Policy Learning Readiness that can be analysed at the organisational level (although the concept is most likely to be portable), which is useful in order to better understand the barriers hampering policy learning through Strategic Intelligence.

Among the dynamic factors of policy learning, the role of Policy Learning Entrepreneurs who are empowered by Strategic Intelligence proved to be outstanding as both change agents operated in totally different contexts (conflictual/consensual, legislative/executive, etc.) although they contributed to orient policy change promoted by policy entrepreneurs.

Policy Learning Entrepreneurs appeared to be real “*programmatic heralds*” pushing for specific changes and acting to some extent like “*boundary workers*”²⁹⁹ (Hoppe, 2010). In that sense, the dynamic nature of policy learning through Strategic Intelligence is purely individual-dependent and not structural. One critical aspect in that respect was therefore the one of the dynamic engines leading to the uptake of Strategic Intelligence-based policy change proposals. Such a finding should incentivize colleagues from the academic community so that some reconsider individualistic approaches but not at the organisational but rather at the individual level (without just breaking with more holistic views of course but rather combining with them as they acknowledge broader conditions): there is potential here in exploring psychological determinants of policy learning entrepreneurship as well as material factors that make it possible. Motivations and strategies of Policy Entrepreneurs (Pes) should be further researched as suggested by Mintrom and Norman (2009) or Crow (2010). The present analysis of PLE confirms that some more systemic psychological analysis of PEs would make sense as to better understand and contextualize which forms of retributions drive policy entrepreneurship.

A challenging operation that would require a longer research timeframe as well as a dedicated focus would be to further investigate the effects of Strategic Intelligence as a vector of social learning in particular, as the structural features of Strategic Intelligence such as the ones listed in the present dissertation (indicators and case study techniques) are expected to impact the shape of the policies to which they are related to. Another one inspired by the conclusions from Bulmer and Padgett (2005) who related the institutionalisation degree of governance regimes and policy transfers (one breeding the other) would relate to the nature of the policy frameworks influencing policy learning. The impacts of the governance structure was already approached and led to understand some of its impacts over policy learning which can partly be overcome by Strategic Intelligence. But the legislative/executive divide as well as the differences between American and European frameworks in terms of hampering or facilitating policy learning could present further research potential.

²⁹⁹ And in particular to the extent they plaid the role of interface between policy and expertise, although they do not fit the boundary worker profile defined by Hoppe (2010) who stated that « *boundary workers work in advisory bodies, for example as permanent secretaries with civil servant status* » and essentially made use of their institutional affiliation instead of having their position defined by it.

3/ Policy implications

According to the academic customs at the University of Twente, “*stellingen*” or “*statements*” should accompany every PhD thesis. As an innovation policy consultant, the decision was taken to include these statements as the concluding section of the dissertation and make them “*policy implications*” and in that sense turn them into policy insights potentially useful for practitioners.

At the source of this thesis is the finding that innovation policy practitioners look for new policy models such as PCP (and mainly SBIR/SBRI-like programmes), betting on Strategic Intelligence to learn from past and external experiences. In Europe in particular this trend touched nearly all innovation policy sub-fields and related programmes (Smart Specialisation, PPI, SIRE measures, etc.). This thesis explained how policy learning takes place through Strategic Intelligence and under which circumstances.

In practice, innovation policy is the product of human interactions operated by individuals belonging to specific areas of the policy making universe: they can be decision makers, officials, stakeholders, losing or winning tiers, etc. Policy implications emanating from this thesis will therefore be addressed to relevant target groups. These implications can be derived at different levels, implying possible actions from specific groups. From a normative point of view, the statements below comfort the direction that policy learning can be facilitated by Strategic Intelligence. And that measures can be undertaken to enable it, taking into account that Strategic Intelligence is not neutral. Some of these policy implications relate to the structural nature of Strategic Intelligence, others to its contingent characteristics.

Building organisational learning capacity around SI

1. Policy learning requires organisational absorptive capacity

The Policy Learning Readiness dimensions suggest that from an administrative body standing point, a number of factors should be in line to allow effective learning to take place. Sufficient **organisational (including absorptive) capacity (material/HR)** appears to be of main importance, and the conclusions of this thesis suggest that Strategic Intelligence should have **dedicated resources** and a **systemic position** in relevant administrative bodies (through the setting up of dedicated services/units and related positions).

2. Systemic inclusion of Strategic Intelligence will lead to more effective policy learning.

This implies that the systemic position of Strategic Intelligence in policy making bodies should be structured according to a relevant “*learning organization*” (see Chun Wei Choo, 2005) **process** and be associated with a **knowledge management system** reinforced by an **uptake-oriented mechanism** (diffusion/dissemination relays, platforms, etc. making the link with the external environment of the organisation).

3. A culture of policy learning should be anchored in administrative bodies.

Profound changes are needed in organisations to have their culture progressively and structurally turned towards the notions of experimentation and risk as well as innovation: this cultural change is a prerequisite to effective policy learning through Strategic Intelligence as policy lessons and related models and practices can only be integrated if organisational HR are “ready” to learn and change. This can take place at different levels (missions of the organisation, individual position fiches, etc.)

4. Incentivizing individuals might foster Policy (Learning) Entrepreneurship

Individual officials should be provided with individual incentives for Policy Learning to take place. Because of the unrealistic nature of a possible award-based mechanism, PLE could be dealt with through the evaluation of individual officials, PLE being made a condition for a positive evaluation. This could apply to particular units such as Strategic Intelligence or Monitoring & Evaluation units in administrations, and be based on a comprehensive set of criteria most likely to be qualitative.

Strategic Intelligence practice as uptake-oriented

5. Strategic Intelligence should result from social demand.

Strategic Intelligence should be driven by social demand as it makes policy change possible (enables policy change) in the form of opportunity window. Social demand means for instance demand for Strategic Intelligence emanating from citizens (accountability-driven), from officials willing to verify the success of an action (implementation/result-oriented), etc.

6. Comprehensive studies should be contextualized and fit in the current policy context.

Comprehensive studies foster policy learning, and should content-wise rely on:

- ▶ Recommendations that are linked to the existing policy pathway
- ▶ Contextualized, state of the art and vulgarized knowledge (Contextualisation of the knowledge is crucial and should ease PL, as shown by the British experience of the European framework which was eased by Strategic Intelligence).

7. Specific analytical and production conditions are required to make policy learning through Strategic Intelligence optimal.

Strategic Intelligence is a catalyst for renewed policy making (conceptualisation and framing through its technical features for instance) which can be made optimal:

- ▶ With upstream transferability and lesson-drawing exercise (what are the needs to be addressed? What lessons are taught? Etc.)
- ▶ When relying on vulgarisation and translation efforts; as knowledge becomes more and more specialized and technical, Strategic Intelligence as an interface is expected to be made accessible to receiving/sourcing policy makers. This implies having a selection stage during which knowledge can be “*filtered*” according to policy making needs. Better translation of Strategic Intelligence-based knowledge could lead to less uncertainty and make recipients more receptive.
- ▶ When emulating from another system, sourcing Strategic Intelligence methodological features from the originating country/ies. Policy sourcing requires by nature more in-depth transferability analysis and contextualisation efforts.

Uptake and Policy Learning Entrepreneurship

8. Strategic Intelligence should be designed by experts as oriented towards uptake and action.

Experts should design and conduct Strategic Intelligence relying on:

- ▶ Clear dissemination strategies and approaches to the involvement of political actors to foster Strategic Intelligence uptake
- ▶ The use of narratives, use of case studies/story telling/Success stories to link up with relevant decision makers (vulgarisation of expertise)

9. The use of multiple diffusion channels should be used by PLEs to foster PL

A key element of this thesis is that Policy Learning through Strategic Intelligence when effective is dynamic; the PLEs observed in the US and the UK overcame the simplistic vision of expertise according which the role of an expert would stop when his/her report is delivered. Beyond the receptivity issue (analysed here through PLR), strategies from PLEs should combine a variety of channels including political channels and the media to allow Strategic Intelligence be taken up by policy making in an effective manner.

Positioning Strategic Intelligence in the overall policy system

10. Strategic Intelligence is a procedural instrument that can regulate power relationships.

The main example from this dissertation is the role Strategic Intelligence plaid as a power tool from Congress over the executive branch. Its control function led to further empowerment of the legislative branch. Other settings could be presented in which Strategic Intelligence could contribute to the regulation of power relationships.

11. Strategic Intelligence should be tailored to the needs of the innovation policy system in place

The following examples show that the functions plaid by Strategic Intelligence can be variable as highlighted by the analytical section of this dissertation; among many others, Strategic Intelligence can indeed present a...

- ▶ Structural function (repository, governance, process)
- ▶ Radar and analytical function (whether internationally or domestically)
- ▶ Platform function (visits, interviews, and of course hearings/committees)

Therefore, its characteristics should be tailored to the innovation policy system in place as to support its needs for policy evolution.

12. Strategic Intelligence should be made a structural component of innovation policy making processes

Although it can be used in an opportunistic way, Strategic Intelligence made structural is most likely to lead to policy learning across time: the evolutions of the American SBIR alimented by structural Strategic Intelligence (set in stone by Public Law) are a good example of such proposal. The post-insertion of the Valley of Death in SBIR and SBRI particularly shows the importance of the repository function of Strategic Intelligence which frames policy across time, so the interest of having a clear engine for policy to follow relevant orientations across time.

Transnational Policy Learning through SI

13. Transnational Strategic Intelligence is beneficial as comparative and/or transnational Strategic Intelligence and PLEs bring in more policy lessons.

Connecting Strategic Intelligence internationally shall bring not only lessons from the past but also lessons from other systems. The fact that the UK and the NL but also the EU are oriented towards the international scene correlates with their rank of first-range adopters of PCP. Another aspect was also brought to the attention of the reader when depicting the role of Strategic Intelligence in the inter-governmental alignment of SBRI with the EU legal framework.

14. Has a role to play in the complex relationships observed which are transnational, linking actors from sub-national and supra-national organisations.

As discussed in different instances, a large amount of Strategic Intelligence outputs (formalized knowledge) is already available in the form of different accessible³⁰⁰ repositories. This suggests that international bodies such as the OECD and the EC are to achieve better Strategic Intelligence uptake.

³⁰⁰ Internet, embassies, professional networks and bodies, platforms such as ERAWATCH or policy-oriented communities, etc. are some of the numerous channels to access these repositories.

ANNEX 1 – Case 1 - Policy Structuring and repository constitution through Strategic Intelligence: the US SBIR case

1/ The Small Business Innovation Research Program

1.1 Rationale and paradigmatic/social components of the programme

1.1.1 Introduction

Rose (2005) clearly defines “programmes as building blocks”: “Programmes are the stock in trade of policy analysis. A programme is a specific measure that sets out the way in which public employees are authorized to spend money in pursuit of stated objectives” (Rose, 2005). Howlett and Rayner (2008) defined a policy measure as organized in policy focus (ends and means) as well as policy inputs and outputs (conceptual ideas, operationalized objectives and implementation targets). According to them, these features would cover the key components of what a policy measure’s features are: overall policy goals, policy objectives, policy level specification, overall approach to policy implementation, policy instruments, and implementation level specifications. An interviewee (JC) summarized the uptake at NORTHERN IRELAND level as based on “Rationale aims needs objectives and constraints”. The Small Business Innovation Research Program (SBIR) can be defined according to these parameters. However, it is also interesting to connect these main features with the ones described in Lascoumes and Le galès’ (2005) approach. The following section will therefore review the key components and building blocks of the programme.

One of the difficulties is that the rationale and some paradigmatic blocks of the programme changed over time, making it more complex and somehow bringing possible contradictions between its core objectives (progressive orientation towards commercialisation vs breakthrough innovation support, etc.). One of the particularities of the programme is that it has been evolutionary, with over the past 15 years a progressive integration of the ‘valley of death’ rationale for instance. Initially grounded into the idea that SMEs were key for innovation and jobs but did not benefit from the share of procurement they should benefit from, the programme was oriented towards high-risk funding of a large number of ideas and cutting-edge research projects at an early stage of R&D. SBIR was therefore oriented towards breakthrough innovation and high-risk investing. However and since its creation, the programme has progressively evolved towards a slightly different rationale.

As to identify building blocks of the rationale underlying SBIR, several blocks can be thought of: philosophical or ideological orientations, subjective values, as well as a specific perceptions of the role of public authorities and their interactions with society (target groups, beneficiaries, way of designing and implementing a policy, etc.). A good starting point for SBIR might be the challenges it was/is aimed to address. In policy studies, public action is very often seen as the result of interest struggles, fights between coalitions.

They are also seen as a way to address challenges identified/conceptualized ex-ante but also sometimes ex-post. Real or not, challenges are perceived and associated to a need for action that requires public authorities to mobilize resources in order to make adjustments in society. These challenges acknowledge the values behind the programme as to what is wrong/right or acceptable in society.

They also define part of the mechanisms according which the programme is supposed to work.

1.1.2 The Federal State should support manufacturing-oriented technology development

From a social but also paradigmatic point of view, the components of the SBIR Program illustrate the importance of State for the economy. The SBIR rationale is indeed based on “state interventionism”, consecrating the idea that market and/or system failures are to be corrected by the public authorities. One of these failures is related to the existence of a “valley of death” (NAS, 2007a) and is further described in O.

Though some players have long been questioning Federal support to small businesses, there remains a dominating argument that the Federal State has been an engine for the development of many key technologies of today (reminder that popped up in several interviews), such as illustrated by the computer, iRobot, SIRRI, etc.

With SBIR it is understood the State must intervene in order to correct market and system-related failures hampering the success of SME-conducted R&D and their related commercial and employment outcomes. In his contribution to NAS (1999), Josh Lerner referred to the possibility for Federal Government to address the need for spill-overs and existing information asymmetries in financial markets. A response could in principle lie in venture capital, but venture capital remains too oriented towards commercialisation and in that sense is less likely to invest in high-risk SME projects. Remains that these SMEs with early-stage research activities are still in need for direct support. Such support should bring these SMEs one step further towards prototyping, demonstration of their commercial potential and either reaching investors or the market.

This interventionist position is further confirmed when considering the legal position attributed to the Federal State regarding SMEs, innovation and growth and described in Public Law 95-507 passed under the 95th Congress in October 1978³⁰¹ - which created additional conditions for Small Businesses’ integration into public procurement initiatives (see Uyarra, 2013)-.

³⁰¹ Accessible on <http://www.gpo.gov/fdsys/pkg/STATUTE-92/pdf/STATUTE-92-Pg1757.pdf>

However, the position of the State is somehow considered on an equal level with the private sector: the idea of partnerships between Federal State and the private sector to make innovation happen and result in commercial benefits that would spill over to the society is indeed the one that drives SBIR. In that sense, the State comes into play when the private sector either dysfunctions or is in need for intervention in order to maximize its achievements.

1.1.3 Technology-push and demand-oriented rationales

SBIR has a purely technological focus. It is not aimed at supporting any non-technological (process, service, social, marketing, etc.) innovation formally.

Such focus is explicated in many instances, one of the most recent examples being the 2012 SBA Directive amending the SBIDA and defining innovation as “something new or improved, having marketable potential, including: (1) Development of new technologies: (2) refinement of existing technologies: or (3) development of new applications for existing technologies”.

Moreover, technology is here to be considered in a manufacturing context. Though it is less restrictive in practice, SBIR tends to be rather oriented towards manufacturing as made explicit by the 2012 SBIR Directive issued by the SBA. The Directive states indeed that implementing agencies should “give priority in the SBIR program to manufacturing-related research”. This orientation finds its source in the willingness to reinforce the focus on innovation in manufacturing in the form of Executive Order 13329 (Encouraging Innovation in Manufacturing – The President, 2004)³⁰². However, other priorities are listed by the Directive, such as energy efficiency, renewable energy, and “critical technologies”.

An additional nuance can also be made in the way SBIR has been designed and implemented. Though it is very often presented as a demand-side measure, the programme has been designed on the basis of both push and pull rationales: the programme is indeed a mix of technology-push and demand-oriented tools, providing direct support to companies and allowing procurement of solutions by Departments and Agencies. In terms of technology push and early-stage support, SBIR provides support to SMEs in order to support them in overcoming the ‘valley of death’ which requires direct support to compensate the limited capabilities of small businesses to develop, scale up and commercialize technologies. From a demand-side point of view, the Program is based on the idea of federally-pulled R&D, with as an intention either to publicly procure the relevant technologies developed under SBIR, or to support their uptake by the private market.

³⁰² The SBA refers to this executive order on <http://www.sba.gov/offices/headquarters/oca/resources/6829>

In practice, the demand-side leverage power will vary from a Department to another: for instance, the National Academies of Science (NAS) found out that “acquisition agencies (NASA and DoD) use the procurement-oriented approach³⁰³; NIH uses the investigator-oriented approach and NSF and DoE use the management-oriented approach³⁰⁴” (NAS, 2008a).

1.1.4 A target group: Small Businesses, or how the Federal State can help “the little guy”

As explained by several interviewees, by the 1960s the importance of SMEs became better understood also in Congress. As reported by the NAS (1999), SMEs are seen as important for innovation and employment, but still face difficulties due to their small size. SMEs in US are not defined as in Europe, a small business concern being in the US a company with less than 500 employees.

The group targeted by SBIR is small businesses (less than 500 employees and to a certain extent less than 51% venture-owned³⁰⁵ - no revenue limit is to be applied); the definition of what an SBC (small business concern) is has however changed over time, covering now small businesses which shares are owned in majority by Venture Capitals. Currently, the businesses under the scope should be owned by at least 51% by one or more U.S. residents or citizens.

One of the leading ideas that was at the source of R. Tibbetts’ (founding father of SBIR) concept was the one of unbalance between SMEs and other corporate actors and Universities in terms of access to public procurement. Already in the 1970s/1980s most of R&D human resources in the US were to be found in SMEs; but these SMEs were clearly left aside when considering public procurement. Therefore the need to support SMEs’ access to public extramural R&D expenses by Departments and agencies was made a main objective behind SBIR, justifying State intervention to support SMEs’ early-stage R&D activities.

The programme was shaped around this principle of rebalancing the R&D procurement game in favour of SMEs which SBIR-supported R&D should be conducted on the US territory (possible subcontractors should preferably be American). Intellectual Property Rights (IPR) and patents are retained by the company, though the Federal agency or government in charge of its support can develop a royalty-free license to use the technology and/or knowledge developed with an SBIR award. This is explicitly suggested as follows:

³⁰³ “where topics are used to publicize areas of interest to the agency, but are not used as a boundary condition” (NAS, 2008a)

³⁰⁴ “where topics are used at least partly to limit the number of applications” (NAS, 2008a)

³⁰⁵ See Section 219 on this issue

“Small business concerns normally may retain the principal worldwide patent rights to any invention developed with Government support. In such circumstances, the Government receives a royalty-free license for Federal Government use, reserves the right to require the patent holder to license others in certain circumstances, and may require that anyone exclusively licensed to sell the invention in the United States must normally manufacture it domestically. To the extent authorized by 35 U.S.C. 205, the Government will not make public any information disclosing a Government-supported invention for a minimum 4-year period (that may be extended by subsequent SBIR funding agreements) to allow the awardee a reasonable time to pursue a patent.” (2012 Directive, example of statement an Agency can use to clarify IPR status – both IPR and Patents)

Another main reason for focusing on this specific group was that SMEs suffer more than larger companies when attempting to cross the so-called “Valley of Death” (that is to be linked to the limits of Venture Capital funding as described next).

1.1.5 The Valley of Death

Another pillar of the SBIR program (though formulated by the NAS only in the 2000s) consists in the existence of a gap in terms of SME early-stage financing that is illustrated by the so-called “Valley of Death” metaphor. One should however notice that the concept of Valley of Death was not referred to in the first years of the programme and came later during the process. It is now fully integrated as one of the reading grids of the programme, pushed forward by the NAS evaluations and related communication.

Box 32: The “a posteriori” added notion of Valley of Death

Since its creation SBIR always dealt with the difficulties of SMEs to access early-stage R&D funding. However, the concept of Valley of Death, today (almost naturally) associated to the programme, only came into play later in its development. An interviewee explains:

“Valley of Death was not used as a term. But the concept was understood (...) Valley of Death comes out from the Venture Capital industry in the Silicon Valley (...) the NAS plaid an instrumental role in bringing policy makers in DC to recognize that there is a Valley of Death and the objective was then to bring Congress to recognize the Valley of Death. The concept came from the venture community; in terms of policy, we can point at the NAS work done in the early 2000s. We helped driving this path” (CW)

The concept was therefore integrated into SBIR as one key source of justification for the programme to be sustained and reconducted as it deals with an uncovered gap in the innovation finance chain.

According to the metaphor of “Valley of Death”, venture capitalists would be subject to risk-aversion and interested in short-term returns on their investments.

They would therefore not/rarely invest beyond a certain level of risk in companies or projects which are too far from the market (commercialisation stage) and about which economic returns remain too uncertain. As research funding follows a rationale guided by public interest and the idea of knowledge externalities, a gap remains that is not covered by the usual Research, Development or close-to-market funding streams.

This Valley of Death is illustrated below (see Figure 28). It is to be understood that research is usually supported by public authorities while innovations that are close to the commercialisation stage can reach other sources of funding such as venture capitalists, business angels, etc. But a gap remains at the development and prototyping stages, when SMEs encounter difficulties to find high-risk investors.

Figure 28: Illustrations – the Valley of Death

Sources: NAS, 2007a and NAS, 2008a³⁰⁶

³⁰⁶ Adapted from L.M. Murphy and P. L. Edwards, Bridging the Valley of Death—Transitioning from Public to Private Sector Financing, Golden, CO: National Renewable Energy Laboratory, May 2003.

The SBIR Program is from that point of view seen as a way to overcome the limits of venture capitalists and angel investors. In that sense, the NAS (2008a) argues that “*SBIR is the main source of federal funding for early-stage technology development in the United States*” as it would provide “20% of funding for early-stage development from all sources and over 85 percent of federal financial support for direct early-stage development” without any substitute (see Figure 29 and Figure 30).

Figure 29: Estimated distribution of funding sources for early-stage technology development diffused by NIST in 2002

Source: NAS, 2004a³⁰⁷

³⁰⁷ Referring to Lewis M. Branscomb and Philip E. Auerswald, *Between Intention and Innovation: An Analysis of Funding for Early-Stage Technology Development*, Gaithersburg, MD: National Institute of Standards and Technology, 2002, p. 23.

Figure 30: Breakdown of US venture capital by stage of development in 2004

Source: NAS, 2007a³⁰⁸

1.2 Technical components of the programme

1.2.1 A phased process with four key objectives

Approaching the technical components of such a programme as SBIR requires provide an overview of the entire device so that the lines can be delineated between its key components. It is indeed here already interesting to note that the SBIR program is a mix of classical instruments to support innovation and entrepreneurship. This mixed nature makes also its complexity. One might find more convenient to first start with the objectives and the process followed by SBIR.

SBIR was created in order to serve economic growth purposes and is a competitive programme. Its statutory purpose is “to stimulate technological innovation by strengthening the role of innovative small business concerns (SBCs) in Federally-funded research and research and development (R/R&D)” (Small Business Innovation Research Program Policy Directive, 2012³⁰⁹).

³⁰⁸ Reference to PriceWaterCoopers/Venture Economics/National Venture Capital Association Money Tree Survey, 2005

³⁰⁹ See *Small Business Administration 13 CFR Chapter I RIN 3245–AF84 Small Business Innovation Research Program Policy Directive - Federal Register Vol. 77 No. 151, Monday, August 6, 2012*; The 2012 SBIR Directive issued by the Small Business Administration (SBA) stipulates that “The statutory purpose of the SBIR Program is to strengthen the role of innovative small business concerns (SBCs) in Federally-funded research or research and development (R/R&D)”. The purposes of the programme are described as to “(1) Stimulate technological innovation; (2) use small business to meet Federal R/R&D needs; (3) foster and encourage participation by socially and economically disadvantaged small businesses (SDBs), and by women-owned small businesses (WOSBs), in technological innovation; and (4) increase private sector commercialization of innovations derived from Federal R/R&D, thereby increasing competition, productivity and economic growth”.

As underlined by Audretsch et al (2002), the initial objectives set by the 1982 Act were the following:

1. To stimulate technological innovation.
2. To use small business to meet Federal research and development needs.
3. To foster and encourage participation by minority and disadvantaged persons in technological innovation.
4. To increase private sector commercialisation of innovations derived from federal research and development.

Its basic process model did not change over time: three phases were designed in order to support the various development stages of innovation. Those phases are considered as three distinct awards that can be called upon individually or altogether (a company can apply to a specific award without any obligation to apply to the others but can also apply for a Phase 1 and then Phase 2 and Phase 3 awards). Those three main components as currently implemented are clearly described in the following box. An illustration of the process comes right after in Figure 31

Box 33: The three phases of the SBIR program

***“Phase I.** The objective of Phase I is to establish the technical merit, feasibility, and commercial potential of the proposed R/R&D efforts and to determine the quality of performance of the small business awardee organization prior to providing further Federal support in Phase II. SBIR Phase I awards normally do not exceed \$150,000 total costs for 6 months. **Phase II.** The objective of Phase II is to continue the R/R&D efforts initiated in Phase I. Funding is based on the results achieved in Phase I and the scientific and technical merit and commercial potential of the project proposed in Phase II. Only Phase I awardees are eligible for a Phase II award. SBIR Phase II awards normally do not exceed \$1,000,000 total costs for 2 years. **Phase III.** The objective of Phase III, where appropriate, is for the small business to pursue commercialization objectives resulting from the Phase I/II R/R&D activities. The SBIR program does not fund Phase III. Some Federal agencies, Phase III may involve follow-on non-SBIR funded R&D or production contracts for products, processes or services intended for use by the U.S. Government.”*

Source: <http://www.sbir.gov/about/about-sbir>; the description of these phases is based on relevant Public Law as well as the related SBA Directives; emphasis added by the author.

Note 1: The 2014 Directive made official the possibility to deliver a complementary SBIR Phase II Award (which should still be in line with support limitations defined by the Law).

Note 2: “For Phase I, a minimum of two-thirds of the research or analytical effort must be performed by the awardee. For Phase II, a minimum of one-half of the research or analytical effort must be performed by the awardee”. For both Phase I and Phase II, “the primary employment of the principal investigator must be with the SBC at the time of award and during the conduct of the proposed project” and the R&D activities implemented should be conducted in the United States (2012 SBIR Directive)

1.2.2 A mix of instruments

In order to achieve the aforementioned objectives, the SBIR process was phased in three different support blocks independent from each other and involving different types of activities. Figure 12 shows the main technical components of SBIR. One can observe that a mix of direct and indirect but also demand-side forms of support are involved. SBIR offers three distinct phases (not mentioning the procurement part) that tend to deal with specific objectives.

For instance, Phase I will consist in supporting feasibility research so that applicants can assess different (technical but also commercial) aspects of their R&D project(s), while Phase II is about direct support to project implementation (prototyping/development). Phase III involves indirect support (technical assistance under several forms). And the procurement aspect is a possibility (not mandatory) for solutions being developed under SBIR and matching Departments’ needs.

Figure 31: SBIR as a process involving multiple instruments

Source: the author, 2014 (inspired by NAS, 2004)

Note: since its last reauthorisation, DoD, DoE and NIH can offer SBCs a direct access to Phase II (without requiring any Phase I award). This remains a pilot initiative for the FY 2012 to 2017. Also complementary Phase II awards are possible (see 2014 SBIR Directive) though the amount of such complementary support is still subject to the Phase II rules defined by the Congress through Public Law.

It is also to be noticed that other complementary measures can be observed, from the matching programmes designed by State authorities and complementary measures (including Small Business Technology Transfer – STTR) to the SBIR awards delivered by the Small Business Administration. SBIR is indeed part of a broader policy mix and is subject to a number of State initiatives willing to play a leverage role (synergetic/complementary to SBIR). One of many examples is referred to in Box 34.

Box 34: The DMEA SBIR phase II enhancement program

The Defence Microelectronics Activity (DMEA) SBIR Programme implemented by the DMEA Program Control Division under DoD proposes some complementary support to SBIR:

“To encourage transition of SBIR into DoD systems, DMEA has a Phase II Enhancement policy. DMEA’s Phase II Enhancement program requirements include: up to one year extension of existing Phase II, and up to \$500,000 matching SBIR funds. Applications are subject to review of the statement of work, the transition plan, and the availability of funding. DMEA will generally provide the additional Phase II Enhancement funds by modifying the Phase II contract”

Source: DMEA SBIR 14.2 PROPOSAL SUBMISSION INSTRUCTIONS, 2014

Though horizontal, SBIR should indeed be considered as part of a broader policy mix (Flanagan et Al., 2011) and even triggered the creation and development of other programmes at both State and Federal. Initiatives complementary to SBIR have indeed been put in place by some American States which SBIR awareness was raised through conferences and intermediaries who channelled relevant information for policy making (see for instance consultants, etc.). A non-exhaustive list of these initiatives is presented below. It is to be noted that the SBIR Program has been amended over time and the possibility for complementary programs to foster the commercialisation of the products and devices developed under its activities evolved. The program is considered as a building block for companies benefitting from other programmes, or as a complementary stone to other programmes such as the NIST Advanced Technology Program (ATP)³¹⁰.

It also to be noticed that SBIR is a programme among other procurement initiatives defined by Federal law on acquisitions. In the US, several procurement mechanisms and set aside modalities exist to rule the access to procurement markets.

³¹⁰ See <http://www.atp.nist.gov/>

Table 13: Non-exhaustive list of publicly led initiatives complementary to SBIR

At the Federal Level	At the State Level
<ul style="list-style-type: none"> ▶ STTR, major initiative which developed in parallel with SBIR ▶ Federal and State Technology Partnership Program – FAST³¹¹ ▶ Phase IIB awards in NSF (see NAS, 2007) and NIH ▶ NIH Commercialization Assistance Program –CAP- (NAS, 2009b) ▶ DoD Commercialization Readiness Program (Sec. 5122 of the National Defense Reauthorization Act of 2012 also reauthorizing SBIR; DoD, 2009) ▶ Army Phase II Plus Awards (NAS, 2008a) ▶ DoD Five Stars Program ▶ NIH Niche Assessment Program –NAP- (NAS, 2009b) ▶ DoE Phase 0 assistance program (Senate Small Business Committee hearing, SR-428A, 2013 and launched in 2014) ▶ DoE Commercialization Assistance Program (CAP) since 1988, Technology Niche Assessment (TNA) since 2005, and the “Phase II awardees additional market identification and networking services” (NAS, 2007 and 2008) ▶ Commercialization Readiness Pilot Programs for civilian agencies (Sec. 5123 of the above reference document) ▶ NSF matching funds (NAS, 2008a) ▶ NIH Regulatory Support Model (NAS, 2008a) ▶ NASA Alliance for Small Business Opportunities - NASBO- (NAS, 2009a) 	<ul style="list-style-type: none"> ▶ Complementary programmes, for instance the Experimental Program to Stimulate Competitive Research (coordination modalities with SBIR set in Sec. 5168 of the last 2011 reauthorization³¹²): “COORDINATION OF THE SBIR PROGRAM AND THE EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH” ▶ Matching programmes at the State Level, such as the following example: http://ctinnovations.com/sbiprogram/grantsupport (Small Business Innovation Research (SBIR) Acceleration and Commercialization Program managed by Connecticut Innovations; royalty-based, this initiative supports SBIR applicants and awardees depending on the SBIR phase and applicants’ needs). ▶ SBIR-like programmes at State level

Source: <http://www.sbir.gov/about/about-sbir> and interviews

1.2.3 Legal form of the set-aside obligation

Right from its beginning, one of the founding features of the SBIR program was a requirement for all federal entities (Departments and Agencies) with extramural R&D expenses exceeding \$100 million to set aside up to 1.25% of these expenses for small businesses.

The first form to be considered for this program is therefore the legal one. Before any other feature, SBIR consists indeed in a law conditioning the use of extramural expenses in Research and Development (R&D) by the American Federal Departments. The SBIR was officially launched through the Small Business Innovation Development Act (SBIDA) of 1982 (P.L.³¹³ 97-219) and reauthorized over the years until now. The original law was extended in 1986 from 1988 to 1993 (Roessner, 1989); the 1992 reauthorisation (including women as a priority [Allen et Al., 2012]) followed, until the subsequent 2000 and 2008 reauthorisations (extending the program till 2009, 2010 and 2011, and leading to a controversial 2012 extension³¹⁴ until September 30, 2017).

The key legal requirement established by this Act and taken up by the related SBA Directives implies that every Department and Agency with an extramural R&D budget exceeding \$100 million should set aside a percentage (initially 0.2% in 1982, then 1.25% in 1987, it increased over time to reach 2.7% in 2014³¹⁵) of those expenses for small businesses. From 1997 to 2011, this percentage was set 2.5%, to be then increased by 0.1% every year from 2011 on. The 2012 SBA directive made clear that the implementing Departments and Agencies may exceed the minimum percentages. Other modalities are defined with legal terms of course: one of the particularities of SBIR is indeed that along with the years, the settings of the programme have been progressively explicated and grounded into law. Such modalities include the types and conditions for support, target group definition, etc.

³¹¹ With an overall budget of \$ 2 000 000 (and usual individual support of \$100 000) for technical assistance and outreach, this competitive programme targets public entities and colleges, universities, centers etc.

³¹² See NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2012

³¹³ Public Law

³¹⁴ Signed by the President on December 31st 2011

³¹⁵ The 2011 Reauthorization aimed at 3.2% of set aside budget by 2017

1.2.4 Direct and indirect support to R&D

The second key feature to be observed is that SBIR provides project holders with direct R&D support. The financial support (in most cases either provided through grants³¹⁶ or in the form of contract³¹⁷ research³¹⁸) is a key component as it supports the feasibility study and the proper R&D (phases 1 and 2) small businesses apply for³¹⁹ SBIR funds can also be delivered in the form of cooperative agreement (Schacht, 2011).

The use of SBIR can therefore be tailored to different uses (function of the Departments and Agencies' ways of functioning) depending on their needs, objectives and operational cultures. An overview of the overall support derived from the set-aside budget is provided below. The presented amounts vary from a Department to another and relate to their overall R&D extramural budget. They correspond to the amounts of extramural R&D expenses set aside for SMEs per Department.

Table 14: SBIR repartition among departments: an overview

DOD	HHS	NASA	DOE	NSF	DHS	USDA	DOC	ED	EPA	DOT	Total
\$1.1 B	\$640 M	\$120 M	\$140 M	\$100 M	\$20 M	\$15 M	\$10 M	\$10 M	\$5 M	\$5 M	\$2,15 B

Note: These are rough numbers for the SBIR budgets for 2009³²⁰

Source: Adapted from SBA

³¹⁶ Defined by the 2000 Directive amending the 1982 Act as "financial assistance mechanism providing money, property, or both to an eligible entity to carry out an approved project or activity"

³¹⁷ Contracting agencies are DOD, DHS, HHS/NIH, NASA, ED, EPA, DOT, DOC; granting agencies are HHS/NIH, NSF, ED, USDA, DOE (source: SBA)

³¹⁸ The 1982 Act allows SBIR projects to be performed under funding agreements that can take the form of a contract, grant, or cooperative agreement (see Comptroller General, 1985); NIH (see Goodnight and Etzler) stated that topics presented by agencies following a contract model (case of DoD, NASA, EPA, HHS/NIH, ED, DOT and DOC) were highly focused while grant topics (from HHS/NIH, NSF, ED, USDA, DOE) were less specified. It is worth noticing that grants are less constraining in terms of commercialization obligation.

³¹⁹ Note with regard to the size of the awards: no award can exceed 50% of the amount established by the 2011 reauthorization Act and related SBIR Directive

³²⁰ In order to give a clearer idea of the evolution of the programme, one should quote the following: "During fiscal years 1983 and 1984 (the most recent for which complete data are available), agencies with SBIR programs issued 26 SBIR solicitations and received about 17,000 total proposals. The agencies awarded a total of 2,097 SBIR funding agreements during the period - 1,685 phase I awards and 412 phase II awards. SBIR awards for the two years totalled about \$156 million - about \$44.5 million in fiscal year 1983 and about \$111.5 million fiscal year 1984." Source: Comptroller General, 1985 – Monitoring Report to the Congress on the first two years of implementation of the SBIR Program

1.2.5 The possible link to public procurement

The SBIR mixed-form of support does not only consist in a mix of direct/indirect support, but also lies in the coupling with an objective of/possibility of public procurement. This has a strong influence on the perception of the programme: SBIR is very often quoted as an example of PPI or PCP instrument. But the part left to procurement in its design and implementation only relates to the ‘possibility for Departments and agencies’ to procure or use (through 4-year royalty-free licences that can be extended) the technologies developed under SBIR. In that regard, SBIR cannot be considered as PPI and rather corresponds to PCP.

Another aspect is the framing role of the challenges or missions of the Departments as to express federal needs in Research, Development and Technology (RDT). On top of this comes a procurement modality which is the possibility for any agency or Department to issue a sole-source (no-bid) contract and avoid the length implied by competitive procurement (the justification is found here in the fact that a competition already took place at the level of Phase I and/or Phase II) when willing to take up a technology, process, product, etc. developed under SBIR.

It is important to observe here that in practice the procurement power will vary from a Department to another, with on one hand side very strong procurers such as DoD and NASA, and on the other hand NSF and NIH which follow different missions (such as seeking ‘fundamental knowledge’) and have a more limited use of procurement for innovative solutions.

The example below highlights the case of DoD SBIR projects and their commercialisation. One can easily observe that a large share of the solution is eventually not procured by DoD but reaches private market (though many technologies are further integrated there by larger companies – for instance aircraft or tank manufacturers – managing larger defence systems in order to feed back into DoD procurement). An equivalent share of procurement by DoD and other Departments can be noticed.

Figure 32: SBIR Phase II projects and their commercialisation – the example of DoD

Source: NAS, 2007a ; Note from the reference document: Reported to DoD in CCR Database by firms submitting proposals to DoD in 2000-2005. Note from the author: the above figure describes Phase III commercialisation of DoD-supported SBIR solutions and shows that in practice, procurement is not an automatism.

1.2.6 Capacity building and awareness raising: technical assistance and communication/support

Another more informal part of SBIR lies into its non-financial components. These mainly cover technical assistance and valorisation of the R&D conducted. Through Phase III Departments offer for instance technical assistance to supported SMEs with specific needs in order for them to reach their market(s).

To a less apparent extent, SBIR also comprises some ‘softer’ forms of instrument, such as communication or valorisation – see for instance the annual SBIR Tibbetts Awards delivered by the SBA³²¹ (using the name of the founding father of the Programme). The so-called “Tibbetts awards” aim at recognizing the value and advertise on the successful businesses supported by SBIR funds, using the success story and practical details about the business and its technology (as well as applications etc.). Tibbetts awards can either be attributed to a business (SBIR project including Phase I and Phase II) and/or to an individual. This initiative is strengthened by a SBIR ‘Hall of Fame’ recognizing “companies with a long period of extraordinary success of research, innovation, and commercialisation within the SBIR program”, reinforcing a long-term view on the programme and what its outcomes should be (source: The Best in SBIR, SBA-2012).

³²¹ See the awardees for 2014 on the SBA website - <https://www.sba.gov/content/high-tech-small-businesses-receive-tibbetts-awards-innovative-and-outstanding-contributions>

On top of these examples come the promotion conferences, road tours and seminars that are organized in order to inform and promote the programme across the country, function that is part of the SBA duties in the context of SBIR coordination and implementation.

1.3 Rules and governance: formal and informal sides of a same coin

1.3.1 The legislative process

The rules and governance of SBIR have been quite formalized over the years. The players involved as well as the legislative path of the programme are quite clear although informal rules apply to the political and administrative routines and even unexpected situations can take place, such as the last and difficult reauthorisation of the programme which will be described in more details in 0. First of all, it is to be noticed that the SBIR is considered to be a “Congress program”. From a decision-making standing point, Congress (both Senate and House of Representatives) is the key institution steering the programme’s life cycle along which stakeholders are consulted and negotiated with. The influence of lobbies (trade associations, etc.) and coalitions heavily impacted SBIR policy making in that respect. The Programme has brought in more stakeholders over the past 15 years due to controversial issues and conflicting interests. The General Accountability Office (GAO) and National Academies of Science also played a quite important role as main reviewers of the programme over the past decades.

At the Congress level, the House and Senate Small Business Committees have jurisdiction over the SBIR Program, but as the programme deals with R&D issues, the House Committee on Science also has his word. These Congressional committees gather Members from each Party which decide upon the terms of their Members. Therefore, party power relationships will frame the decisions or chairing of a Congress Committee. The particularity here is that informally but *de facto* each committee in the SBIR context has specific coalitions and proximities with stakeholders (small business advocates, universities, etc.). Congress is in charge of passing the programmes reauthorisations, and to set up the rules that will be followed by the Departments and Agencies. But the internal political games do not make these decisions easy as the Committees themselves are of different consistencies and present divergent preferences (the House Science and Technology Committee being closer to some Departments and some communities such as the Research community; while the Senate Small Business Committee is closer to the SBC advocates).

From the side of the White House, the Office of Science and Technology Policy (OSTP) is concerned with SBIR. However in practice, the programme is mainly left in the hands of the Congress, with the White House playing mainly a validation role. Also in practice, the position of OSTP vis-à-vis SBIR relates to more informal elements: several interviewees referred for instance to the proximity of OSTP with the University sphere because of its leadership. However, OSTP remains on a downstream level along the decision-making process. However, the position of OSTP vis-à-vis SBIR seems to find its roots in the first years of the programme:

GAO reported in 1985 a conscious limitation of SBIR-related activities in OSTP during the first two years of the programme³²². Another branch of the White House, the Office of Management and Budget, plays the role of financial interface between the Congress and the executive branch involved in the implementation of the SBIR Program.

The SBIR is implemented at the Department level under the coordination of the Small Business Administration (SBA). The SBA elaborates and amends the SBIR directives (not later than 180 days after reauthorisation of the programme³²³, with internally the Office of Investment and Innovation being in charge) according to the rules established by the Congress through Public Law and is the key coordinator / relay with official responsibility for the programme. The directive(s) should establish SBIR-related procedures. SBA should also monitor and review activities should cover the “review of policies, rules, regulations, interpretations, and procedures generated to facilitate intra- and interagency SBIR Program implementation” (2012 Directive). The SBA is also in charge of outreach³²⁴ and collection/publication of data duties, such as the “information on all Phase I and II awards from across all SBIR agencies, as well as Fiscal Year Annual Report data” (source: SBIR 2012 Directive), as well as of communicating information to SBIR managers in view of the improvement of the programme (such as best practices, etc.). SBA also coordinates some of the discussions that take place between the Congress and the Departments, requesting feedback and monitoring negotiations and decisions from the House and Senate. SBA also meets with SBIR managers from the Departments that implement SBIR to exchange on the topic of SBIR and related issues and challenges.

While the overall coordination of the program is managed by the Small Business Administration³²⁵ (SBA)³²⁶, the SBIR is implemented by each of the following Departments which has an obligation to follow the SBIR Directive³²⁷:

³²² See GAO (1986) publicly available on <http://www.gao.gov/products/129288>

³²³ See Sec. 5151 of the 2011 SBIR Reauthorization

³²⁴ Not specific to SBA, NAS (2008a) mentions different forms of outreach implemented by different actors: National SBIR Conferences, agency-specific conferences, Phase III conferences, the SWIFT Bus Tour, web sites and listservs, agency publications and other non-SBIR-focused publications, as well as demographic-focused outreach.

³²⁵ Created by the Congress in 1953 through the Small Business Act of July 30 (1953), the Small Business Administration to support small businesses through different schemes (loans, etc.).

³²⁶ Where SBIR is coordinated by 5 people which major responsibility is to make the link between implementation agencies and Congress legislative expectations

³²⁷ The 2012 SBIR Directive issued by the SBA describes this obligation as follows: “Federal agencies participating in the SBIR Program (SBIR agencies) are obligated to follow the guidance provided by this Policy Directive. Each agency is required to review its rules, policies, and guidance on the SBIR Program to ensure consistency with this Policy Directive and to make any necessary changes in accordance with each agency's normal procedures. This is consistent with the statutory authority provided to SBA concerning the SBIR Program.”

- ▶ Department of Agriculture (DoA)
- ▶ Department of Commerce - National Institute of Standards and Technology (DoC/NIST)
- ▶ Department of Commerce - National Oceanic and Atmospheric Administration (DoC/NOAA)
- ▶ Department of Defense (DoD)
- ▶ Department of Education (DoEd)
- ▶ Department of Energy (DoE)
- ▶ Department of Health and Human Services (HHS)
- ▶ Department of Homeland Security (DHS)
- ▶ Department of Transportation (DoT)
- ▶ Environmental Protection Agency (EPA)
- ▶ National Aeronautics and Space Administration (NASA)
- ▶ National Science Foundation (NSF) (source: <http://www.sbir.gov/about/about-sbir>)

The Small business Development Act launched in 1982 and monitored 2 years later by the Comptroller General stipulated indeed that the Nuclear Program of DoE as well as other agencies involved in intelligence and foreign research were not targeted by the SBIR program³²⁸. Departments have connections with the other instances in charge of designing, adjusting and coordinating SBIR implementation parameters, but less connections across Departments can be observed at the more operational level (for instance between SBIR managers at the institute level of NIH and other Departments' managers). Congressional feedback is provided by SBIR managers and SBA to the Hill during hearings to the Congress. The congressional office of every Department filters these and other forms of feedbacks (written contributions for instance) in order for them to be in line with broader positions of the Department. These positions are then communicated to relevant Committees.

³²⁸ The 2000 Directive initiated by the SBA amended the initial Small Business Act and stated that "for the Agency for International Development, the "extramural budget" must not include amounts obligated solely for general institutional support of international research centers or for grants to foreign countries. For the Department of Energy, the "extramural budget" must not include amounts obligated for atomic energy defense programs solely for weapons activities or for naval reactor programs".

1.3.2 Appropriation of SBIR by Federal Agencies and Departments

Every Department and Agency decides on specific themes to be supported through SBIR and which should correspond to its missions. The definition of these areas is made at different levels depending on the Department/Agency, but usually the key themes are defined at a higher administrative level than SBIR management (areas are strategic). In every Department, SBIR managers have been appointed, who can supervise SBIR officers (see GAO, 1999).

The Departments have different levels of commitment with regards to SBIR as highlighted in Box 13. NAS (2008a) refers to differences in 1) Number and Timing of SBIR solicitations; 2) Broad vs. Focused Topic Areas; 3) Variation in Award Size for Phase I and Phase II; 4) Availability and Type of Phase I to Phase II Gap Funding; 5) Availability of Post Phase II funding and Commercialization Assistance; 6) External vs. Internal Proposal Review Processes; 7) Type of Award-Contract of Grant. Interviews confirmed that one of the influencing factors is of course the funding capacity of the Department (NASA can for instance be a customer comparable to DoE, but not DoD which has higher support and buying capacities). However, the differences are still mainly due to the missions of the Departments as well as to the type of technologies/markets and industries these Departments deal with.

Figure 33: Share of SBIR spending per department – a time perspective

Source: GAO (1999) – reference to the Small Business innovation Development Act Fifth Year Results released by SBA in June 1988

Source: National Academy of Sciences (2009)³²⁹, based on SBA data for 2005. Note: NAS (2007a) reported the following distribution: DoD (51.7%), NIH (29.7%), NASA (5.6%), DoE (4.9%), NSF (4.9%) and others (3.2%)

Although an evolution can be observed, no drastic change in terms of SBIR balance changed the initial balance among Departments over the past 30 years. Among the relevant Agencies and Departments in 2013, NAS (2014) estimated that an average of about 97% of SBIR funds allocated in the SBIR context were concentrated in the Department of Defence (DoD), National Institutes of Health(NIH), the National Aeronautics and Space Administration (NASA), the Department of Energy (DoE), and the National Science Foundation (NSF)³³⁰. This repartition follows similar proportions to the repartition presented above in the second figure from NAS (2009).

One should note that the flexibility of the SBIR Programme allows the Departments and Agencies to play on technical aspects to adapt the program to their own approach. Two interesting examples are the exception for NIH set aside rate (allowed to be kept at 2.5%) as well as the proposed modifications of the transition benchmark (percentage of Phase I to appear in Phase II): “The approved and published transition benchmark rate for DOT is currently 0.45 and DOT uses a five year period for the benchmark calculation. DOT is revising its benchmark rate from 0.45 to 0.25”³³¹.

Also due to their different missions, technology areas, and target groups, each of those Departments has a specific lecture of the program.

³²⁹ Publicly available at <http://www.ncbi.nlm.nih.gov/books/NBK32525/pdf/TOC.pdf>

³³⁰ Source: “An Assessment of the SBIR Program”, National Research Council of the National Academies, 2008

³³¹ Amendment reference can be found in the Notices from the Federal Register /Vol. 78, No. 100 /Thursday, May 23, 2013

A 1999 GAO Report made explicit that the relationship of the Departments involved with SBIR was pre-conditioned by their R&D needs and the dominance of basic research (NSF, HHS) versus applied research (DoD, NASA). As a consequence, the form and content of the implementation of the programme varies from a Department to another. An interesting example in that regards is the comparison between the DoD and NIH³³². Most of the time, the DoD is the direct end-user of the technologies developed under Phase 2 by the SMEs and constitutes a direct demand factor for those technologies (weapons, vehicles, etc. that will be further used by DoD forces). On the other hand, the NIH might support the development of devices but also drugs that will be used in a medical context, but firstly aims at developing fundamental knowledge on life science issues. It is also clear that the private market uptake of related technologies varies a lot. Commercialisation can be hardly considered from the same standing point from a Department to another, and so are the benefits attributed to SBIR³³³ from a Department standing point. Depending on these different parameters, Departments and Agencies also work with contracts, grants or both.

³³² The NIH represents

³³³ GAO (1999) reported that though DoD and NASA considered that the first contribution of the programme was to be understood in terms of its contribution to meeting R&D needs, NSF and HHS presented this contribution as an extension of fundamental research and a better link to the market.

Box 35: Institutional complexity – illustrations of the decentralized management of SBIR

Though the SBA coordinates the overall program implementation, Departments and Agencies are in charge of its practical implementation. The management of SBIR is therefore highly decentralized, with in some Departments and Agencies sub-units in charge of the SBIR that can also delegate to other sub-units.

The Department of Defence (DoD) implements SBIR through its branches which have proper SBIR management forms³³⁴. These official branches are the following: Air Force, Army, Defence Advanced Research Projects Agency, Defence Logistics Agency, Defence Microelectronics Activity, Defence Threat Reduction Agency, Missile Defence Agency, National Geospatial-Intelligence Agency, Navy, Office for Chemical and Biological Defence, Office of the Secretary of Defence, and the Special Operations Command. The Air Force, Army and Navy are the three key DoD components usually considered in first instance when considering DoD; their relative position in terms of SBIR budget increased over time, from 19.5%, 20.6% and 27% respectively for Army, Navy and Air Force in 2002 (NAS, 2004a), to 23.7%, 23% and 28.9% in 2008³³⁵ and 21.72%, 27.22% and 27.14% in 2009 (see figure on the right side of the box – source: GAO, 2010).

Figure 1: DOD SBIR Budget Allocation for Fiscal Year 2009

Source: GAO analysis of DOD information.

Under the Department of Health and Human Services (HHS), a second example is here the National Institutes of Health (NIH) which is the HHS component that covers and implements most of the HHS SBIR budget (81% in 2005³³⁶, around 98% in 2013³³⁷). The various Institutes (see figures below) under NIH also have their proper ways of implementing SBIR (see NIH, 2003).

³³⁴ On the side of DoD, different entities were part of the solicitations from June 2014, including: the Department of the Army (ARMY), Department of the Navy (NAVY), Defense Advanced Research Projects Agency (DARPA), Defense Logistics Agency (DLA), Defense Microelectronics Activity (DMEA), Missile Defense Agency (MDA) (source: U.S. DEPARTMENT OF DEFENSE SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM SOLICITATION FY 14.2, June 2014).

³³⁵ See DoD, 2009; NAS, 2009c

³³⁶ See the 2007 House “Small Business Innovation Research Reauthorization on the 25th Program Anniversary” Hearing and related proceedings

³³⁷ Source: Matthew Portnoy’s contribution to the Hearing at the Senate, Small Business Committee – SR – 428A

By the time of the presentation I refer to and according to the speaker, over \$690 million of SBIR/STTR funding (including \$616 million specific to SBIR, which corresponds to the set aside required for FY 2010³³⁸) were to lead to budget allocations spread over the NIH institutes in the following way:

Source of both figures presented above: “NIH SBIR & STTR Programs - Features and Nuances” presentation from Susan Pucie – SBIR/STTR Program Coordinator – National Heart, Lung, and Blood Institute (no date)

³³⁸ See <http://www.hhs.gov/asl/testify/2011/03/t20110331a.html> and <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-124.html>

The general process of priority area setting appears to be different from a Department to another, though strong similarities are to be observed. In any case, interviewees confirmed that the guiding principle was the pursuit of federal needs. Priority areas or technologies are indeed defined internally in each Department. In NASA for instance, laboratories are in charge of defining which technologies are relevant to space programmes and activities. The SBIR units then implement SBIR in function, adapting the calls for projects and ensuring the completion of SBIR projects. DoE also follows a similar process where topics are internally developed by another segment of the administration. In DoD, the implementation of SBIR is spread over different services; while in other Departments, the decisions to target particular technological fields are taken at a more strategic level, in DoD specific branches such as the NAVY, the Defence Logistics Agency or the DARPA will manage their own SBIR programme including priority setting (in function of their field of activity). Technological orientations therefore come from monitoring activities taking place at a more technical level; in the case of NASA for instance this is steered by programme managers in collaboration with technical experts.

Through hearings in Congress and meetings with staffers, SBIR managers provide Congress with their feedbacks. Programme managers' meet once to twice every month with SBA in order to exchange experiences, provide mutual feedbacks, etc. In addition, webinars are put online every month which are available on SBA website (access restricted to SBIR managers). SBIR managers were given more power over the agency-specific process. As reported by NAS (2008) for instance, managers can decide upon which company will benefit from technical assistance, and can sign-off for the second year of a Phase II award (while before, once the award would be granted, then the payment procedure should go by itself).

2/ Understanding the role of Strategic Intelligence in an SBIR context: cross-temporal learning along the policy process

2.1 Defining Strategic Intelligence in the SBIR context

2.1.1 Forms of and rationales behind Strategic Intelligence (SI) with direct links to SBIR

Strategic Intelligence considered as a procedural instrument is not a homogeneous set of tools and techniques. All intelligence exercises are launched and implemented only in the context of specific policy processes: evaluation of a policy, foresight study feeding in general innovation policy directions, etc.

Therefore Strategic Intelligence can be better viewed through the viewpoint of the areas (sectors, technological, socio-economic areas) or the programme(s) it deals with. Strategic Intelligence (SI) is indeed context-dependent. This is why in the case of SBIR only the Strategic Intelligence in direct relation to the programme is considered (studies and processes on/in the context of the programme or to guide the programme; or studies and processes that had an impact on the programme). In such context, one can notice the dominance of specific forms of Strategic Intelligence which take place in a quite well-elaborated legislative process.

An overview of the most recent legal requirements assimilated to SBIR-related Strategic Intelligence can be found in the 2012 National Defence Reauthorization Act into which SBIR reauthorisation for the same year was integrated (see Box 36 below).

Box 36: Extract from the 2012 National Defence reauthorization act

Subtitle C—Oversight and Evaluation

- Sec. 5131. Streamlining annual evaluation requirements.
- Sec. 5132. Data collection from agencies for SBIR.
- Sec. 5133. Data collection from agencies for STTR.
- Sec. 5134. Public database.
- Sec. 5135. Government database.
- Sec. 5136. Accuracy in funding base calculations.
- Sec. 5137. Continued evaluation by the National Academy of Sciences.
- Sec. 5138. Technology insertion reporting requirements.
- Sec. 5139. Intellectual property protections.
- Sec. 5140. Obtaining consent from SBIR and STTR applicants to release contact information to economic development organizations.
- Sec. 5141. Pilot to allow funding for administrative, oversight, and contract processing costs.
- Sec. 5142. GAO study with respect to venture capital operating company, hedge fund, and private equity firm involvement.
- Sec. 5143. Reducing vulnerability of SBIR and STTR programs to fraud, waste, and abuse.
- Sec. 5144. Simplified paperwork requirements.

Source: National Defence Authorization Act, 2012

Strategic Intelligence in the SBIR case involved political conflicts and disagreements over the programme, which also involved discussions and conflicts over the definition of some of the Strategic Intelligence to be supported by Federal Departments such as for the definition of commercialisation benchmarks. Confrontations over the results/outputs of Strategic Intelligence (specific reports) could also be observed, especially in the context of the last reauthorisation of the programme. The definition applied to Strategic Intelligence here is the one described in Chapter 2, Section 3.5. Therefore, all initiatives set up only for internal administration (such as the Interagency Policy Committee described in 2011 and 2012 SBIR reauthorisation and directive) are not considered as they are set up as information transmission mechanisms internal to the administration and not involving accountability issues with regards to the citizens³³⁹.

³³⁹ Such devices are indeed to be considered more as internal platforms or relays for strategic intelligence. This is the case of the Interagency committee established by SEC. 5124 under the 2011 SBIR Reauthorization and entitled “INTERAGENCY POLICY COMMITTEE”. In order to coordinate STTR and SBIR Programmes among agencies, OSTP was entitled with the duty of creating this committee in order to review key issues and formulate “policy recommendations on ways to improve program effectiveness and efficiency”. The Committee should report to Congress (both House and Senate) on a pre-determined basis (after 1 year, 18 months and 2 years since the enactment of the SBIR Reauthorization).

Box 37: Research on SBIR – academic contributions

Although they are not considered as Strategic Intelligence, a number of academic papers (published in peer-reviewed journals) with a clear focus on SBIR have been produced. It is to be underlined that in the SBIR context, only a few of these publications are known or even quoted in Strategic Intelligence, policy documents or position papers drafted by stakeholder organisations. This could be surprising as some of them go against the dominant perceptions of SBIR (for instance when assessing its success in terms of employment promotion, etc.). However, some of the authors (Lerner, Link, Audretsch, Wessner, etc.) have been involved in Strategic Intelligence exercises such as the NAS evaluation (as committee members, etc.). A non-exhaustive list of these publications has been gathered and is presented below.

1989_Roessner_Evaluating government innovation programs - Lessons from the U.S. experience
1992_Anuskiewicz_SBIR First Decade - Results, Benefits, Problems from a Michigan Perspective
1992_Berger et Al._Commercialization Activities in the SBIR Program - Part 1
1992_Berger et Al._Commercialization Activities in the SBIR Program - Part 2
1995_Colvin_Small Business INnovation, Research, and Development
1999_Gulbrandsen_Convergence Between Europe and America - The Transition from Industrial to Innovation Policy
1999_Lerner_The Government as Venture Capitalist - The Long-Run Impact of the SBIR Program
2001_Audretsch_Standing on the Shoulders of Midgets - The U.S. Small Business Innovation Research Program (SBIR)
2002_Audretsch et Al._Public-private technology partnerships - evaluating SBIR-supported research
2002_Audretsch et Al._Small Business Innovation Research Program
2003_Archibald et Al._Evaluating the NASA small business innovation research program - preliminary evidence of a trade-off between ...
2003_Cooper_Purpose and Performance of the Small Business Innovation Research (SBIR) Program
2005_Marshall_An Overview of Potential Government Impacts on Technology Transfer and Commercialization
2008_Link and Scott_Government as entrepreneur-Evaluating the commercialization success of SBIR projects
2009_Link et Al._Bringing science to market - commercializaing from NIH SBIR awards
2009_Wessner_The Innovation Imperative and the Role of SBIR Innovation Awards
2010_Bearse et Al._Economic implications of raising the threshold funding limits on US Small Business Innovation Research awards
2010_Link et Al._Government as entrepreneur - Evaluating the commercialization success of SBIR projects
2011_Link et Al._Employment growth from public support of innovation in small firms
2011_Salles-Filho et Al._Evaluation of ST&I programs - a methodological approach to the Brazilian Small Business Program and some ...
2012_Allen et Al._Public gains from entrepreneurial research - Inferences about the economic value of public support of the Small Busi...
2012_Audretsch et Al._Universities as research partners in publicly supported entrepreneurial firms
2012_Cosh et Al._Never mind the quality feel the width - University-industry links and government financial support for innovation in s...
2012_Link et Al._Employment growth from the Small Business Innovation Research program
2012_Link et Al._Government as Entrepreneur - Public Sector Support of Innovative Firms in the United States
2012_Siegel et Al._Universities and the success of entrepreneurial ventures - evidence from the small business innovation research prog...
2013_Link et Al._Public R&D subsidies, outside private support, and employment growth

Source: The author, 2014

In order to delineate SBIR-related Strategic Intelligence, the initial repository of studies and papers but also possible Strategic Intelligence processes (round tables, etc.) was completed along the field inquiry during which every interviewee was asked to point at relevant Strategic Intelligence sources that influenced, did not influence or might had an influence on their perceptions. Main types of Strategic Intelligence were found and used as a basis for this case study and this dissertation as a whole.

Some of them played a crucial role in the process of passing, adjusting, re-designing or (for some political representatives and supporting stakeholders) trying to terminate the programme. The most crucial source of influence classified as Strategic Intelligence was the evaluation(s) of SBIR conducted by the NAS. Since 2011, every 4 years the NAS (on behalf of the NRC) should submit to the head of the agreeing agency and the relevant Congress committees with a report regarding the evaluative study conducted. After kicking-off the process in 2001, the 5 key SBIR agencies agreed in 2004 on a common memorandum of understanding with NRC highlighting the importance for the latter to do the evaluation in an independent way.

Box 38: SEC. 5137 – continued evaluation by the National Academy of Sciences

After the amendment brought to Section 108 of the Small Business Reauthorization Act of 2000 (15 U.S.C. 638 note) by the 2012 National Defence Reauthorization Act, the conditions for the evaluation of SBIR by the NAS were updated. It was decided that not later than 6 months after the reauthorization of the programme, the head of each agency “in consultation with the Small Business Administration, shall cooperatively enter into an agreement with the National Academy of Sciences for the National Research Council to, not later than 4 years after the date of enactment of the SBIR/STTR Reauthorization Act of 2011, and every 4 years thereafter”. The evaluation should lead to recommendations based on estimates that describe “to the extent practicable” jobs creation per agency for SBIR. The process under the supervision of the NAS should be participative and engage the “small business community, the Administration, and other interested parties”.

Source: 2012 National Defence Reauthorization Act

Reporting and monitoring metrics. All agencies should report to the SBA annually on the status of their SBIR program and produce individual annual reports on their activities and their impacts (see for instance DoD, 2007 and 2009³⁴⁰; NIH, 2007 and 2009; NASA, 2011). Annual reports should for instance be sent by the Departments and agencies to the Senate Committee on Small Business and Entrepreneurship, House Committee on Small Business, and the House Committee on Science, Space, and Technology.

The political nature of Strategic Intelligence (for instance in the case of the commercialisation benchmarks and similar metrics) clearly lied in the willingness of the Congress to put pressure on the executive branches to implement SBIR according to legislative directions³⁴¹. Monitoring modalities were defined by Congressional law, but other indicators can be used by the Departments to better monitor their awardees in connection with other Departmental objectives.

³⁴⁰ The 2009 study of DoD mentioned here relates to the SBIR Commercialization Pilot Programme review

³⁴¹ For instance with regard to the ‘mills issue’ (see Section 2.3.2)

The indicators and monitoring modalities have been reinforced with the last reauthorisation which led to the definition of new metrics and associated goals as listed by the following extract from the 2012 SBIR Directive:

Figure 34: Extract from the 2012 directive – SBIR databases

(1) The Act requires that SBA coordinate the implementation of electronic databases at the SBIR agencies, including the technical ability of the agencies to share the data. In addition, the Act requires the reporting of various data elements, which are clustered together in the following subsections:

- (i) Solicitations Database (to include the Master Schedule);
- (ii) Tech-Net, which includes the following databases:
 - (A) Company Registry Database;
 - (B) Application Information Database;
 - (C) Award Information Database;
 - (D) Commercialization Database;
 - (E) Annual Report Database; and
 - (F) Other Reporting Requirements Database.

Source: 2012 SBIR Directive

The Directive also explains that the performance criteria should be put in perspective with the goals of every agency and that every agency should report on their progress in terms of performance in their annual reports (to be released by the end of every Fiscal Year).

Comprehensive evaluation(s). Evaluating the SBIR Program is a legal requirement³⁴² and the evaluations of the programme have been the most influential Strategic Intelligence of the past 15 years. According to Congressional law, the value of the programme should be shown in multiple and different ways. Officially the comprehensive evaluation of the programme is to be conducted by the National Academies of Science (NAS)³⁴³ as defined by the Congress under Public Law.

³⁴² “In the 1992 program reauthorization, Congress required the U.S. the General Accounting Office to review the SBIR program to ensure that federal agencies were meeting the statutory requirements for program implementation and to measure the impact the program has had on the agencies and on participating firms (Public Law 102-564). The FY 2000 reauthorization also required an independent assessment of the program, and directed the National Academies of Science through its National Research Council to conduct the study” (RAND, 2006)

³⁴³ Though the NAS is in charge of formulating scientific roadmapping to deliver orientations for some programmes such as in the space area, the entity in charge of the SBIR evaluations is separate and no influence of one on the other could be identified, thanks to the size of the National Research Council (NRC) and its Academies.

In parallel with a consultation with the small business community, SBA and the agencies were together with the Interagency Policy Committee in charge of determining the parameters of the first evaluation and its form over the subsequent years. These parameters consisted in the focus areas as well as the priorities of the evaluation³⁴⁴. In the context of the implementation of the evaluation process by the National Academies of Science, a Board on Science, Technology and Economic Policy (STEP) was established by the National Research Council. This Committee brought and still brings together outstanding personalities from prestigious academic and private sector organisations (Harvard, Xerox, etc.), part of them being also in the steering committee of the SBIR-relevant assessments performed at least since 1999 by the NAS and supported by relevant staff (headed by C. Wessner since at least the initial 1999 paper). Several evaluations were produced at the level of the main SBIR-users (main Departments such as NASA, NIH, DoD, DoE) and at the programme level (SBIR evaluation).

Since their announcement these NAS evaluations were called to be more comprehensive and provide analytical insights on the programme and its results. The 2000 Reauthorization Act (P.L.106-554), amended section 9 of the initial Act and added a requirement for “agencies with an SBIR budget of over \$50,000,000 for fiscal year 1999 to enter into an agreement with the National Academy of Sciences for the National Research Council to conduct a review of each agency’s SBIR Program”. This clause was confirmed and further detailed in the 2011 Reauthorization Act under the sec. 5137. Entitled “Continued evaluation by the National Academy of Sciences”. The overall NAS evaluation was therefore “ordered” by the Congress but funded by the Executive Branch (Departments). With a first opening meeting in 2001/2002 (see NAS, 2004a), the 5 main SBIR agencies kicked-off the overall process, reaching in 2004 a memorandum of understanding with NRC. With a foreseen operational duration of 36 months (from contracting to final symposium), the 2-phase³⁴⁵ evaluation eventually lasted about 5 years (with an official cost of about \$5 million³⁴⁶). The “first round” of NAS evaluations of the SBIR programme consist in 11 reports listed by NAS (2014) as follows:

³⁴⁴ Source: 2014 SBA Notice of amendments to final policy directive, Federal Register / Vol. 79, No. 5 / Wednesday, January 8, 2014 / Rules and Regulations

³⁴⁵ “Development and review tools and metrics” -16 months- and “research refine, review, and report” -20 months- (NAS, 2004)

³⁴⁶ See Glover, 2009 House Hearing on “The Role of The SBIR and STTR Programs in Stimulating Innovation at Small High-Tech Businesses”

1. An Assessment of the Small Business Innovation Research Program: Project Methodology (2004)
2. SBIR—Program Diversity and Assessment Challenges: Report of a Symposium (2004)
3. SBIR and the Phase III Challenge of Commercialization: Report of a Symposium (2007)
4. An Assessment of the SBIR Program at the National Science Foundation (2007)
5. An Assessment of the SBIR Program at the Department of Defense (2009)
6. An Assessment of the SBIR Program at the Department of Energy (2008)
7. An Assessment of the SBIR Program (2008)
8. An Assessment of the SBIR Program at the National Aeronautics and Space Administration (2009)
9. An Assessment of the SBIR Program at the National Institutes of Health (2009)
10. Venture Funding and the NIH SBIR Program (2009)
11. Revisiting the Department of Defence SBIR Fast Track Initiative (2009)

Note: A second round of evaluation following a similar model (Department-based evaluations) has been launched which already led to the publication of the follow-up on the DoD SBIR evaluation (NAS, 2014).

The 2008 evaluations focused on two overarching questions: to what extent did the programme reach its four guiding objectives, and how could SBIR management at the agency level be improved and be made more effective, as well as whether and how could best practices transferred from an agency to another (see NAS, 2008). Making use of surveys, database analyses, interviews and case studies, the NAS evaluation focused on the key agencies representing 96% of the overall SBIR budget (DoD, NIH, NASA, DoE, NSF). In practice, the key effectiveness criteria was commercialisation success. A similar model was followed by the latest evaluation of DoD SBIR in 2014.

Most of the evaluations under the scope made use of the same types of tools (literature review, case studies, surveys, one or more expert panels, agency consultations, database analyses); to some extent, some of them use more developed algorithm or quantitative-oriented approaches (with the introduction of comparison/counterfactual analysis in the latest 2014 evaluation). The latest version of the SBIR NAS evaluation also made use of workshops that made the evaluation process more participative (see NAS, 2014).

Box 39: From intelligence to intelligence – evaluation introducing itself on the agenda

The following extract illustrates how intelligence breeds intelligence. It shows indeed the introduction of the NAS evaluation into the SBIR agenda through Policy Learning as the result of previous exercises and studies (incl. upon request of DoD) in a non-congressional context.

“The current assessment of the SBIR program follows directly from an earlier analysis of public-private partnerships by the National Research Council’s Board on Science, Technology, and Economic Policy (STEP). Gordon Moore, Chairman Emeritus of Intel, guided STEP’s eleven volume study of public-private partnerships. This study reviewed the drivers of cooperation among industry, universities and government; operational assessments of current programs; emerging needs at the intersection of biotechnology and information technology; the current experience of foreign government partnerships and opportunities for international cooperation; and the changing roles of government laboratories, universities, and other research organizations in the national innovation system. This analysis of public-private partnerships included two published studies of the SBIR program. Drawing from expert knowledge at a 1998 workshop held at the National Academy of Sciences, the first report, SBIR: Challenges and Opportunities, examined the origins of the program and identified some operational challenges critical to the program’s future effectiveness. The report also highlighted the relative paucity of research on this program. Following this initial report, the Department of Defence asked the NRC to assess the Department’s Fast Track Initiative in comparison with the operation of its regular SBIR program. The resulting report, SBIR: An Assessment of the Department of Defence Fast Track Initiative, found that DoD’s Fast Track Initiative was achieving its objectives and recommended that the program be continued and expanded where appropriate. The report also recommended that the SBIR program overall would benefit from further research and analysis. These two NRC reports highlighted the need for an analysis of SBIR—a program that had grown over its 20 year history to be the largest U.S. program for innovation awards. As a part of the 2000 reauthorization of the SBIR program, Congress called for a review of the SBIR programs of the agencies that account collectively for 96 percent of program funding. The five agencies meeting this criterion, by size of program, are the Department of Defence, the National Institutes of Health, the National Aeronautics and Space Administration, the Department of Energy, and the National Science Foundation. HR 5667 directs the NRC to evaluate the quality of SBIR research and evaluate the SBIR program’s value to the mission of the agencies that administer it. It calls for an assessment of the extent to which SBIR projects achieve some measure of commercialization, as well as an evaluation of the program’s overall economic and non-economic benefits. It also calls for additional analysis as required to support specific recommendations on areas such as measuring outcomes for agency strategy and performance, increasing federal procurement of technologies produced by small business, and overall improvements to the SBIR program”.

Source: NAS (2004a), “SBIR Program Diversity and Assessment Challenges – Report of a Symposium”

Forward-looking assessments and internal intelligence. Beyond the external evaluations of the programme, internal methods were developed (for instance in NASA) to evaluate SBIR and its outcomes, although these exercises are mainly conducted in order to assess which technologies to aim for at the Department level. This corresponds to some extent to an evaluation of technological choices which makes use of relevance and risk factors. Both company and internal data are collected through a survey process in order to assess the relationship between company data and SBIR funding. The process of collecting and analysing internal data has however mainly been used in the design of thematic priorities at the Department level rather than to influence SBIR directly.

Normative evaluations (control and regulatory assessments). GAO has reported quite extensively and through its conclusions and recommendations pressured the SBA and SBIR agencies and departments to implement and make available the relevant metrics and databases (see for instance GAO, 2006, 2006a, 2010, 2011 and 2013³⁴⁷). These databases were pretty much oriented in both design and practice towards the commercialisation objective of the programme as well as towards key monitoring issues (VC-backed firms participation to the programme for instance) as illustrated by an example from GAO (2006) which found out that “two of the eight agencies we reviewed had not consistently provided SBA data on the gender and socio-economic status of SBIR award recipients”. Unlike the NAS evaluations which are punctual (though regular) exercises and shaped around the four main objectives of the programme, GAO studies and reports follow an independent logic of control based on very specific aspects of administrative management of policy (to what extent are Departments following up on Congressional decisions for instance, respect specific aspects of the legislation, etc.). Given their nature, GAO evaluations and analyses are particularly followed.

The Act and subsequent reauthorisations of the programme determined the duties of the GAO and Comptroller General. In content these exercises of normative assessment remain a power tool for Congress to better control and frame the Programme and especially the actions/inactions from Departments and Agencies. Technical and grounded into the legal requirements or objectives of the programme, trying to flag/warn and keep things on track.

Socio-economic studies. Other influential studies do not focus on SBIR but are used as a forum to elaborate on SBIR; however, these studies are very limited in number, as more recent such as the 2008 and 2011 papers called “Where Do Innovations Come From? Transformations in the U.S. National Innovation System, 1970-2006” (by Fred Block and Matthew R. Keller). In the very few specific studies which analyse SBIR in a more comprehensive way, several functions can be observed:

³⁴⁷ Source (completed by the author) : presentation of the results by GAO during the 2013 Senate Hearing entitled “SBIR-STTR Measuring the Effectiveness of the Reauthorization Act and Maximizing Research Dollars to America's Small Businesses”.

- ▶ The few Congressional Research Services papers (see 2008 and 2012 for instance, as well as Schacht [2011]) that are available provide a status (state of play) on one or more specific issue(s).
- ▶ Defence-related studies make a clear attempt to focus on the outcomes and the link made between the programme and its achievements with regards to the Department's mission such as in the case of the NAVY SBIR review paying specific attention to technological transition (see NAVY, 2009). They also emphasize complementary (pilot) programmes aiming at fostering the commercialisation success of SBIR awardees. Such examples can be listed, such as the 2006 study by the RAND Corporation or the 2014 study from the NAS. This is also the case for non-official surveys (such as the anonymous survey of SBIR Phase II conducted by DoD to identify best transition practices).

These studies, such as the 2009 NAS study on DoD Fast Track Initiative, can coincide with other exercises (in this specific case for instance the overall SBIR evaluation including the DoD SBIR assessment – see NAS, 2009). References are also made to relevant studies and testimonies (see for instance NAS, 2009d; testimonies gathered during Senate hearings are used as qualitative inputs to the study).

Conferences. Conferences and road tours are regularly organized across the country to promote the programme. They are however also used by experts to gather views on SBIR as described by a two interviewees).

Privately initiated Strategic Intelligence. Reports and position papers produced by the stakeholders (business federations, associations, etc.) are to be considered with care. In the context of SBIR, the papers produced by the stakeholders were mainly position papers and only relied on evidence to a certain extent. Also, their uptake was more limited due to reduced credibility. This was indeed the case for several organisations (National Venture Capital Association, BIO, etc.) to the extent that the defended arguments used in these papers were clearly going in the sense of the interest of each organisation and its members.

2.1.2 Socio-technical components of SBIR-related Strategic Intelligence in practice

These various forms of Strategic Intelligence imply the use of different techniques corresponding to specific metrics, indicators and descriptors (qualitative indicators) that in the case of the NAS evaluations correspond to evaluation criteria and questions.

Repository. The repository considered for this case study covered the following Strategic Intelligence sources. These are a mix of reports of different natures (translating also different types of processes) but also hearings held at the Congress (see Table 15).

Table 15: Repository of Strategic Intelligence considered in the SBIR case study

Structure of the list			
Type of item	Date_	_Author_	_Title
P31	1985	Comptroller General, Report to the Congress of the United States - Implementing the Small Business Innovation Development Act - The First 2 Years.	pdf
P32	1999	GAO, Assessment of Small Business Innovation Research Programs.	pdf
P33	1999	NAS, The Small Business Innovation Research Program - Challenges and Opportunities.	pdf
P34	2000	NAS, The Small Business Innovation Research Program - An Assessment of the Department of Defense Fast Track Initiative.	pdf
P35	2003	NIH, National Survey to Evaluate the NIH SBIR Program.	pdf
P36	2004	NAS, An assessment of the small business innovation research program project methodology.	pdf
P37	2004	NAS, SBIR Program Diversity and Assessment Challenges - Report of a Symposium.	pdf
P38	2005	HHS, Report from the National Institutes of Health on the Implementation of Executive Order 13329 - Encouraging Innovation in Manufacturing.	pdf
P40	2005	NAS, Partnering Against Terrorism - Summary of a Workshop.	pdf
P41	2006	GAO, Small Business Innovation Research - Agencies Need to Strengthen Efforts to Improve the Completeness, Consistency, and Accuracy of Awards Data.	pdf
P42	2006	GAO, SMALL BUSINESS INNOVATION RESEARCH - Information on Awards made by NIH and DoD in Fiscal Years 2001 through 2004.	pdf
P43	2007	DoD, Annual Report Submission on Executive Order 13329 - Encouraging Innovation in Manufacturing.	pdf
P44	2007	House, Small Business Innovation Research Reauthorization on the 25th Program Anniversary - Hearing.	pdf
P45	2007	NAS, An Assessment of the SBIR Program at the National Science Foundation.	pdf
P46	2007	NAS, SBIR and the Phase III Challenge of Commercialization - Report of a Symposium.	pdf
P47	2007	NIH, Report on the 2007 Outcome Measures Update - NIH SBIR Performance Outcomes Data System (PODS).	pdf
P48	2007	OECD, OECD Framework for evaluating SME support.	pdf
P49	2008	CRS, The Small Business Innovation Research Program - Reauthorization Efforts - Wikileaks release.	pdf
P50	2008	House, Hearing of Mr Bean on SBIR - America's National Technology Development Incubator.	mp3
P51	2008	House, Hearing Q&A by Ms. Velasquez.	mp3
P52	2008	NAS, An Assessment of Small Business Innovation Research Program at the Department of Energy.	pdf
P53	2008	NAS, An Assessment of the SBIR Program.	pdf
P54	2008	NAVY, A Report on the NAVY SBIR Program - Best Practices, Roadblocks and Recommendations for Technology Transition.	pdf
P55	2009	DoD, Report on Department of Defense Small Business Innovation Research Program Commercialization Pilot Program.	pdf
P56	2009	House, The Role of The SBIR and STTR Programs in Stimulating Innovation at Small High-Tech Businesses.	pdf
P57	2009	NAS, An Assessment of the Small Business Innovation Research Program at the Department of Defense.	pdf
P58	2009	NAS, An Assessment of the Small Business Innovation Research Program at the National Aeronautics and Space Administration.	pdf
P59	2009	NAS, An Assessment of the Small Business Innovation Research Program at the National Institutes of Health.	pdf
P60	2009	NAS, Revisiting the Department of Defense SBIR Fast Track Initiative.	pdf
P61	2009	NAS, Venture Funding and the NIH SBIR Program.	pdf
P62	2009	NIH, National Survey to Evaluate the NIH SBIR Program.	pdf
P63	2009	UN Commission for Europe, Policy Options and Instruments for Financing Innovation - A Practical Guide to Early-Stage Financing.	pdf
P64	2010	GAO, Space Acquisitions - Challenges in Commercializing Technologies Developed under the Small Business Innovation Research Program.	pdf
P65	2010	OECD, Public Procurement programmes for small firms - SBIR-type programmes.	pdf
P66	2010	OECD, United States.	pdf
P67	2011	CRS, Small Business Innovation Research (SBIR) Program.	pdf
P68	2011	GAO, Small Business Innovation Research - SBA Should Work with Agencies to Improve the Data Available for Program Evaluation.	pdf
P69	2011	GlobalForumForHealthResearch, New investment strategy - innovative developing country research awards.	pdf
P70	2011	NASA, Review of NASA's Management of Its Small Business Innovation Research Program.	pdf
P71	2011	OECD, Business Innovat Policies.	pdf
P72	2011	OECD, Demand-side policies to support innovation.	pdf
P73	2011	OECD, Demand Side Innovation Policies and Instruments.	pdf
P74	2011	OECD, Demand Side Innovation Policies.	pdf
P75	2011	OECD, Evaluating demand-side innovation policies.	pdf
P76	2011	Senate, Haring of Dr Mattgew Silver Cambrian Innovation on SBIR Reauthorization - introduction.	mp3
P77	2011	Senate, Hearing of Dr Charles Wessner NAS on SBIR Reauthorization - piece on proposal mills.	mp3
P78	2011	Senate, Hearing of Dr Charles Wessner NAS on SBIR Reauthorization - piece on university objections.	mp3
P79	2011	Senate, Hearing of Dr Charles Wessner NAS on SBIR Reauthorization.	mp3
P80	2012	CRS, Small Business Innovation Research (SBIR) Program.	pdf
P81	2012	OECD, Strengthening innovation in USA.	pdf
P82	2013	Senate, Hearing- SBIR-STTR Measuring the Effectiveness of the Reauthorization Act and Maximizing Research Dollars to America's Small Businesses.	mov
P203	2006	RAND, Evaluation and Recommendations for Improvement of the Department of Defense Small Business Innovation Research Program.	pdf
P204	2009	Wessner and Gaster, The Myth of the "Mills" - SBIR and multiple award winners.	pdf

Source: The author, 2014

Techniques applied in Strategic Intelligence. A multiplicity of methods and tools have been applied to SBIR Strategic Intelligence. NAS and GAO evaluations and studies were dominant, though some of the reports were transcripts of round tables and brainstorming sessions bringing altogether thematic experts.

Time here has been presented by several interviewees as a constraint: the nature of innovations themselves makes it difficult to trace second and third-degree impacts (which can be, by nature, more diffuse and harder to catch through usual indicators). Methods observed in practices were mainly desk research, surveys, interviews, workshops, agency consultation, database analyses, and case studies. These methodological building blocks were found in most of the studies as they are considered as the most usual and widely accepted techniques of field enquiry.

GAO and NAS reports. The GAO studies are very much implementation-oriented, making use of interviews with SBIR officials (managers and SBIR project officers for instance) as well as organizing surveys and using data with an input/output-oriented perspective. This is visible since the first assessment in the 1980s and the follow-up studies in the 1990s and later on in the 2000s. However, it is clear that the more comprehensive and analytical aspects (commercialisation, quality of research, impacts) were clearly shifted to the NAS with the 2000 reauthorisation. The 1999 study for instance was mainly based on the perception of SBIR managers and officers of the programme, as well as surveys among companies which received SBIR awards. The questionnaires were in line with the key objectives of the programme and quite oriented towards receiving performance responses or Likert-scale-based perceptions of the programme and its effects. The NASA review of its SBIR management (see NASA, 2011) also illustrates the very operational and control-oriented nature of audits and control studies conducted with the SBIR Program at their core.

On the other hand, the NAS evaluations were designed to be “comprehensive” and bring a value judgment over the programme on the basis of selected questions that related to the achievements of SBIR as compared to its objectives. All usual aspects were considered by the NAS evaluations conducted up to 2008 (though the 2014 DoD SBIR Evaluation shows similar characteristics): efficiency, effectiveness, relevance... were all assessed through the use of quantitative and qualitative investigation techniques. Especially descriptive quantitative analyses and the case studies had a central position in the study process which led to conclusions and recommendations to improve the programme and push it towards further extension. Indicators used in the NAS evaluations cover sales, additional non-SBIR research funding and contrasts, licensing revenues, third-party investment and additional SBIR awards for related work (NAS, 2008) but also science and engineering indicators released by the NSF. Other specific indicators were shaped to respond to specific needs (for instance the percentage of awardees new to SBIR, etc.) sometimes related to controversial issues in SBIR design and implementation modalities.

Information types and sources are therefore multiple. Reporting modalities became more and more detailed, especially with the new initiatives that were launched with the 2012 reauthorisation and implying the setting up of multiple thematic databases³⁴⁸ (which are extensively described in the 2014 Directive). The development of relevant databases became inherent to the implementation of the programme. Relevant data is gathered and taken up by the agencies and administration in charge of SBIR as to keep track of the programme implementation and performance, but also in order to be useful inventories for the industry (see for instance the 2008 DoD Manual for SBIR defence contractors). At the level of applicants for instance data is collected on different aspects: applicants and awardees are required to provide data to feed in a broader SBIR Databases, some of this information focusing on commercialisation (in order to feed in the commercialisation benchmarks to be applied). Also control exercises are in place in order for relevant Departments and Agencies to report to the SBA and Congress (as required by the SBIR Directives such as the one from 2000). In terms of monitoring at the program level, one can quote the fact that the SBA and OSTP were initially provided with a monitoring duty, or that SBA is in charge of monitoring the SBIR programs implemented by the Agencies and Departments. Also the GAO and mainly Comptroller General of the U.S. implement audits and control exercises of SBIR. Additional sources of information were mobilized during specific studies such as the NAS evaluations, calling upon interviews, case studies, surveys, and other tools implying inputs from entrepreneurs, researchers, experts, programme managers, etc.

SBIR monitoring and related metrics. The development of new metrics has long been recommended by GAO and other reports. The 2012 SBIR Directive prescribes conditions: “The metrics must be science-based and statistically driven, reflect the mission of the agency, and include factors relating to the economic impact of the programs. The report must describe in detail the agency's annual evaluation of the programs using these metrics. The final report must be posted online so it can be made available to the public” (Source: 2012 SBIR Directive). The metrics should since the last reauthorisation support the work of the Interagency Policy Committee in order for it to formulate relevant recommendations on SBIR efficiency and effectiveness³⁴⁹. These metrics and in particular the associated benchmarks (calculated and monitored by the SBA) also rule the access of SBIR awardees to any new Phase 1 and consequent Phase 2 awards for a year.

³⁴⁸ “(iii) SBA will establish performance criteria each fiscal year by which use of these funds will be evaluated for that fiscal year. The performance criteria will be metrics that measure the performance areas required by statute against the goals set by the agencies in their work plans. The performance criteria will be based upon the work plans submitted by each agency for a given fiscal year and will be agency-specific. SBA will work with the SBIR agencies in creating a simplified template for agencies to use when making their work plans.” (source: 2012 SBIR Directive)

³⁴⁹ A particular way to transmit relevant quantitative and qualitative report from the agencies to the committee are the yearly annual reports produced by the agencies.

All small businesses that do not match the relevant benchmarks are indeed not allowed to submit new applications to the same agency during that period³⁵⁰.

One of the interviewee explains that “The SBA and agencies did not do a great job in terms of evaluating the outcomes of the SBIR awards”. Metrics should then be used to monitor the programme closer and better evaluate its effectiveness and efficiency.

Box 40: Measuring SBIR commercialisation success at the agency level

The 2014 SBIR Directive lists for instance two blocks of commercialisation information to be gathered by the SBA and/or Departments at different levels in order to feed in the commercialisation Database³⁵¹:

1. Firm Level Commercialisation – Company Name, Agency Tracking Number, SBA Firm ID, IPO, IPO Value, Merger/acquired, Spinoff, Narrative, Comm Contact First Name/Middle Name/Last Name/Title/Phone/Email, Sales Amount, Patent Numbers, Number of Patents, Investment Types, and Sales Type
2. Award Level Commercialisation – Product Launched, Names of Company Established for Product/Commercialisation, Sales Amount, Investment Amount, Investment Types, Sales Type, Phase III Value/Launched Implemented/Narrative

The Directive also refers to indicators such as revenue generated and additional investments. These data should support the commercialisation benchmark defined according to the 2012 SBIR Directive in terms of three dimensions:

³⁵⁰ In line with Congressional lines, the 2012 SBIR Directive issued by the SBA states that “For Phase I eligibility purposes, agencies will establish a threshold for the application of these benchmarks where they are applied only to Phase I applicants that have received more than 20 Phase I awards over the prior 5, 10, or 15 fiscal years (excluding the most recently completed fiscal year) or has received more than 15 Phase II awards over that period (excluding the most recently completed two fiscal years). Agencies must base these benchmarks on the SBC’s SBIR awards across all SBIR agencies (...) The Commercialization Rate benchmark sets the minimum Phase III commercialization results a Phase I applicant must have realized from its prior Phase II awards”

³⁵¹ The 2012 SBIR Directive states that “Agencies must require each Phase II awardee to update the appropriate information on the award in the Commercialization Database upon completion of the last deliverable under the funding agreement. In addition, the awardee is requested to voluntarily update the appropriate information on that award in the database annually thereafter for a minimum period of 5 years.”

“(A) in financial terms, such as by using the ratio of the dollar value of revenues and additional investment resulting from prior Phase II awards relative to the dollar value of the Phase II awards received over the prior 5, 10 or 15 fiscal years, excluding the most recently completed two fiscal years; or (B) in terms of the share of Phase II awards that have resulted in the introduction of a product to the market relative to the number of Phase II awards received over the prior 5, 10, or 15 fiscal years, excluding the most recently completed two fiscal years; or (C) by other means such as using a commercialization scoring system that rates awardees on their past commercialization success”.

Source: 2012 SBIR Directive

With regards to the broader issue of metrics and associated benchmarks, the 2012 SBIR Directive from SBA stipulates that “(f) SBA establishes databases to collect and maintain, in a common format, information that is necessary to assist SBCs and assess the SBIR Program”. It also adds that every agency should establish “benchmarks for progress towards commercialization”.

Other indicators and benchmarks have been put in place, such as the transition benchmark which the 2012 Directive describes as follows: “the Phase I-Phase II Transition Rate benchmark sets the minimum required number of Phase II awards the applicant must have received for a given number of Phase I awards during a specified period”³⁵². The transition benchmarks as described by a notice from the Federal Register (Vol. 78, No. 100 / Thursday, May 23, 2013) apply as follows³⁵³:

³⁵² The Directive adds that “The benchmark will establish the number of Phase II awards a small business concern must have received for a given number of Phase I awards over the prior 5, 10 or 15 fiscal years, excluding the most recently completed fiscal year. For example, if a SBC submits its application on January 2012, the agency may require that the SBC have received at least one Phase II award for every 10 Phase I awards it received during fiscal years 2001 through 2010”

³⁵³ Transition benchmark rates over 5 years and from Phase I to Phase II and relating to “the minimum required number of Phase II awards the applicant must have received relative to a given number of Phase I awards”; these benchmarks were turned into Program solicitations by the agencies and Departments (see for instance the 2014 solicitation from DoD)

Table 16: SBIR benchmarks applied to the Departments

Agency	Benchmark rate (Phase II/ Phase I)	Length of period (years)
USDA	0.25	5
DOC (NIST)	0.25	5
DOC (NOAA)	0.25	5
NASA	0.25	5
DHS	0.25	5
DOE	0.25	5
EPA	0.25	5
DoD	0.25	5
NSF	0.25	5
DOT	0.25	5
ED	0.25	5

Source: Federal Register (Vol. 78, No. 100 / Thursday, May 23, 2013)

The importance of these metrics is capital to understand how Strategic Intelligence influences SBIR. It was agreed by many interviewees but also stated in the academic literature that SBIR was evolving towards a more commercialisation-oriented focus. The metrics were installed to better frame and strengthen this orientation, providing Congress with information to act closer to the programme by pressuring Departments for better performance indicators (sales, time-to-market, etc.). An interviewee explains that the NAS evaluations led to the definition of the effectiveness benchmarks pushed by the Congress following the idea that the “*mark of success is commercialisation*” (source: one of the interviewees).

Outputs of Strategic Intelligence and their use. Strategic Intelligence should lead to different ranges of outputs. Though metrics and monitoring lead to indicators to be further monitored by operational actors and taken up by broader studies, the evaluations from the NAS were designed to provide analytical information and recommendations regarding the programme, its success and its future. These outputs were mainly reports/papers and tacit knowledge, leading to different types of use. Direct uses of S.I resulted for instance in:

- ▶ Letters, testimonies and other similar codified material
- ▶ Arguments to be taken up in discussions – in Congress Committees for instance
- ▶ Strengthening positions already taken by political representatives, officials or stakeholders
- ▶ Diffusion through conferences

In terms of utilisation, Strategic Intelligence and especially evaluation was used to:

- ▶ Better identify the particular role of SBIR (for instance with regards to the Valley of Death)
- ▶ Establish better combinations or complementary measures
- ▶ Identification/delineation of SBIR contours – to which Strategic Intelligence contributed to an important extent
- ▶ Assessment of the potential needs for complementary actions or links with existing policy making (less the latter)
- ▶ Recommendations (mainly rooted in stakeholders' discourse) and identification of best practices to include SBIR in the broader policy setting (policy making would not be appropriate as innovation policy is fragmented in the US, not under one particular umbrella).

2.2 Strategic Intelligence and the SBIR Policy Process over time: more than 30 years of interaction

2.2.1 Setting up the stage: back to the 1980s and the emergence of a controversial programme

SBIR lifetime was intertwined with the one of Strategic Intelligence that took shape around it and as part of it (if one considers the NAS evaluations). The relations between SBIR and Strategic Intelligence were marked by a quite political conflicts of interests and related controversies. These controversies are not new to the programme, although some pike could be observed during the last reauthorisation of the programme.

The early days of SBIR were indeed already quite difficult although the conditions for its emergence seemed to be quite favourable: facing the economic crisis and resulting budget cuts, reflections were engaged on the value of SMEs which structure and size were seen as natural limitations to their development but who would cover an important growth potential. The recognition of SMEs' importance went first through the post-WWII creation of the SBA (1953); then in 1976³⁵⁴ the Office of Advocacy was created in SBA in order to advocate the interests of SMEs. The role of this office was to conduct studies to show the impact of new laws on small businesses and provide arguments favourable to these SMEs when relevant in the context of the legislative process. By then, the interest for SMEs grew in the spheres involved in the design of US economic programmes.

By the time of SBIR creation numbers would show that a relatively low share of procurement was accessible to SMEs while most of scientists and engineers in the US were working for SMEs.

³⁵⁴ See <http://www.sba.gov/category/advocacy-navigation-structure/about-us>

Starting from this finding, R. Tibbetts initially focused the design of SBIR on small high-tech firms, with a clear focus on high-risk and early-stage projects (less development or commercialisation-oriented ones), position he still defends today³⁵⁵. The main consideration in the mind of the SBIR founding father was to sustain growth through innovative SME support, orientation that later got comforted by the recommendation from the first White House Conference on small business held in January 1980 (Archibald and Finifter, 2003). Arguments would be found in broad studies or key indicators (R&D procurement share of SMEs, etc.) to further support the newly born initiative.

The first version of SBIR in the National Science Foundation (NSF) faced an almost unanimous opposition from officials and stakeholders not willing to let the programme come off the ground. An interviewee involved in the initial launching of SBIR explains: “A Congressman went to the NSF in 1972; he wanted to see how NSF could help the economic recession.

He wanted the NSF to focus on technology ideas versus research ideas. That started a division in NSF (in 1970 already). What happened was that the committee on economic growth was interested in that” (source: interviewee). By then an official from the NSF with an important Venture Capital track record named Roland Tibbetts came up with SBIR. R. Tibbetts faced the opposition of agencies not willing to follow the constraints of SBIR (set aside and SME-targeting obligations). Over 1976/1977 Roland Tibbetts pushed a first pilot of what would later become the SBIR Program.

Roland Tibbetts testifies: *“So what I tried to do was to get something started. We pulled out an annual solicitation. Congress gave NSF some money. Phase 1 came then by 1977. I designed SBIR and got it out in 1977. It was to be annual. Then Phase 2 was to be the second year effort with a second solicitation (Phase 2 which started for a group selected 1978)”*. These elements were confirmed by other interviewees who referred to the resistances to SBIR internal to NSF. Roland Tibbetts pushed a first pilot of SBIR Phase 1 by 1977 despite of internal resistances (“[they] say it’s not working we should give it up (...) they already wrote a letter to Congress saying that ‘there was not going to be a second Phase 1’ (...) so I went to Congress I learnt that and we had to make a new solicitation” – R. Tibbetts).

³⁵⁵ See Tibbetts (2008), “REAUTHORIZING SBIR: THE CRITICAL IMPORTANCE OF SBIR AND SMALL HIGH TECH FIRMS IN STIMULATING AND STRENGTHENING THE U.S. ECONOMY”

This pilot was conducted in the NSF. Supported by Milton Stewart (who had been appointed in 1978 by President Carter as SBA's first Chief Counsel for Advocacy and was called 'Mister Small Business'³⁵⁶), two senators³⁵⁷ (Senator Edward M. (Ted) Kennedy³⁵⁸ and Senator Warren Rudman (R-NH)), R. Tibbetts pushed for the programme to go through the legislative process, later joined by Jere Glover –NSBA–. 1978 was considered an unusual year for the Congress as Senate and House Small Business Committees had joint committees and reports. This is by one of these committees that Ted Kennedy explicitly identified SBIR as good practice.

At this time, NSF, NASA, NIH and DoD (as well as their associated industries) were opposed to the programme³⁵⁹. Among the arguments to oppose SBIR, was the idea that SBIR would take money away from the Universities and the academic sphere³⁶⁰ but also larger companies and specific industries. However the political support brought by leading advocates such as Ted Kennedy and Reagan to SBIR made it a “uniquely bipartisan” initiative (source: interviewee; confirmed by further research and interviews).

³⁵⁶ See <http://www.zyn.com/sbir/articles/mdstewart.htm>

³⁵⁷ “Because of the sensitivities occasioned by the Golden Fleece Awards that Senator William Proxmire (D-Wis.) was giving out at the time to stigmatize wasteful government spending, Mr. Tibbetts was asked to come up with a program that would ensure that the proposals submitted by the small firms would be of high quality (...) Efforts by Senator Edward Kennedy (D-Mass.) in 1976 helped raise small firms’ share of NSF’s R&D funds from 7.5 to 10 percent, and the following year an SBIR program came on stream at NSF” (NAS, 1999)

³⁵⁸ Arthur S. Obermayer (2009) describes Ted Kennedy’s contribution as follows: “In the 1970s Senator Ted Kennedy was chairman of the National Science Foundation (NSF) Subcommittee of the Senate Labor and Public Welfare Committee. At all stages, institutional resistance was encountered within NSF to the support of research at qualified small business (...) After it became clear to the NSF that this would be an annual requirement, they decided to look for a new way to encourage quality proposals from small business and in 1977 instituted the SBIR program. In 1979 the Small Business Administration looked for ways to encourage innovation and concluded that the SBIR program should be instituted at all government agencies involved in research. Senator Kennedy and his staff drafted the legislation and actively spearheaded its passage in the presence of fierce opposition from the academic community. At the beginning of 1981 the Senate and the President switched from Democratic to Republican resulting in Kennedy losing much of his clout. He recognized that the Republicans would not want to give credit to a liberal Democrat for new legislation. Therefore, he maintained a low profile and worked behind the scenes with his Democratic colleagues. At the same time he convinced Republican Senator Warren Rudman to lead the charge to secure the passage the bill’s passage. Finally in July 1982 the Congress passed and the president signed the bill making the SBIR program government wide”.

³⁵⁹ Several interviewees referred to such pressure that two of the key opposing institutions were apparently pushing R. Tibbetts out of NSF

³⁶⁰ “The 1982 legislation was passed against strong opposition from universities, the Department of Defense and other government agencies who were concerned about losing control over a portion of their budgets” (Connell, 2006).

A key achievement showing that the idea reached Reagan's office was the organisation in 1980 of the White House Conference on Small Business (NAS, 1999)³⁶¹.

This resulted in 1982 in a first legal extension of SBIR under controversial auspices: the SBIR Program was formally created by the Small Business Innovation Development Act of 1982 (by the American Public Law 97-219). It is interesting to note that Milton Stewart plaid an instrumental role in passing the idea from the administration to the Congress, while the Congressmen supporting the initiative decided to bring it to the President's table ("Reagan was interested in jobs", and being ex-Governor of California which was already quite high-tech-oriented, he showed interest for the idea – source: SBIR founding father R. Tibbetts).

Box 41: The roots of SBIR seen in a broader context

"The roots of SBIR actually go back to Congress' concern over the "Rust-Belt Recession" of the 1970's. Unemployment in Detroit was high, due to the growing sales of new smaller automobiles and machine tools from Japan and Germany. The question was asked whether National Science Foundation research was focused on economic needs. The result was a new NSF program in applied research called "Research Applied to National Needs" or RANN. For the first time in NSF history, ten percent of a program budget – the RANN program budget -- was set aside for small business. This was the basis for the design and initiation of the Small Business Innovation Program at NSF in 1977. That program grew each year. Its successes led to legislation in 1982 that required all agencies with an extramural R&D budget over \$100 million (today 11 such agencies) to participate. There were some early successes, such as Symantec, that gave us confidence in the basic design of the program."

Source: SBIR Founding Father Roland Tibbetts, 2008

However, the programme has been evolving over its existence: it was given an increasing importance (observable for instance through the increasing set aside rates) and was even taken up by different States such as Maryland.

³⁶¹ Two arguments used during the discussions to support the proposed legislation were 1) the declining R&D budgets going to SMEs and 2) the (at this time) recent research showing the benefits from SMEs in terms of employment.

Box 42: Illustration of SBIR growth: a 1983/2009 comparison

Fiscal Year	Number of Phase I Awards	Number of Phase II Awards	Total Number of Awards	Total Dollars Awarded (millions of dollars)
FY1983	686	74	760	44.5
FY2009	4,008	1,801	5,809	1,937.7

Source: Schacht (2012) referring to U.S. Small Business Administration, The Small Business Economy 2010, A Report to the President, available at http://www.sba.gov/sites/default/files/sb_econ2010.pdf

Over time, the range of technologies under the scope also got broader. Departments also elaborated specific roadmaps and identified key technological areas corresponding to their federal goals and mission, such as illustrated in the table observable in Annex 4, Section 6.1 putting in regards the initial technology areas targeted by SBIR solicitors with the current DoD areas. Department's performance vary in function of their implementation style which is directly related to the missions, technologies, markets and objectives but also industries each Department deals with. This has been acknowledged by many interviewees as well as the NAS evaluations for which this variety issue was a key challenge to produce generalizable conclusions and recommendations.

Since the 1980s, the initial oppositions to the programme were somehow constant: the programme was perceived as an R&D tax over the Departments which did not benefit from any budgetary increase to implement it until the last reauthorisation. The programme was also perceived as a constraint over the way Departments externalized R&D and a budget drain from the universities. Though SBIR managers gained ownership over SBIR at the operational level, higher management levels and some decision makers kept the resistance to SBIR constant. The overall set of interests and positions sheds some clear light on a blurry and complex SBIR setting involving a lot of different stakes. It was acknowledged by all relevant interviewees that from the political side, intelligence has been and is still used in order to support or regenerate arguments at the basis of existing positions and provide political representatives with relevant arguments to defend these positions. As for any other politico-administrative behaviour, some individual preferences could also be identified that had an influence over the direction taken by the programme (for instance at the OSTP level).

Disagreements could be observed during field research at all levels of the programme, including at the level of companies: for instance one beneficiary explained during her interview that social benefits were not valued (enough) by SBIR ("I'm a multimillionaire in terms of social value" – testimony from one interviewee, SBIR-funded company). Another interviewee referred to a company that designed a guidance system thanks to a Phase 2 award that did not succeed immediately but diffused later and led to highly positive spill-overs. Here Strategic Intelligence played the role of frame: the evaluations and reports studied show that commercialisation is the main focus through which the programme has been and is still analysed/evaluated.

Therefore variations can be found in Department's performance due to their differences in nature, while Strategic Intelligence is used to better frame programme implementation and improvement in the sense of the criteria formulated. Commercial success is therefore the key benchmark: as explained by an interviewee, this specific benchmark mainly relies on company data.

The role of Strategic Intelligence in that regard could be understood through the first official evaluation of the programme that was released after the first two years of its implementation. This evaluation issued by the GAO (1985) emphasized the implementation of the mechanisms associated to SBIR (establishment/funding of relevant delivery mechanisms at the Department level, reported data and obligations, monitoring issues). The GAO report got back to some issue from the side of OSTP which "however, ha[d] purposely limited its program monitoring and reporting activities" for different reasons including possible duplication of SBA duties. This first GAO study appeared to be a control and compliance mechanism in the hands of the Congress, which it remains also in the current context. Right from then, the GAO report was a key convergence factor in the sense that it pointed out structural issues such as the different ways used by agencies to calculate the set aside funds. That way, Strategic Intelligence played a role of vulgarisation, monitoring and convergence between the different SBIR programmes implemented by the Departments. This is in a few lines the role Strategic Intelligence was to play until the 2000s when the first comprehensive evaluation process of SBIR was launched.

2.2.2 Towards a commercialisation-oriented horizon: framing objectives through S.I

"SBIR was created to address a need that is still critical: to provide funding for some of the best early-stage innovation ideas – ideas that, however promising, are still too high risk for private investors, including venture capital firms"

SBIR Founding Father Roland Tibbetts, 2008

Despite of conflicting views on the programme, Departments progressively integrated SBIR from an organisational perspective with some increasing ownership by the SBIR managers (see NAS, 2008). It is clear that although the research conducted in the context of that dissertation shows less positive perceptions than what some of the NAS studies might suggest, progress has definitely led the programme to a stronger position and better perceptions.

SBIR is seen by some as a “tax on R&D funds”³⁶² (see RAND, 2006³⁶³ and NAS, 2007a) and in that sense can be badly perceived by Departments (as described in NAS, 2008) and contested by some of the members of the university and more broadly research community who consider it as an appropriation of a share of their own resources (NAS, 1999). But the benefits of the programme gained in recognition (see NAS, 2008) while the ownership of the programme at the SBIR unit level fosters SBIR perception in Departments.

An interviewee noted that “the program exploded over the past ten years”. Over time, the SBIR got strengthened and better structured, but also enlarged to broader and more targeted sets of technologies (see for instance ANNEX 4, Section 6.1 on DoD technology areas comparison over time). But the direction of the programme was altered by both political pressure (Congressional pressure on Departments to show success in terms of jobs, supported by GAO and OMB reports) to make it visibly effective and the integration of new elements partly rooted in and framed by Strategic Intelligence. Due to the limited organisational capacity of the SBA, Strategic Intelligence remained in the hands of external entities (GAO, NAS) but also found some ground at the Department level (metrics).

At the level of the objectives. Along the decades of its existence, SBIR was progressively given a slightly different shape and mainly in terms of objectives. These objectives were mainly shaped following the orientations provided by Strategic Intelligence which was itself quite oriented towards some political concerns one can qualify as programme “performance” concerns, while the original shape was framed by Departments’ missions and longer term perspectives. In terms of programme design, an evolution could be observed in the way objectives were prioritized. Though they remained the same in substance, their hierarchy changed over time. Archibald and Finifter (2003) explained that not only “*the goal of commercialization moved from being listed fourth in 1982 to second in 1992*” but also that the selection process itself reflected this evolution. A growing emphasis on commercialisation³⁶⁴ is therefore clearly observable, which was first illustrated by the 1992 reauthorisation of the programme and implied a reduction of fundamental research support as a quicker way to the market is sought. The most recent SBIR Program Policy Directive³⁶⁵ from 2014 stated the following:

³⁶² “Second, he recalled that he and his colleagues in the Office of the Secretary of Defense (OSD) saw the SBIR program as a tax on agency R&D budgets” (NAS, 1999)

³⁶³ “In other words, within DoD the SBIR program is managed more as a tax and burden to be borne than as an R&D resource to be leveraged” (RAND, 2006); however, since the last reauthorization Departments and agencies can use up to 3% of SBIR funds for administration purposes (in order to low down the feeling that SBIR is a “tax”)

³⁶⁴ Defined by the 2012 SBIR Directive as “The process of developing products, processes, technologies, or services and the production and delivery (whether by the originating party or others) of the products, processes, technologies, or services for sale to or use by the Federal government or commercial markets.”

³⁶⁵ SBA, <http://documents.scribd.com/s3.amazonaws.com/docs/6c90n43wxs1wmoxi.pdf?t=1351707349>

“Specific program purposes are to: (1) Stimulate technological innovation; (2) use small business to meet Federal R/R&D needs; (3) foster and encourage participation by socially and economically disadvantaged small businesses (SDBs), and by women-owned small businesses (WOSBs), in technological innovation; and (4) increase private sector commercialization of innovations derived from Federal R/R&D, thereby increasing competition, productivity and economic growth”.

A similar trend is observable in the successive reauthorisations of the programme which progressively brought in new amendments with regards to the expected effectiveness of the programme and related Strategic Intelligence modalities to frame the performance of the programme (in terms of efficiency and effectiveness mainly). The current version of SBIR clearly contrasts with the programme as conceived and implemented in its early life³⁶⁶: “The intent of the 1982 Act and the original NSF program was not for the SBIR program to be merely a commercialization program”³⁶⁷. Back in the early days of the SBIR Program, “using the term ‘commercial potential’ in a proposal was likely to do more harm than good” in a time when high-risk funding was almost inexistent and very difficult to access venture capital or business angel support (NAS, 1999). However, commercialisation became the central issue in SBIR discussions (see for an illustration NAS, 2007a) and the key success criteria to approach the programme. As reported by NAS (2008), “commercialization potential” was added in 1994 as evaluation criteria used in the context of the assessment of SBIR proposals.

Also since 1996, DoD has the possibility to apply a Fast Track policy – initiative officially launched in 1995 (NAS, 2009c)-, “the purpose of which is to focus SBIR funding on those R&D projects most likely to lead to viable new products that will make a major contribution to U.S. military and economic capabilities. Under the Fast Track policy, SBIR projects that attract matching funds (cash) from outside investors receive a significantly higher chance of Phase II award, as well as continuous funding between Phases I and II”³⁶⁸. Validation from outside investors such as venture capitals, etc. is taken as a signal for commercial viability of the idea(s) proposed by a SBC and allows it getting priority over non-validated projects. After a review of the SBIR evaluations, the Ballistic Missile Defence Organization (BMDO) initiated a first pilot in 1995, rewarding through co-investment and preferential evaluation of the technologies showing positive commercial potential.

³⁶⁶ “In the early years agencies generally made no effort to determine outcomes from the program, or to design and implement management reforms that would support improved outcomes. Beginning in the late 1990s, this limited view of SBIR began to change” (NAS, 2008)

³⁶⁷ Source: Committee Reports, 111th Congress (2009-2010) Senate Report 111-037 available on the Library of Congress Thomas Website (http://thomas.loc.gov/cgi-bin/cpquery/?&dbname=cp111&sid=cp111tHQ1z&refer=&r_n=sr037.111&item=&sel=TOC_9130&)

³⁶⁸ Source: http://www.acq.osd.mil/osbp/sbir/sb/resources/deskreference/04_fast.shtml

This initiative quickly showed favourable results (NAS, 1999 and 2000³⁶⁹). In 2000 commercialisation as an orientation given by the Congress was comforted by Public Law 102-564 (see Schacht, 2011), with competitiveness goals quite emphasizing jobs creation.

Though it appears to be controversial to some extent (SBIR Founding Father in 2008 recommended the Congress to “Avoid using SBIR funds for commercialization”, though recommending that commercial success should be valued), the importance of commercialisation became clear in all policy and legal documents (from legislative to solicitation and guiding documents) but also in practice (implementation level). A growing emphasis on Phase 3 could also be observed (starting from reflections initiated in DoD), as the relevant shape to be given to Phase 3 was increasingly debated over time.

All these orientations were either initiated or at least comforted by comprehensive intelligence developed through NAS studies which developed a cognitive frame to approach SBIR and developed indicators to understand the programme in practice.

Comprehensive intelligence. The iterative evolutions of both SBIR and related Strategic Intelligence clearly led to an increased focus on commercialisation as a key objective of the programme. Since the first evaluations of the programme in 1984 (Rand study), 1985 (GAO), 1987 (Department-specific)³⁷⁰, 1992 (GAO), etc. commercialisation became a focal point receiving increasing attention. The 1999 NAS paper on SBIR challenges and opportunities states that “Congress made two major changes to the SBIR program in the 1992 reauthorisation. First, the set-aside rate doubled to 2.5 percent. Second, Congress increased the emphasis on commercialisation of federal R&D as a program goal”. The shift was indeed noticed in the legislation, switching from demonstrating “scientific and technical merit” in phase I to demonstrating “scientific and technical merit and feasibility of ideas that appear to have commercial potential” but also increasing the ‘commercial’ requirements in Phase II through the 1992 reauthorisation (see NAS, 1999).

The 1999 SBIR assessment from GAO shows a great interest for commercialisation issues. Using data from surveys to Departments and Agencies (SBIR managers and officers) as well as to SBIR beneficiaries (target group), GAO expanded its analysis on the status of commercialisation of the programme and the increasing interest in this area. Commercialisation was especially strengthened as a focal point since the first “comprehensive” intelligence exercises conducted on SBIR and its effects.

³⁶⁹ From which one of the conclusions would be that the Fast Track Program would made the DoD SBIR more effective by “encouraging the commercialization of new technologies”, facilitating the “development of human capital and technical knowledge” and providing the companies with a kind of “SBIR certificate” (the latter not being Fast Track-specific). The Fast Track firms would suffer less from interruptions due to lack of capital. Overall, they would also show better performance (financial capital attraction, employment, etc.)

³⁷⁰ Such as presented in GAO, 1999

The 2004 NAS methodological report clearly identifies “commercialization” as the first focus of the evaluation to be conducted (in line with the 2000 reauthorisation)³⁷¹. Mission support, knowledge base and program management then follow. This reinforcement of commercialisation through “legislative language” (NAS, 2008) confirmed an underlying trend that became set in stone. In 2005, the GAO highlighted in a report to the Congress the fact that using commercialisation as a success criteria for the Program was not efficient as other Federal needs and missions were met by the projects funded under the SBIR umbrella (GAO, 2005); the GAO also identified the different ways for agencies to fill in SBIR-related data, even under a same line (such as commercialisation for instance). This dimension of Strategic Intelligence is important.

Also, an increased emphasis on the third Phase of the programme and the link to demand (technical assistance to Phase 3 awardees and link to public procurement) go in that direction. The 2014 SBIR evaluation for DoD released by the NAS in 2014 spotted a clear evolution of commercialisation language used in SBIR design; it also elaborated a descriptive timeline of DoD efforts to orient its programme towards commercialisation starting from 1991 and pointing at the increasing pressure from the Congress to make changes accordingly. Overestimated commercial success and under-achieved its commercial objectives), leading to the setting up of new initiatives at the component level to promote commercialisation of SBIR results.

The exercises of the Fast Track Initiative assessment (2000) and the NIH evaluation (2003) are clear examples of the great focus on commercial success. These studies were clearly used as a cognitive frame for the programme to evolve towards a more commercialisation-oriented design as its success (effectiveness being the relationship between the programme and the achievement of its objectives) is progressively judged and benchmarked on the basis of commercialisation indicators and criteria.

Metrics. In its analysis of the key changes that occurred in SBIR since its last reauthorisation, the SBA pointed out different elements including shifts towards more commercialisation-oriented activities (such as in monitoring or through the setting up of commercialisation benchmarks). One of the key changes identified is the so-called ‘increased support for commercialisation, described on the SBA website. The SEC. 5165 in the last Reauthorisation amended Section 9 of the Small Business Act (15 U.S.C. 638) and established a SYSTEM AND MINIMUM COMMERCIALIZATION RATE for all participating agencies.

³⁷¹ The objectives of the evaluation are clearly identified as being: “Satisfy the Congressional mandate for an objective, external assessment of the program; Provide an empirical analysis of the operations of the SBIR program, in particular rates and sources of commercialization, for agency officials and program managers; Address research questions relevant to the program's operation and evaluation derived from the legislation and that emerge in the course of the study; Develop a rigorous assessment of the program and contribute to Congressional understanding of its multiple objectives, measurement issues, operational challenges, and contributions as described in the legislation”.

This system should “measure, where appropriate, the success of small business concerns” that received both Phase I and Phase II awards (at the project level: the project in Phase 2 should have started with a Phase 1 award). It also establishes a “minimum performance standard” for Phase 2 awardees based on a minimum commercialisation rate.

Box 43: An “Increased support for commercialisation”

In its analysis of the key changes that occurred in SBIR since its last reauthorisation, the SBA pointed out different elements including shifts towards more commercialisation-oriented activities (such as in monitoring or through the setting up of commercialisation benchmarks). One of the key changes identified is the so-called ‘increased support for commercialisation, described on the SBA website as follows:

- ▶ *“Technical assistance. Amounts increased to \$5000, flexibility on use, applies to STTR as well.*
- ▶ *Commercialization Readiness Programs. DoD Commercialization Readiness Pilot is made permanent and includes the STTR program; Commercialization Readiness Pilot programs for civilian agencies are authorized allowing agencies to use up to 10% of SBIR/STTR funds to support commercialization and Phase III efforts.*
- ▶ *Phase III preference. Agencies directed to support SBIR/STTR awardees in their efforts to commercialize SBIR/STTR work through, among other things, Phase III sole-source contracts”*

Source: SBA, <http://www.sba.gov/content/key-changes-sbir-and-sttr-policy-directives>

The latest reauthorisation for instance introduced different changes such as the above-mentioned creation of a commercialisation benchmark database (monitoring companies’ patents, sales, licensing revenues, etc.)³⁷².

³⁷² When considering the data to be provided by the companies for the company database, the 2012 Directive suggests the following information, implicitly underlying the importance of commercialization and employment-related data for the monitoring and judgement of the programme’s performance: “(i) Any business concern or subsidiary established for the commercial application of a product or service for which an SBIR award is made. (ii) Revenue from the sale of new products or services resulting from the research conducted under each Phase II award; (iii) Additional investment from any source, other than Phase I or Phase II awards, to further the research and development conducted under each Phase II award. (iv) Update the information in the database for any prior Phase II award received by the SBC. The SBC may apportion sales or additional investment information relating to more than one Phase II award among those awards, if it notes the apportionment for each award.”

Companies are today required to present commercialisation plans and to report on commercialisation afterward, as well as to feed in the commercialisation database related to their SBIR activities and outcomes³⁷³; agencies and Departments are tied by commercialisation benchmarks, and the main focus became primarily short/medium-term (commercialisation of technologies developed under SBIR) rather than longer-term (focus on the challenges addressed). Other examples could be given to illustrate this trend. Commercialisation potential became an evaluation criteria for the proposal submitted to agencies and Departments in charge, and so already from Phase I (feasibility assessment phase, for which one of the three main criteria for proposal assessment by DoD in 2014 was “The potential for commercial (Government or private sector) application and the benefits expected to accrue from this commercialization”).

It remains that like other aspect of the programmes, the commercialisation focus impacted the Departments in variable ways. An interviewee from EPA for instance stated that the benchmark would not really affect EPA as it is already quite oriented towards commercialisation, which is less the case for other Departments such as DoT where the technologies that cover commercial potential (when considering private market commercialisation) are less dominant and in general more IT-oriented. This is also the case for NIST (under DoC). Variations are even observable in Departments: while DoD is considered a procurement-oriented Department “on the paper”, this characteristic seems appropriate mainly to NAVY but not all other units are concerned. For instance DoD-DLA shows a number of examples of technology transfers from military to civil aviation -as aviation companies use to work on both markets- and plays an intermediary role rather than a procurer one, translating technological needs and not controlling the use of technologies in weapon systems in se.

General framing by Strategic Intelligence. The increasing focus on commercialisation is understood as evidence-based and strengthened by a better understanding of the capability of American companies to be successful on the market (NAS, 2000). Comprehensive but also GAO evaluations were mainly used by the Congress as control tools over the design of the programme and its implementation by the Departments and agencies, with a clear focus on the delivery modalities and framing of the performance repository of the programme (norms and beliefs defining how the programme can qualify as performant). More recently internal surveys or reflective exercises such as the ones conducted by the NIH are used by the Departments to show performance. The 2000 evaluation of the Fast Track Initiative also refers as broader trends in American policy making (referring among others to the Stevenson-Wydler Technology Innovation Act (1980) and the Bayh-Dole University and Small Business Patent Act (1980) which designed a frame for such evolution). It clearly illustrated the role of commercialisation as a key success criteria for the programme rather than technological breakthrough or social benefits.

³⁷³ See <http://www.sba.gov/content/key-changes-sbir-and-sttr-policy-directives>

One of the company representatives interviewed in the context of this thesis and known as a successful SBIR awardee explained that the company was poorly ranked in terms of commercial success but highly recognized in terms of social benefits (supported by the DoEd SBIR, the company has been developing learning softwares for deaf people). The company CEO explained that the success of this SBIR award could not be assessed in its entirety as non-economic spill-overs were poorly covered by the programme as success criteria.

Indirect benefits from innovation are also under the scope: a company developing a technology not taken up but allowing the development of a new successful one (or being used after some time by another buyer) is an example of indirect success. However, indirect benefits are more difficult to catch through usual evaluation methods and approaches.

Box 44: Framing through Strategic Intelligence: the instrumental perspective

Initially the metrics used in the context of SBIR were rather focused on “stimulation” and less on “innovation” (see Rand, 2006). A progressive shift took place that was in line with changes in the way the programme and its role were perceived. As already explained in the previous sections, the initial design of SBIR aimed at stimulating the tissue of innovative SMEs in order to support high-risk R&D projects they might have and lead to break-through innovations. However, all along the process, the objectives and associated metrics and benchmarks used to orient or measure the success of the programme were more and more oriented towards commercialisation. Studies played an important role in that evolution, providing a renewed frame for the programme. However, most of the SBIR managers pointed out the limited lessons learned in the context of the NAS evaluations, explaining that no new information or insight was brought to the Departments; several interviewees explained that the evaluations mainly “repeated what we knew already” (source: interviewee) although the distance taken with the overall programme was acknowledged as useful. The identification of weaknesses in existing data by GAO also entailed the credibility of some of the evaluations.

In that sense, an important number of interviewees underlined the dominance of the instrumental-type of use of Strategic Intelligence by policy makers, and in particular political representatives (in that case, mainly House and Senate representatives). In the context of SBIR, Congress representatives and their staff made use of the arguments and evidence developed through Strategic Intelligence in order to support their arguments.

Interesting is to see here that no consensus has been found on the evaluative repository for SBIR: determining success criteria for SBIR is something that has been done in the context of the evaluation(s) of the programme, but still SBIR administrators and some beneficiaries highlight the fact that the success of SBIR and the nature of innovation spill-overs (which can be very diffuse) are not all caught by the existing studies.

As an example, the criticisms regarding the commercialisation benchmark are clear: social benefits (not very well caught by the existing criteria) as well as some other types of successes are not covered by the sole commercialisation indicator(s), which might also be subject to important time lags (several interviewees explained that a technology can be put aside and come out years later and lead to commercial successes).

2.2.3 Strategic Intelligence and controversies: the case of the SBIR 2012 reauthorisation issues

“Congress, when it comes to small business: In public they'll hug em, in private they'll mug em”

Attributed to M. Stewart³⁷⁴

From the apparent SME support consensus to controversies. The above quote attributed to Milton Stewart shows the ambivalence of public SME support, usually putting SMEs on the front stage publicly but leaving them aside in practice. ‘SMEs support’ remains a consensual topic in the discourses from opposing parties that traditionally support the idea that SMEs should be supported. In terms of political advocacy, SMEs are consensually considered as “the little guy” or “little man”, correlating with their constrained economic capacity. In the case of SMEs, limited money comes indeed with limited power: “Unlike the University community or the large industry organisations, Bios and venture capital communities, the small business community does not have the big protector to fight for them” (Source: one of the SBIR advocates). Several interviewees identified that issue, which in other words refers to the more difficult political capacity of SMEs to defend their interests when facing stakeholders with more power due to their economic capacities (powerful lobbies relying for instance)³⁷⁵. This would suggest an unbalance between the influence power of SMEs advocates such as the National Small Business Association and in particular the Small Business Technology Council (SBTC) when confronted to influencing associations such as the Biotechnology Industry Organization (BIO) or the National Venture Capital Association (NVCA).

³⁷⁴ Source: <http://www.zyn.com/sbir/insider/sb-insider2-28-13.htm> and similar articles from the same source

³⁷⁵ As underlined by several interviewees, small businesses are seen as the defenceless companies (missing capacity for lobbying and defending their interests). The logic underlying this state of play is mainly an elective one: in order to be appointed to important committees, congressmen should bring in party funding (also to support their reelection); in the Small Business community, raising money is usually a difficult task. However, some other factors are at stake: for instance, Massachusetts has always been very supportive of SBIR as small businesses are important players in the innovation system and remind themselves to their congressional representatives.

A growing space for SMEs in the policy area therefore became a vector of tensions. Since its creation SBIR is in that way subject to conflicts between opposing philosophies but also interests: the usual primary receivers of the federal extra-mural expenses in R&D before SBIR contested the idea that a share of those amounts would be kept for SMEs. This is still a valid situation.

As noticed by one of the interviewees, over the past decade SBIR reauthorisation has always been associated to another legislation and never got a dedicated act because it has always been controversial. Lately, the 2011 reauthorisation was attached to the 2012 Defence authorization Act –H.R. 1540-. Sec 5101 of the Act extended its termination date of SBIR to 2017.

2008-2012: a controversial reauthorisation process. The last SBIR reauthorisation was identified by several interviewees involved in its politics as a quite unique case for an innovation programme. The particularity of this reauthorisation process lies in the absence of clear-cut confrontation between Democrats and Republicans³⁷⁶. The Senate Small Business and Entrepreneurship Committee supportive of the reauthorisation faced the House Committee for Science, Space and Technology and to some extent the House Small Business Committee (both sharing responsibilities for SBIR at the House level). Each of these committees also faced internal dissensions (still not based on the classical democrat/republican opposition but linking to philosophical views and especially state-related interests as was acknowledged by a number of interviewees).

Box 45: Reauthorisation of SBIR through the 2012 National Defence Authorization Act

“On December 31, 2011, the President signed into law the National Defence Authorization Act for Fiscal Year 2012 (Defence Reauthorization Act), Public Law 112–81, 125–Stat. 1298, Section 5001, Division E of the Defence Authorization Act contains the SBIR/ STTR Reauthorization Act of 2011 (Reauthorization Act), which amends the Small Business Act and makes several amendments to the SBIR Program. The Reauthorization Act requires that SBA issue amendments to the SBIR Policy Directive and publish the amendments in the Federal Register by June 27, 2012.”

Source: Small Business Innovation Research Program Policy Directive, 2012³⁷⁷

The latest SBIR Reauthorisation dates back from the National Defence Authorization Act for Fiscal Year 2012 through which SBIR was reauthorized and amended under Title LI, Division E (subtitles A to E and Sec. 5101 to Sec. 5168).

³⁷⁶ According to some testimonies, more support to innovation and SMEs would however come from Democrats when considering the executive branch, such as illustrated by Clinton’s presidency and the support brought to SBIR under the occupancy of the White House by the Democrats (see for instance NAS, 1999)

³⁷⁷ SMALL BUSINESS ADMINISTRATION 13 CFR Chapter I RIN 3245–AF84 Small Business Innovation Research Program Policy Directive - Federal Register Vol. 77 No. 151, Monday, August 6, 2012

The reauthorisation brought in some more technical assistance (from \$4000 to \$5000 per award per year on top of Phases I and II awards), but also in practice. As a concrete illustration, one should refer to the Commercialization Readiness Pilot Program of DoD allowing the use of 10% of SBIR budget for Phase 3 and commercialisation activities. In addition, a closer mentoring of small businesses along the process with a particular focus on commercialisation is conducted by SBIR managing departments in order to ensure an optimal commercial success of the supported SBCs.

But the changes were acted after long negotiations between conflicting entities which led to a ‘forced passage’: the integration of the “SBIR/STTR Reauthorization Act of 2011” into the Defence Authorization Act.

The SBIR Program was to be terminated by 2008. But by the 12th of June 2008, a key advocate of the SBIR Program alimentering his newsletter (accessible to the wide public and monthly shared online) entitled a new article “House SBIR Reauthorization Bill gets “Cool” Reception in the Senate” (source: SBIR INSIDER³⁷⁸). Instead of a clear-cut reauthorisation such as the previous ones, the Program got prolonged through successive bills temporarily extending its implementation (a list of the bills is provided by the Schacht report delivered to the Congress in 2011 – see box).

Box 46: Successive extensions of the SBIR

After the 1982 Small Business Innovation Development Act, the SBIR Program was prolonged by the Small Business Research and Development Enhancement Act of 1982 and then by the Small Business Innovation Research Program Reauthorization Act of 2000. The latest reauthorisation appeared to be quite difficult (temporarily reauthorized 14 times before a compromise could be reached between House, Senate and Stakeholders) as the following description suggests:

“The SBIR program has been extended several times and was scheduled to terminate on September 30, 2008. Although no specific legislation reauthorized the program, the Small Business Administration determined that P.L. 110-235 temporarily extended the SBIR activity through March 20, 2009.⁴ Subsequently, P.L. 111-10 provided an additional extension of the program through July 31, 2009; P.L. 111-43 extended it through September 30, 2009; and P.L. 111-66 extended the effort through October 31, 2009. P.L. 111-89 once again extended the SBIR program through April 30, 2010, after which P.L. 111-214 extended the effort through September 30, 2010. P.L. 111-251 extended the program through January 31, 2011, while P.L. 112-1 provided an additional extension through May 31, 2011.” (Source: Schacht (2011), “Small Business Innovation Research (SBIR) Program”, on behalf of the Congressional Research Service – Report for Congress prepared for Members and Committees of Congress).

³⁷⁸ Publicly accessible on <http://www.zyn.com/sbir/insider/sb-insider06-12-08.htm>

The 2011 reauthorisation of the SBIR Program (part of the 2012 National Defense Reauthorization Act) extended the termination dates of the programme (see Sec. 5101).

The successive extensions were the result of an opposition between Senate and House Committees on a number of key issues. While most research-related bills go through fast track, SBIR has been subject to what is called “regular order”.

The House would usually vote before passing the bill to the Senate before both go through “Conferencing”³⁷⁹ to fix disagreements. In order to pass a bill, the two chambers have to agree on a common version of the bill with a minimum of 60 votes from the side of the Senate where one senator has the power to block the process. Bills written by the Senate and House go through regular order: after a bill is submitted by the leadership of the House or the Senate, the bill is passed to the appropriate committee with appropriate jurisdiction. The Committee appoints a sub-committee to study the bill under the scope in depth before voting and sending back the bill to the full committee. In case of vote approval, the bill gets back to the Senate (in case the bill was initially issued by the House) or the House (if the bill comes from the Senate) and in case of amendments, mark-up hearings are organized.

In the case of SBIR, 14 continuing resolutions were voted to prorogate the negotiations and reach an agreement between both chambers as no compromise could be found on the terms of the reauthorisation. Key struggles involved the political entities willing to back either the SME community, the venture capital community and/or the university community. Also compromises were to be found between the Science and Technology Committee and the Small Business Committee in the House before negotiations with the Senate could take place, creating an additional layer of complexity. Especially as both House Committees have a different constituency, leading the S&T Committee (close to NSF, NIH, NASA, and National Laboratories) to support the SB Committee on one of the key controversies (called in that dissertation “VC issue”) while the SB Committee supported the S&T Committee on another issue (related to SBIR set aside). Stakeholder organisations played a particularly influencing role as a window of opportunity for further defence of their interests was open in the political agenda (see Box 47). A similar complexity was identified by an interviewee from the side of the stakeholders: the interviewee underlined the complex game in which compromises were to be found, as stakeholders might have different positions depending on the controversy³⁸⁰.

³⁷⁹ This term refers to Congressional members getting together with their respective versions of one bill in order to try to find a compromise to be wrapped into one bill

³⁸⁰ For instance, the interviewee referred to BIO which did not only lobby on the venture-capital issue but also on the set-aside one in order to point at the necessity to bridge the Valley of Death. The compromise on the VC issue was a way for BIO to have an insurance that there would be an increase in the set-aside ratios.

Box 47: Political context of the reauthorisation

The political context plays an important role in terms of the relations between political representatives in the Congress willing to get financial support in an election context and influent stakeholder organisations like BIO and the NVCA. This is suggested by the following lines:

“Unlike the House actions on SBIR reauthorisation, Kerry and Snowe have spent a significant amount of time and effort over the past two years hearing from stakeholders on both sides of the VC issue. A reasonable compromise was struck via S.3778 in the 109th Congress that both sides could accept, but it was side-tracked due to the election and budgetary issues.”

This political context also made Strategic Intelligence more important in terms of evidence to be presented by stakeholders to relevant political targets in the Congress to argue against certain aspects of SBIR (if not about the all programme) and influence the decisions to be taken at the level of the House and Senate.

Source: SBIR Gateway, <http://www.zyn.com/sbir/insider/sb-insider06-12-08.htm>

Though in the House any regulation passed should be relevant to the subject of the bigger bill it is associated to, it is not the case for the Senate. In 2010, the SBIR reauthorisation was attached to the Defence Reauthorization Act by SBIR advocates in the Senate in order for the reauthorisation bill to pass. A shift in the majority in 2011 as well as the strong role plaid by Senators such as Mary Landrieu and some of their lead staffers led to overcome the political stagnation over the reauthorisation and its integration into the Defence Reauthorization Act (conceived as a “forced passage”). All entities in the Congress eventually voted on a compromise. Other instances such as the White House (more precisely OSTP) accepted the bill as a whole (though dissensions were also perceived between members of OSTP).

Role of Strategic Intelligence. Attention to the utilisation of expert knowledge is particularly relevant when controversies can be observed in practice³⁸¹. This is also the case in the context of Strategic Intelligence as a source for arguments in policy making. The case of the SBIR 2012 reauthorisation is interesting in that regard, and especially when considering the uptake of evaluation knowledge during the negotiation process. Some of the main issues (orientation towards commercialisation goals, SBIR mills, or venture-owned businesses) were even made priorities of Strategic Intelligence gathering strategies³⁸².

³⁸¹ Utilization can take place through and after the processes of dissemination (Knott and Wildawsky, 1980) and diffusion of the knowledge in question; evaluation scholars dedicate an important attention to this issue, as can be understood in the topic review made by Leviton and Hughes (1981). Knowledge utilization remains a broad topic (beyond policy studies, students of management explored those issues, such as Aakhus [1999] or Senapathi [2011])

³⁸² As an example, the 2012 Directive mentions in its Appendix IX several “Performance Areas, Metrics, and Goals” that relate to the controversies observed during the reauthorization process: “Company and agency-level commercialization of awards”, “Repeat-award winners”, “Outreach to first time SBIR/STTR applicants,

In the overall reauthorisation negotiation process, Strategic Intelligence was used in a purely instrumental way and never led to a change in positions (no content change in the arguments of the conflicting parties). It is interesting to note that the perception shared by the majority of the actors involved in the political discussions (on “the Hill”) is that evaluation arguments, very often held to the Congress through testimonies, are selected by political electives in a biased way (electives selecting the arguments serving their already-taken position). An interviewee stated the following: “Depending on the side they own, [politicians] look at the report to support what it is they believe (...) I’ve seen both sides, both the small business side and the VC and University side, only extract from these reports the parts that supported their case; because in essence, there is some support of all evidence on both sides of this” (from an interviewee and backed by several others).

Strategic Intelligence would along that process be picked up by the actors at stake from contacts or gathered through desk research. Other platforms were extensively used for Strategic Intelligence to percolate in the political arena (see Box 23).

Box 48: Linking controversies to Strategic Intelligence - congress hearings

Parallel to studies (control and comprehensive studies), hearings take place that proved to be a key form of Strategic Intelligence fora where knowledge is generated, discussed, diffused, (in)validated, etc. The example of the 2009 House hearing on ‘the role of the SBIR and STTR programs in stimulating innovation at small high-tech businesses’ shows that the hearings are stages for controversies to be debated and made public³⁸³. The issue of Venture Capital participation in SBIR was already debated in several hearings in 2007. Stakeholders use the Senate and House hearings as expression and formalisation platforms of their discourses (see for example the statements made by the Association of American Universities or by the Small Business Technology Council).

Source: SBIR 2012 Directive, SBA

On top of these findings, it is to be introduced here the fact that Strategic Intelligence somehow breeds Strategic Intelligence: several examples such as the NAS evaluations show that recommendations derived from Strategic Intelligence often recommend to strengthen Strategic Intelligence. For instance, NAS (2008) stated that its conclusions “suggest that it is important to find appropriate benchmarks against which to measure success” with regard to commercialisation support provided by the Departments.

WOSBs, SDBs – including percentage of new applicants from those demographics that have applied to the agency, and other goals and metrics established by the agency and the interagency policy committee”, and “Shortening review and award timelines for small businesses (collected annually in annual report)”

³⁸³ The issue of the set aside budget as well as the venture capital issue were two of the 4 key issues to be debated in the context of this specific hearing

The same evaluation also recommends to “Conduct Regular Evaluations”, mainly through annual reports, internal and external evaluations.

Introducing the three controversies. Though the progressive and confirmed shift towards commercialisation is far from being consensual as explained by several interviewees and additional documentary sources³⁸⁴, it was not the core subject of the controversial reauthorisation process that lasted over 2008-2012. The extension of the programme was supported by organisations such as the NSBA and the SBTC, but also associations such as the International Society for Optics and Photonics (also supportive of the limitation to Venture Capital participation to the programme such as described in 0 and which urged “Congress to reauthorize the SBIR program so that these businesses can continue to help build a better America” in a 2011 communication. It was acknowledged by the interviewees as described in the following sections that the main conflicts and coalitions were shaped in function of distinctive issues involving conflicting interests and being related to specific parts of the bill. Therefore, only a limited portion of the interviewees and stakeholders involved in the reauthorisation process emphasized the existence of the programme as such as an issue but rather focused on the specifics of its objectives and design.

The three selected controversies discussed in the next section were reported by Schacht (2011) who in the context of her analysis of the SBIR reauthorisation ‘efforts’ recognized that “Perhaps the most contentious issue in the reauthorisation is that of the level of small business ownership by venture capital companies and eligibility under the SBIR and STTR programs”. Three issues triggered important disagreements:

1. The set aside issue, which relates to the size and initial design of the programme;
2. The “mill riding” issue, which relates to companies cumulating an important number of awards and potentially living on federal money;
3. The Venture-Capital issue, which relates to the involvement of venture capital firms in SBIR through supported companies.

Less conflicting issues could be referred to which were much less subject to debate³⁸⁵. Here are only presented the key issues that crystallized political coalitions and led to meaning (though temporary) lock-ins in negotiations over the last reauthorisation of the programme.

³⁸⁴ An overall conclusion could be that it takes the form of a “tension” between those in favour of technology breakthrough (Tibbetts model) versus those in favour of short/medium-term commercial outcomes (dominant trend).

³⁸⁵ Such as whether State quotas should be put in place or whether the programme should stick to a more risk-oriented (rather than commercialization-oriented) design; or the issue of using SBIR set aside for administrative costs; whether the State level should play a role in SBIR; which return on investment can be considered as appropriate; etc.

One illustration of their importance in terms of the SBIR policy process was the time and efforts they required in negotiations and presentations in Congress Hearings, but also the amount of evidence-based analyses produced to better frame these issues (evaluation reports mainly but also analyses produced by the negotiating parties).

Important to note is that the reauthorisation does not mark the end of the controversies and tensions around the programme. Several interviewees referred to a transfer of tensions to the STTR Programme, pointing at the bill under discussion at the time of this field research in the House (H.R.2981³⁸⁶). At the time of the field research, new initiatives were already rising new concerns across stakeholders and Congress Members, and some stakeholders declared that they were planning to get into new negotiations by the upcoming legislative period in order to anticipate on the next reauthorisation milestone (by 2017).

2.3 Argumentative use of Strategic Intelligence in SBIR decision process: eye on three key controversies

2.3.1 Controversy 1- Size of the programme: from 1982 to 2012 onward...

The first controversy mainly relates to the size of the programme from both a set aside amount and an award size perspective. This is a conflicting point that has a long-standing history, opposing mainly the small business community to universities, NIH, NSF, and to some extent (up to the 2000s) the defence industry³⁸⁷.

Calculation of the set aside and framing by GAO. Technically, calculating the amount of extra-mural R&D expenses from which to derive the SME set aside was always a challenge and therefore an issue that led to disagreements between policy entities. A first struggle was to be observed on that topic in the context of the debates around the calculation of the extra-mural expenses that took place on the basis of the first GAO report (what should they cover? How to define extra-mural and over which time period to calculate these expenses?). Particular attention was directed by GAO to DoD on that matter in the early life of the programme. Disagreements were exposed (for instance between DoD, DoT and SBA) regarding the calculation of what the SBIR law defined as “extra-mural R&D expenses” (see Comptroller General – GAO, 1985). Clarifications have also been brought on the way to calculate extra-mural expenses (on the basis of estimated obligations or appropriations). These clarifications brought by GAO were made a frame for Congressional control over SBIR implementation by the Departments.

³⁸⁶ See <https://www.congress.gov/bill/113th-congress/house-bill/2981>

³⁸⁷ Since the end of the 1990s, DoD seems to have shaped an internal strategy around SBIR, fostering the uptake of successful SMEs by larger industrial players, and pushing its SBIR programme towards commercialization success through targeted initiatives such as the Fast Track one.

As described by the 2012 Directive requirements, every agency should report to the SBA on the methods used to calculate the amount of extra-mural expenses, for which several warnings were sent by the GAO in reports to the Congress.

More recently, the 2014 Directive stated that “The sum of the total obligations for R/R&D minus amounts obligated for R/R&D activities by employees of a Federal agency in or through Government-owned, Government-operated facilities. For the Agency for International Development, the “extramural budget” must not include amounts obligated solely for general institutional support of international research centres or for grants to foreign countries. For the Department of Energy, the “extramural budget” must not include amounts obligated for atomic energy defence programs solely for weapons activities or for naval reactor programs”.

Size of SBIR and NAS evaluations. SBIR funds are essentially allocated through Phase 1 and Phase 2. No SBIR funding is foreseen for Phase III: while matching programmes can be elaborated by public authorities at the federal or state levels in order to boost SBIR effects, it is expected that SBIR awardees during Phase III dedicate themselves to prospecting venture capital or any other source of funding that might lead the products to the market. Only very limited amounts dedicated to technical assistance were recently instaured. SBIR started in 1985 with the following set aside rates which progressively increased over time as foreseen (see Table 17):

Table 17: SBIR set aside rates in 1985

Table 2.1: <u>Percentages of Extramural R&D Budget</u> <u>Required for SBIR</u>		
	<u>Agencies having</u> <u>extramural</u> <u>budgets in excess</u> <u>of \$100 million</u>	<u>Agencies having</u> <u>extramural</u> <u>budgets in excess</u> <u>of \$10 billion^a</u>
	----- (percent) -----	
Fiscal year 1983 - or first year		
having such budget	0.2	0.1
- second year		
having such budget	0.6	0.3
- third year		
having such budget	1.0	0.5
- fourth year		
having such budget	1.25	1.0
- fifth year		
having such budget	1.25	1.25

^aDOD is the only agency in this category thus far.

Source: Comptroller General – GAO, 1985

Though the re-conduction of the SBIR Program did not seem to be an issue by the process of the 2000 reauthorisation, the set aside issue remained one: upon their request, GAO recommended Senator Bond and Senator Kerry to re-conduct the programme but questioned the set aside issue (NAS, 1999). Views still differ on whether the House is dominated by representatives who would like to cancel the programme (see the contradiction between James Turner's feedback in NAS [1999] and feedbacks from interviews).

In 2002, the set aside rate was made 2.5%³⁸⁸, and since the last reauthorisation the set aside rate should increase yearly by 0.1% over ten years except for the National Institutes of Health which would remain at 2.5% (Link and Scott, 2010). Schacht (2011) noticed that under the 110th Congress, in H.R 448 introduced by January the First 2011, the set aside increase brought the set aside rate to 5%, while the S.1867 as passed by the Senate and S.493 as reported by the 3rd of September 2011 limited this increase to 2.5% with incremental yearly raises³⁸⁹. Under the 111th Congress, the Senate passed H.R. 2965 and S. 4053 which brought additional modifications to the exception modalities regarding DoD and DoE as well as confirmation that the limit set aside rate would eventually be 3.5%. She refers to similar apparent compromises taking place in different areas, for instance in terms of the award size (instead of the proposed \$200 000 and \$1,5 million for Phase I and Phase II, the compromise reached was \$150 000 and \$1 million). The set aside rate increase is valid for all implementation bodies "with the exception of the set-aside for the National Institutes of Health which remains at 2.5% and limits on use of DOD and DOE funding increases to "activities that further the technology readiness levels of technologies being developed under Phase II awards" (see Schacht, 2008). The 2011 SBIR reauthorisation chapter in the 2012 National Defense Reauthorization Act confirms the allocation increase for SBIR (Sec. 5102) such as shown by the following extract and confirmed by the 2014 SBIR Directive:

³⁸⁸ By then SBA was asked to adjust for inflation over the years but did not.

³⁸⁹ Schacht (2011) described it as following: "The set-aside is increased from 2.5% in FY2013 by 0.1% per year up to 3.5% in FY2023 and beyond with the following exception: the increases in funding generated by the set-aside in excess of 2.5% at the Department of Defense and the Department of Energy are not to be used for new Phase I or II awards but for "activities that further the technology readiness levels of technologies being developed under Phase II awards.""

Figure 35: Confirmation of the allocation increase by the National Defense Reauthorization Act

(C) by striking subparagraph (C) and inserting the following:

“(C) not less than 2.5 percent of such budget in each of fiscal years 1997 through 2011;

“(D) not less than 2.6 percent of such budget in fiscal year 2012;

“(E) not less than 2.7 percent of such budget in fiscal year 2013;

“(F) not less than 2.8 percent of such budget in fiscal year 2014;

“(G) not less than 2.9 percent of such budget in fiscal year 2015;

“(H) not less than 3.0 percent of such budget in fiscal year 2016; and

“(I) not less than 3.2 percent of such budget in fiscal year 2017 and each fiscal year thereafter,”; and

Source: National Defense Reauthorization Act, 2012

The increase of the set aside rate was not supported by the NIH and (less visibly) OSTP. Also stakeholders such as the Association of American Universities, the Federation of American Societies for Experimental Biology and other similar organisations advocated against SBIR growth as they consider SBIR money as being taken away from the Research sphere. These positions were taken while it was recommended by the NAS evaluation report at the programme level: “In summary, the program is proving effective in meeting congressional objectives. (...) Should the Congress wish to provide additional funds for the program in support of these objectives, those funds could be employed effectively by the nation’s SBIR program” (NAS, 2008). Although this might read as a modest suggestion, the experts involved in the evaluations clearly advocated for an increase in the programme set aside.

The opposing interests to the set aside increases were the ones of the universities mainly³⁹⁰: “What you see depends on where you sit (...) Universities are a little bit schizophrenic: on one hand they value [SBIR] for commercialisation, on the other hand they obviously want more funds for their research” (Wessner, 2011 Senate hearing³⁹¹). It appeared along the interviews that neither the conclusions of the evaluations nor the status of NAS as Strategic Intelligence impacted the position of the stakeholders against the set aside.

³⁹⁰ Universities are influential players in the political game as they are large employers in American states with structured and strong federal support; when coming to SBIR, “Universities are still very mad about this increase” (source: one of the stakeholders interviewed).

³⁹¹ See the contribution from Charles Wessner to the hearing before the Senate – Small Business Committee, SR428A- available on-line (<http://www.youtube.com/watch?v=q-NScDmPM1Q>)

Other arguments to value the programme in the eyes of the academic community were pushed forward by the NAS, such as the fact that a third of DoE SBIR awardees were previously academic researchers (NAS, 2008) while overall, half of the respondents to the NRC survey “reported some university involvement in SBIR projects. Of those companies, more than 80 percent reported that at least one founder was previously an academic” (NAS, 2008a). But this most likely illustrates the distinction between the interests of the researchers and academic organisations from which they might be “drained”. Another argument derived from the NAS evaluations and did not find any echoe was that universities contract with SBIR awardees (being subcontractors or contractors on SBIR projects or providing graduate students with R&D positions in SBIR companies).

Awards. Another key change over time related to the amounts allocated to small businesses. Starting in 1982 with \$50 000 for feasibility study support (to be conducted on a 6 month period), the amount is now \$150 000³⁹².

The same applies to R&D support, originally \$500 000 (over 2 years) and now being \$1 000 000 (the 1992 reauthorisation already allowed a \$750 000 support)³⁹³. No award could/can exceed the guideline amounts (see table below) by more than 50%, though.

Table 18: Amounts allocated to SMEs through SBIR - A time perspective

Time	Phase I support	Phase II support
1982	\$50 000	\$500 000
1992	\$100 000	\$750 000
2010	\$150 000	\$1 000 000 ³⁹⁴ (x 2) ³⁹⁵

Source: The author (2014) adapted from Bearse and Link (2010), Schacht (2011) as well as Sec. 5103. SBIR and STTR Award Levels, (a) SBIR Adjustments³⁹⁶;

³⁹² According to the 2011 reauthorization, an SBIR award should not exceed the amount foreseen by the law by more than 50%

³⁹³ According to the 2011 SBIR Reauthorization Act, adjustments for inflation shall be made annually

³⁹⁴ See the adjustments made under SEC. 5103 of the 2011 SBIR Reauthorization Act (see next footnote)

³⁹⁵ Since the last reauthorization, a Phase II award can be continued with an additional Phase II award (still framed by the amounts and conditions defined in relevant SBIR policy guidelines)

³⁹⁶ 2012 National Defense Reauthorization Act, Title LI reauthorizing and amending the SBIR and STTR programmes; one should note that an award cannot exceed 50% of the reference value determined by the requirements established by this Act

Note: since the 2012 Reauthorisation, the limit for technical assistance funds also raised from \$4000 to \$5000 per unit. Also since the last reauthorisation, a second Phase II award can be allocated to a SBC already recipient of Phase II support.

Those increases took place over time and were formalized by the several reauthorisations of the programme. The latest changes presented in table above were due to a directive from the SBA issued in 2010 and raising the support thresholds for Phases I and II. The increases were recently followed by the introduction of the possibility to grant an SBC with a second Phase II award in order to complete the first it would have received.

From 2005 onward, the NAS supported the increases: “Congress should consider making a one-time adjustment that would give the agencies latitude to increase the standard size of Phase I awards to \$150,000, and to increase the standard size of Phase II awards to approximately \$1,000,000” (NAS, 2008). But ways were found for some of the actors at stake to go around these orientations thanks to exemptions. The NIH for example obtained several exemptions: first, the NIH were exempted from the progressive set aside amounts increase; second, they were given the possibility to provide SMEs with awards superior to the SBIR thresholds as reported by the NAS evaluation (see NAS 2008a and its reference to these “Extra-large phase II Awards at NIH” and especially one award of \$3.5 million in FY2003; also see NAS, 2009b). The 2014 Directive stated that “during fiscal years (FY) 2012 through 2017, the National Institutes of Health (NIH), Department of Defense (DoD) and the Department of Education (DoEd) may issue a Phase II award to a small business concern that did not receive a Phase I award for that R/R&D”. The last NAS evaluation (DoD SBIR Evaluation from 2014) reports however that the NIH grants were limited again: “awards may no longer exceed 150 percent of guidelines (i.e., \$1.5 million for Phase II) without a specific waiver from the SBA Administrator” which can only apply to a specific topic and should be documented – NAS, 2014).

2.3.2 Controversy 2 - The ‘mill riding’ issue³⁹⁷

Experts versus politics. Concern has been rising about SBIR awardees receiving multiple awards, some of them reaching an important amount of federally-funded R&D dollars. This issue was initially targeted by the 1987 SBA Annual report and taken up by the 1999 Assessment of SBIR by GAO. Among the companies having received more than 11 awards, GAO concluded that “of the projects that had completed Phase II, 25 percent had been performed by firms with 11 or more Phase I awards. For both groups of firms, about 25 percent of the completed projects resulted in products or services that were being sold commercially”. The notion of ‘SBIR mills’ refers to the existence of these companies which are called ‘proposals mills’, or multiple award companies that appeared to some actors to live on SBIR funds without growing.

³⁹⁷ See Senator Mary Landrieu’s (Louisiana) question to Charles Wessner during the hearing before the Small Business Committee –SR 428A- also available on <http://www.youtube.com/watch?v=SCivFaCatH4>

Some companies were indeed identified that were only relying on SBIR awards without taking up the technologies developed and commercializing them.

This issue, qualified by the SBIR Evaluator from NAS C. Wessner as an “urban myth”³⁹⁸, is interesting to the extent that if the fact is recognized, the perception of its problematic nature depends on the way data is interpreted. This finding is supported by Wessner and Gaster (2009) who anchored the notion of “myth of the mills” while referring to the SBIR evaluation work conducted by the NAS and its results. The mills issue was put on the agenda of the NAS evaluation in the 2004 memorandum of understanding passed with the five key SBIR agencies. The evaluation should indeed among other things consider “The SBIR “mills” phenomenon: How prevalent is this phenomenon; Types/motivators of mills; How concentrated are they by agency? What is the nature of the awards? What are characteristics of mills that deal with one agency vs. those that deal with multiple agencies?” (NAS, 2004).

But the House positioned itself against the evidence produced by the NAS on Mills and decided to promote a limitation of the number of awards a company can get which should lead to more awards for low-participation States. However, Senate staffers came across and rather supported another position while referring to GAO’s conclusion that “Awards are proportionate to applications” (in case an application would be refused, the award would go to another company in the same State and would not shift to low-level participation States). In the course of negotiations, the House underlined indeed that such initiative would allow low-participation states to get more awards. One of the Senate staffers involved in these negotiations on the front line referred to during an interview that “However, when we ran the probability on what would happen if you eliminated the firms that had large numbers of SBIR awards, it didn’t have that effect: all the states were going to get the awards in the same proportion that they already did”. The House SB Committee pushed however against evidence for stricter control over mills participation in the programme.

In his testimony, the NAS lead evaluator of the SBIR programme refers to an issue of perception that negatively affects SMEs: “When MIT gets a large number of awards, this is good just and right; and it probably is. When Lockheed Martin gets a lot of major contracts this is good just and right. When a small company gets a number of, a hundred or thousand awards, there is something wrong” (Wessner, 2011). Advocates of the SBIR relayed this position (such as the SBTC, which stated while referring to the NAS evaluations that “Multiple SBIR awards to individual companies are not a problem”). Content-wise, an interviewee explains that “a distinction is needed between the start-up function of the programme versus its contract research function”.

³⁹⁸ See the 2013 hearing SR 428A before the Senate’s Small Business Committee chaired by Senator Landrieu.

This position of the experts could even seem surprising to some. Several interviewees explicitly referred to the fact that when the SBIR evaluation was launched, the Small Business community was scared that coming from the NAS the lead evaluator would have a negative a priori regarding the programme. From a neutral position, he however became an advocate of SBIR, though always referring to the evidence and conclusions generated in the context of the SBIR evaluations. But in the specific controversy around the mills issue, the expert arguments did not compete with the philosophical view of the House SB Committee which obtained a stricter control of the access to SBIR by these companies.

Transition and commercialisation benchmarks³⁹⁹. Two types of benchmarks appeared to be used in order to better control for the possible SBIR “mills”. The use of benchmarks was pushed by the House regardless of the position of the NAS recommendations regarding the “myth of the mills”. The introduction of transition benchmarks for the 11 Departments in charge of SBIR implementation (see initial rates in the table below) is one of these two benchmarks that play the role of filtering company participation to SBIR. Those benchmarks constitute the “minimum required ratio of past Phase II to Phase I awards that an awardee firm must maintain to be eligible for a new Phase I award from a particular agency”⁴⁰⁰. Precise ratios are provided by the Federal Register Volume 77, Number 200 (Tuesday, October 16, 2012) (accessible on <http://www.gpo.gov/fdsys/pkg/FR-2012-10-16/html/2012-25328.htm>) where only slight variations can be observed and mostly in favour of the Departments using SBIR the less. The same source explains that at the agency level, these benchmarks constitute “the minimum required number of Phase II awards the [SBIR] applicant must have received for a given number of Phase I awards during a specified period”

Commercialisation benchmarks were also introduced and triggered a number of practical questions regarding their implementation (calculation and use) such as illustrated by the response from SBA to the comments requested on the annual Directive (see Federal Register / Vol. 79, No. 5 / Wednesday, January 8, 2014 / Rules and Regulations). It is described by the SBIR website as follows:

“Phase I applicants that have received more than 15 (16 or more) Phase II awards over the past 10 fiscal years, excluding the last two years. These companies must have achieved at least the minimum required levels of commercialisation activity, resulting from their past Phase II work, in order to be eligible to receive a new Phase I award.

³⁹⁹ See mainly commercialization and transition benchmarks and their description on <http://www.sbir.gov/performance-benchmarks>

⁴⁰⁰ Source: Notices from the Federal Register Volume 77, Number 200 (Tuesday, October 16, 2012)

The current Commercialization Benchmark requirement, agreed upon and established by all 11 SBIR agencies, is that the awardee applicant must have received, to date, an average of at least \$100,000 of sales and/or investments per Phase II award received, or have received a number of patents resulting from the SBIR work equal to or greater than 15% of the number of Phase II awards received during the period”⁴⁰¹.

The benchmarks were both put in place in order to provide monitoring information but especially control over the access to SBIR. The benchmarks are therefore a constraint over programme implementation (used in policy practice to regulate SBIR access to companies), and a control instrument from the Congress to ensure that the legal lines will be followed by the executive branch in charge of the implementation of the programme.

2.3.3 Controversy 3 – Reaching compromise in the context of a main conflict: the Venture Capital Issue

VC-owned firms. The biggest change in eligibility required by the reauthorization legislation will be allowing firms that are majority-owned by multiple venture capital operating companies (VCOs), hedge funds and/or private equity firms to receive SBIR and STTR awards⁴⁰².

Emergence of the VC issue. The controversy around Venture Capital participation in SBIR –called in that dissertation “VC issue”– was definitely the most controversial and most prominent SBIR conflict over the past 15 years. It was even reported in the media⁴⁰³ and one of the interviewees lobbying on the Hill since more than 20 years pointed out this conflict as being “the most emotional issue” she dealt with in her career. This emotional intensity could even be perceived when watching the Senate hearings on the topic which involved quite a number of opposing views on the direction that should be taken by SBIR. This issue concerned the (non-)eligibility of companies that were majority-owned by a venture capital to the SBIR programme.

⁴⁰¹ Source: <http://www.sbir.gov/performance-benchmarks>

⁴⁰² Source: <http://www.sba.gov/content/key-changes-sbir-and-sttr-policy-directives>

⁴⁰³ See for instance http://boss.blogs.nytimes.com/2011/12/15/congress-reaches-deal-to-reauthorize-and-revamp-small-business-programs/?_php=true&_type=blogs&module=Search&mabReward=relbias%3As%2C{%22%22%3A%22RI%3A17%22}&r=0 and <http://boss.blogs.nytimes.com/2012/07/16/in-proposed-small-business-rules-big-seems-to-be-the-new-small/?module=Search&mabReward=relbias%3As%2C{%22%22%3A%22RI%3A17%22}>

Box 49: Introducing the "VC issue"

"The current dispute over VC funding began in 2001, when the SBA Office of Hearings and Appeals issued a ruling against the majority ownership of SBIR companies by VC firms in response to an appeal of a rejection of SBIR funding by NIH based upon majority VC ownership. The ruling made by the Administrative Law Judge stated that VC firms were not "individuals," i.e., "natural persons," and therefore SBIR agencies could not give SBIR grants to companies in which VC firms had a controlling interest. BIO and NVCA claimed this was a new interpretation of the VC-small business relationship, but SBA said it was simply a clarification and enforcement of eligibility standards. VCs can take majority ownership after an award is made but the firm would thereafter be denied further awards or enhancements."

Source: 2007 House "Small Business Innovation Research Reauthorization on the 25th Program Anniversary" Hearing and related proceedings

In 2003 -while John Kerry, by then chair of the Senate SB committee was running for the 2004 presidential elections-, the venture capital community called upon fund raisers in order to spot the above issue. In response to their claims, the Small Business Administration made the case that any small business which shares are owned in majority by another business having shares in other companies⁴⁰⁴ could not be considered as a small business and therefore not supported by SBIR. Control by a venture capital over the small business was considered to be a control by a larger source than the board of a 500 (or less)-employee company. Qualification of those companies as a small business was therefore contested by the SBA. The standards covered indeed the size in terms of number of employees (no business with more than 500 employees) as well as turnover generation. In other terms, the initial position adopted in 2001 by the SBA in line with existing standards was that any business should be majority-owned (51%) by one or more "individuals" and (including affiliates) not have more than 500 employees. The underlying rationale behind this position was that should an SME be majority-owned by a VC, its decisions would be constrained by the VC who has decisive corporate power over company decisions (strategy, etc.). This would de facto make the small business an affiliate of the VC, not considered as eligible to SBIR.

One could sum up the situation as a debate over the interpretation of the eligibility standards by the actors involved. While the SBA positioned itself against the participation of VC-backed SMEs to SBIR (when the SBC is majority-owned by VCs and/or has more than 500 employees in total including its affiliate), VCs claimed that the access should remain open to SMEs with VC ">51% ownership and control regardless of the VCs size and ownership structure"⁴⁰⁵.

⁴⁰⁴ Reaching that way a threshold higher than allowed by the SME definition in the US in terms of number of employees – including affiliates

⁴⁰⁵ Source: SBIR Gateway, <http://www.zyn.com/sbir/articles/bnews-bio-1.htm>

An interviewee confirmed that “everyone agreed SBIR is successful (...) [there was] not very much controversy around the program; the controversy was about who should be part of the program” (Source: an interviewee). But this issue, perceived as highly technical, was not only about the ownership of SBIR awardees by venture capital but went beyond the programme as it touched upon the definition of “what is small” or not. The initial conflict on the access to SBIR extended beyond the programme to reach a broader debate on the definition of what an American SME is.

The two opposing views could also be illustrated by a other arguments heard during the interviews; for instance, the argument from the SB community “you get private money so you don’t need public money” would go against another argument from the VC community which was that “if private sector spotted this SBC it is a sign of good investment target”. Another argument particularly defended by BIO was and still is that the valley of death needs to be bridged and that VC was not only an additional mark of possible success but also a way to better link SMEs to relevant investors and markets while pursuing a public health mission.

A view on the opposing coalitions. Two opposing blocks can be identified in that conflict. The first constituted by the small business community backed the SBA decision and 2003 state of play (limited access to SBIR for VC-backed companies) while VC advocates pushed changes in the sense of a redefinition of these access modalities. In practice, lobby forces from the venture capital and biotech industries engaged into a confrontation with the small business community. BIO lobbied on this issue with SBIR actors for 9 years (in 2013)⁴⁰⁶ and came to collaborate with some players from the Defence industry (but not DoD) on this issue. The Universities and research community remained quite distant with this specific issue and did not get involved in the VC conflicts.

After the NVCA got in touch with BIO to bring them along their cause, support was obtained by both VC advocates in the Congress and more precisely the House but also in the executive branch. It was indeed perceived by interviewed that the OSTP position was in favour of the changes pushed by VC advocates, though the NIH⁴⁰⁷ was the institution on the frontline and in clear coalition with BIO and the NVCA who pressured the House SB Committee to get an exemption for Venture Capitals (VCs) “to own and control small businesses that are competing for and/or receiving SBIR funding”⁴⁰⁸. The NSBA and the SBTC clearly defended the ground of SMEs considering the following: “They say invest, we say purchase small companies” (SBC advocate).

⁴⁰⁶ After a Venture-backed company was denounced because it received public funding it should not have legally received

⁴⁰⁷ One stakeholder also pointed out, “*to some extent*” DoD (though if DoD was involved it was clearly a secondary position)

⁴⁰⁸ Source: <http://www.zyn.com/sbir/articles/bnews-bio-1.htm>

The confrontation between the two blocks was taken up by the House and the Senate (the House being positioned in favour of BIO and NVCA while Senate was more in line with SBCs advocates). On both sides Congressmen used the issue to raise campaign money.

Though the VC lobbies had more institutional resources (versus the SBC lobbies), perceptions also played a role: on the Hill the battle turned into a “David Vs Goliath” fight (source: an interviewee) opposing the fragmented and defenceless Small Business community represented by the SBTC to VC supporters. Other stakeholders brought some support to the VC cause –less extensively than BIO and NVCA though– such as what an interview called smaller “niche diseases associations”. These associations were mainly looking for funding as specific diseases are less funded and would benefit from SBIR and VC support).

From the side of the Congress, most interviewees acknowledged that the VC confrontations were a “Philosophical issue”. No clear opposition between democrats and republicans but dissensions in both parties were identified, with different views on what the role of VCs should be in such a programme. Cross-party alliances were set up and lobby organisations tended to push the political lines thanks to election-oriented arguments. However the controversy reached a dead end: though the SB Committee bills usually go through Unanimous Consent (“UC”)⁴⁰⁹, some Congressmen declared they would block the “UC” from any free-standing in the Senate. After a very rough discussion led by the chair of the Senate SB Committee with the “blockers”, an agreement was reached that would mark the end of the controversy until the next reauthorisation.

Strategic Intelligence as a negotiation tool. This issue has probably been the most extensively debated in House and Senate hearings, but also during workshops and mainly between the different parties at stake, crystallizing more than an SBIR conflict over the past decade (since 2001).

Several sources were used in political arguments on this issue, including the NAS evaluation data, NVCA and Bio studies and data (seen as less credible though because of their clear lack of objectivity), as well as SBIR data available online (issued for instance by the SBA). NAS and GAO studies were used by Congressional staffers who looked up for the needed information to further support their positions. NVCA and BIO used less NAS evidence in their communication material than the SBTC, calling upon internal resources such as Members surveys etc.

⁴⁰⁹ Implying that when the bill is then presented to the floor of the Senate a call for comment would be launched, according which (in case of no comment) the bill would be passed

Box 50: Making up evidence

Several times during this field research, interviewees requesting anonymity confessed that they used “made up figures”. The fight over evidence seemed to be a capital one for political actors (representatives, staffers, stakeholder organisations, etc.) for political stakes to be credible. This fight over credibility sometimes reached serious proportions as the following denunciation suggests:

“Both the Senate and House Small Business Committees are receiving a great deal of pressure from Bio and VC organisations. These organisations are furnishing false and misleading information on this subject in order to get the rules changed”.

Source: SBIR Gateway, <http://www.zyn.com/sbir/articles/bnews-bio-1.htm>

Positions were also taken by key actors like the founding father of SBIR who derived a position paper (or policy brief) from his knowledge and experience: “If big VC’s get into Phase I and Phase II, they will push for bigger bets on fewer companies. They will want to shift SBIR funding away from high-risk Phase I ideas and toward Phase II development, which is closer to market and therefore less risky for them. Sooner or later, they will back SBIR funding for Phase III, which will also offset some of their risk. And the kind of innovations they ultimately favour will be those that big companies favour – safer and more familiar ones, incremental rather than quantum leap. SBIR can do much more than this. SBIR’s current restrictions on big VC’s are therefore wise.” (SBIR Founding Father Roland Tibbetts, 2008)⁴¹⁰.

In-depth analysis of the VC issue was performed through an NIH viewpoint⁴¹¹ with the study released by the NAS in 2009 and entitled “Venture Funding and the NIH SBIR Program” (NAS, 2009d). The study reported the different positions of opposing advocates and took here a role of streamlining of the issue (providing an evidence-based vision on the issue) and positioning the controversy.

⁴¹⁰ In the same communication, Tibbetts made the following statement: “I must say that as I review the SBIR recommendations made to Congress by the Biotechnology Industry Organization (BIO) and by my former VC colleagues in the National Venture Capital Association (NVCA), I am deeply troubled. It is mainly these two organizations that are calling for the far-reaching changes in the program. Many of the changes they are proposing would, in my judgment, significantly and perhaps irreparably harm the program. I can understand the desire of any organization to represent its members and prospective members, but this is a case when we must think of the broader national interest. Without open and competitive early R&D efforts, spread as widely as possible, innovations will never reach the level of maturity that can draw in venture capital or other follow-on funding. BIO and especially NVCA should understand this. The need is to explore as many ideas as possible and lower the risk as much as possible to attract follow-on Phase III investment. There will be no shortage of great new innovations to invest in if we allow SBIR to do its work in supporting truly innovative small companies by objectively assessing which ideas are wheat and which ones chaff”.

⁴¹¹ The study was funded by the NIH; the initial idea of the study (and its funding source) came from a Member of the Congress.

Box 51: Conclusions and recommendations from NAS on the role of VC-backed firms in NIH SBIR

The NAS study released in 2009 reported a number of conclusions and recommendations on the participation of VC-backed companies in NIH SBIR. The following conclusions were presented in the final report:

“A limited number of venture-funded firms appear to have been excluded as a direct result of the SBA ruling; (...) the ruling seems to disproportionately affect firms with demonstrated potential for significant commercialization. (...) SBIR firms—with or without venture funding—commercialize in significant numbers. Firms that are venture-funded are somewhat less likely to commercialize but are much more likely to generate substantial sales from their SBIR-funded projects when they do commercialize than are firms that receive SBIR funds but are not venture-funded. (...) At NIH, SBIR awards with venture-funding received marginally more patents per project than did the non-venture-funded firms. (...) A survey of non-participants indicates that the SBA ruling has played a limited role in the decisions of small firms not to participate in the NIH SBIR program. (...) Recognizing that the number of affected firms is small, it is the judgment of the Committee that restricting access to SBIR funding to firms that benefit from venture investments would risk disproportionately affecting some of the most promising small innovative firms. To this extent, the SBA ruling has the potential to diminish the positive impact of the nation’s investments in research and development, especially in the biomedical area.”

These conclusions led to the formulation of four key recommendations (source: NAS, 2009d) which are presented one by one below:

- 1. “Consideration should be given either to restoring the de facto status quo ante eligibility requirements for participation in the SBIR program or to making some other adjustment that will permit the limited number of majority venture-funded firms with significant commercial potential to compete for SBIR funding”*
- 2. “SBA and the agencies should maintain an open competition that is based on scientific quality and commercial potential”*
- 3. “SBA should maintain the commendable program flexibility it has exercised in the past”*
- 4. “NIH should conduct follow up assessments of its SBIR program, including the impact of venture capital participation and eligibility requirements on program involvement and outcomes”*

NAS results were used in line with argumentation lines of lobbying organisations. The value of every argument relied on its independence (the more a fact or finding appears to be unbiased, the more it is valuable to support a given position).

But the NAS study also directed opposing parties towards a compromise or status quo (see Box 51). SBC advocates “[sat] down in group with NAS” in order to better own the results of the evaluation and structure their position.

One of the lobby organisations on the forefront of these negotiations mainly used internal sources to present arguments supporting their position (Members survey, talks with members, etc.) as confirmed by the interview with its representatives. Evidence was seen as a way to complement the limited resources of SBC advocacy coalitions (compared to more organisationally powerful VC lobbies) who made use of the NAS evaluation results to a larger extent.

Compromise. The Senate ended up cutting a deal with the small business community, NIH, NVCA and BIO on the VC issue (leading to limited participation to SBIR)⁴¹², leaving the House in a stand-alone position. The 2012 Directive amended the definition of Small Business Concern becoming “not majority-owned by multiple venture capital operating companies (VCOCs), hedge funds, or private equity firms on the date on which it submitted an application in response to a solicitation under the SBIR program” or “majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms on the date of the SBIR award” (Small Business Innovation Research Program Policy Directive, 2012⁴¹³). The amended 2012 Directive was clearly the result of a forced compromise pushed by the chair of the Senate SB Committee and especially Ms. Kevin Wheeler, Deputy Democratic Staff Director for the Senate Committee on Small Business & Entrepreneurship (whose efforts have been acknowledged in many occasions⁴¹⁴). This compromise was reached in a highly complex setting (mix of stakes, stakeholders and politics).

⁴¹² In terms of the compromise reached, BIO quote several trade-offs, including an increase in overall SBIR budget. Another trade-off was the possibility for 25% of NIH SBIR applicants to be venture-backed businesses (ensuring by this ratio that the traditional 25% average of VC-backed companies having access to SBIR in practice would remain).

⁴¹³ SMALL BUSINESS ADMINISTRATION 13 CFR Chapter I RIN 3245–AF84 Small Business Innovation Research Program Policy Directive - Federal Register Vol. 77 No. 151, Monday, August 6, 2012

⁴¹⁴ Kevin Wheeler was indeed awarded the title of “SBIR Person of the Year” in 2008: see <http://www.zyn.com/sbir/articles/08poy.htm>

Box 52: Allowing limited participation of VC-backed firms to SBIR

“NIH, Department of Energy and National Science Foundation may award not more than 25% of the agency's SBIR funds to SBCs that are owned in majority part by multiple venture capital operating companies, hedge funds, or private equity firms through competitive, merit-based procedures that are open to all eligible small business concerns. All other SBIR agencies may award not more than 15% of the agency's SBIR funds to such SBCs. At their discretion, if the agency has not exceeded these maximum statutory percentages, the agency may make awards to small businesses that are majority-owned by multiple VCOCs, hedge funds or private equity firms through competitive, merit-based procedures that are open to all eligible small business concerns under the STTR Program, using STTR funds. See STTR Policy Directive.”

Source: 2012 SBIR Directive

The National Defense Reauthorization Act of 2012 from which the 2011 SBIR reauthorisation was part of presented a key change: Sec. 5107 established new rules with regards to the “Participation by firms with substantial investment from multiple venture capital operating companies, hedge funds, or private equity firms in a portion of the SBIR program”⁴¹⁵. The new reauthorisation allows NIH, NSF and DoE “to award up to 25% of SBIR funds to small businesses that are majority-owned by venture capital companies, hedge funds, or private equity firms and other agencies to award up to 15% of SBIR funds to such firms” (Schacht, 2012).

⁴¹⁵ Requirements were also formalized in the eligibility guidelines issued from SBA at the attention of SBIR applicants (see the Guide to SBIR/STTR Program Eligibility issued by the SBA in 2013).

Table 19: Compromise tracking - a senate perspective

Issue	H.R. 448 Introduced 1/26/11	S. 1867 As passed by Senate/ S. 493 As Reported 3/9/11)	H.R. 1425 Introduced 4/7/11
Majority Venture Capital Owned Small Businesses	No similar provision.	NIH, DOE, and NSF may not award more than 25% of SBIR funds to "small business concerns that are owned in majority part by multiple venture capital operating companies through competitive, merit-based procedures that are open to all eligible small business concerns..." Other federal agencies may not award more than 15% of SBIR funds to "small business concerns that are owned in majority part by multiple venture capital operating companies through competitive, merit-based procedures that are open to all eligible small business concerns."	NIH, DOE, and NSF may not award more than 45% of SBIR funds to "small business concerns that are owned in majority part by multiple venture capital operating companies, hedge funds, or private equity firms through competitive, merit-based procedures that are open to all eligible small business concerns..." Other federal agencies may not award more than 35% of SBIR funds to "small business concerns that are owned in majority part by multiple venture capital operating companies, hedge funds, or private equity firms through competitive, merit-based procedures that are open to all eligible small business concerns."
Issue	H.R. 2965 Passed by House	H.R. 2965 Passed by Senate	S. 4053 Passed by Senate
Majority Venture Capital Owned Small Businesses	For the SBIR and STTR programs, the bill would allow majority venture capital ownership in a small business if not more than 50% of the firm is owned by one venture capital company and the employees of the venture capital company are not a majority of the small firm's board of directors. If the venture capital company is controlled by a business with more than 500 employees, the small business is eligible only if not more than two large venture capital companies have ownership interest in the small firm and these large venture capital companies do not collectively own more than 20% of the small business.	The bill permits NIH to award not more than 18% of SBIR funds to majority venture capital-owned small businesses so long as "no single venture capital company owns more than 49 percent of the small business concern" upon a written determination provided to the Administrator of the SBA and the Senate Committee on Small Business and Entrepreneurship and the House Committee on Small Business. Allows other participating agencies to award not more than 8% of SBIR funds to majority venture capital-owned small businesses so long as "no single venture capital company owns more than 49 percent of the small business concern" upon a written determination provided to the Administrator of the SBA and the Senate Committee on Small Business and Entrepreneurship and the House Committee on Small Business.	NIH, DOE, and NSF may not award more than 25% of SBIR funds to "small business concerns that are owned in majority part by multiple venture capital operating companies through competitive, merit-based procedures that are open to all eligible small business concerns..." Other federal agencies may not award more than 15% of SBIR funds to "small business concerns that are owned in majority part by multiple venture capital operating companies through competitive, merit-based procedures that are open to all eligible small business concerns."

Source: Schacht, 2011 (Congressional Research Services)

The size of the VCs under the scope was also in the balance of the discussions. Calculation models were discussed in that regard in order to include a mix of gross annual turnover and number of employees as criteria for framing VC (non-)participation to SBIR through the backed companies.

The guide to SBIR eligibility (2013) was therefore heavily affected by this warm controversy. The precisions on ownership structure and parameters framing ownership issues with regards to SMEs affiliation and venture-owned companies appear to be extensive and details as a result from the bargains on this issue in Congress. The 2012 Directive explicitly stated that any SBC that is majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms should submit a certification together with its SBIR application to the agency it applies for (see Annex 4, Section 6.2).

Interviewees see the next reauthorisation process as a new opportunity for VC advocates to get back to this issue and try to get more out of the legislative process in line with their interests.

Reinforced Strategic Intelligence as a policy response. In response to the conflicting views on the VC issue the Congress included new Strategic Intelligence modalities into the reauthorisation (see Box 53).

Box 53: Responding by setting up conditions for Strategic Intelligence

As a result of the controversy around the issue of venture capital-owned participants in SBIR, the following clauses were added to the reauthorisation:

“Not later than 3 years after the date of enactment of this Act, and every 3 years thereafter, the Comptroller General of the United States shall— (1) conduct a study of the impact of requirements relating to venture capital operating company, hedge fund, and private equity firm involvement under section 9 of the Small Business Act; and (2) submit to Congress a report regarding the study conducted under paragraph (1).”

Source: 2011 SBIR Reauthorization Act, SEC. 5142. GAO STUDY WITH RESPECT TO VENTURE CAPITAL OPERATING COMPANY, HEDGE FUND, AND PRIVATE EQUITY FIRM INVOLVEMENT

The monitoring of VCOC-specific information through the Tech-Net database has been pushed forward as a way of controlling the implementation of the congressional exigence. The 2012 SBIR Directive also states that *“Agencies must maintain information on all awards exceeding the guidelines set forth in paragraph (i)(1), including the amount of the award, a justification for exceeding the guidelines for each award, the identity and location of the awardee, whether the awardee has received any venture capital, hedge fund, or private equity firm investment, and whether the awardee is majority-owned by multiple VCOCs, hedge funds, or private equity firms”*.

It also added that in the context of its company registry database, information should be given about whether the Small Business Concern is backed by “venture capital, hedge fund or private equity firm investment and if so” describe *“(A) The percentage of ownership of the awardee held by the VCOC, hedge fund or private equity firm; (B) the registration by the SBC of whether or not it is majority-owned by VCOCs, hedge funds, or private equity firms. Please note that this may be auto-populated through the individual calculations of investments in the SBC already submitted.”* (Source: 2011 SBIR Reauthorization Act, SEC. 5142. GAO STUDY WITH RESPECT TO VENTURE CAPITAL OPERATING COMPANY, HEDGE FUND, AND PRIVATE EQUITY FIRM INVOLVEMENT).

In that sense, Strategic Intelligence came as a way of regulating controversial aspects of the programme, giving the word to the numbers to be spoken by the experts along the implementation of the newly reauthorized SBIR.

3/ Strategic Intelligence as a frame for perception and export resource: the American 'Outward Perspective' and limited 'learning from abroad'

3.1 Positioning embedded learning processes: linking intertemporal and Transnational Policy learning through Strategic Intelligence

3.1.1 The role of Strategic Intelligence in SBIR change in practice: perceptions from the field

Strategic Intelligence contributed to policy learning at different levels. It is however perceived in different ways by the actors involved in the design and implementation but also assessment of SBIR and its outcomes. To some extent, actors recognize that Strategic Intelligence can have a structural role (for instance when it is a vehicle for power relations, such as when control from decision-makers is exerted over administration through GAO assessments); however, the “feelings of pressure” vary (some interviewees referred for example to the fact that ‘pressure’ might not be the right word to use, influence might fit better here). The forms of intelligence and intentions behind actors’ behaviours matter in that respect. The comprehensive and regulatory assessments did not lead to important administrative uptakes of Strategic Intelligence results for instance. In terms of content, mainly metrics are expected to impact internal management of SBIR. However, they were main inputs to the political process underlying the programme and its successive reauthorisations.

General views on Strategic Intelligence. Strategic Intelligence focused or related to the SBIR Program also presents some structuring aspects. It is interesting to note that in the context of their synthetic work on the impacts of innovation policy, Edler et Al. (2013) state that systematic evidence about PCP measures and schemes is only available for the American SBIR.

The use of Strategic Intelligence remains focused on national matters and does not involve the use of foreign knowledge in SBIR design or re-design. The difference between the various sources of intelligence described in this section tend to confirm that GAO studies are similar to audits while the NAS, DoD (RAND) and NIH (Self-) evaluations are more comprehensive. The hearings on Capitol Hill are clearly pointed out as key momentums during which awareness is raised, knowledge is transferred, and all stakeholders (including public authorities and beneficiaries) are gathered around the SBIR topic. One of the interviewee clearly identified these hearings as being one of the very key vectors of influence on SBIR policy making. Conferences also ease the contacts between each group (stakeholders, consultants, experts, consultants, policy makers, beneficiaries) as suggested by several interviewees, one of them considering the biannual National Conferences as a “great achievement” and a way to “educate SMEs” on the program.

Operational level and limited uptake. In general SBIR managers perceive the metrics as a duty. Compliance with legislative requirements (and OIG⁴¹⁶ recommendations) and auto-monitoring/auto-justification, as illustrated by the NIH reports on its SBIR program (2003, 2007 and 2009) are key to Departments. SBIR managers also perceived the usefulness of the NAS evaluations as being very limited, justifying this position by a lack of operational value of the evaluation. In that sense, the evaluation is rather seen by most of the interviewees as a tool “for the Congress. Most of the Departments also face limited resources which correlate with limited capacity to look for / read studies or evaluation reports. However, if knowledge about the existing studies is not equal from a Department to another, all know about the NAS Evaluation. SBA uses feedbacks from SBIR managers, stakeholders, as a source of organisational and operational intelligence. The discourse held by SBIR managers remains based on the argument that operationally better learning takes place by doing and that evaluation conclusions did not bring any new operational information (“lessons come from practice, not from books and studies, and especially regarding commercialisation” – an interviewee). Another aspect in terms of operation was the non-use or even absence of knowledge about the NAS studies and similar others by the beneficiaries themselves (confirmed by several interviews).

Several interviewees evoked the fact that Strategic Intelligence in an SBIR context would rather be used at a higher management level (non-specific) in the definition of agencies and departments’ priority areas (such as for NSF or DoE), then taken up in SBIR design at the level of every single agency (and most likely “*translated*” into federal needs per agency). Influencing pieces of Strategic Intelligence would be here rather market-oriented (market and socio-economic studies) than policy-oriented (evaluations, IA, etc.).

Political level and argumentative perspective. The argumentative use of Strategic Intelligence in the SBIR context is clearly illustrated by the statements made by contributors heard in Congress hearings. The controversies described in this case study also highlight the relations between Strategic Intelligence and the interactions between political players. Most of the interviewees see the influence of the NAS evaluation at the decision level. This is clearly related to the utilisation of the evaluation results, pointing at specific issues such as described above (mainly regarding the issues of Venture-backed companies, SBIR mills, and the increase of the set-aside). Instrumentation of knowledge generation is clear: the recent attempt to strengthen Congress control over agencies’ management and implementation of SBIR goes through the development of extensive databases, among which the commercialisation database and related benchmarks (not forgetting the realisation benchmarks) is an expression of the willingness to use knowledge about the Programme and its effects to better frame its commercially-oriented orientations.

⁴¹⁶ Office of Inspector General

One other parameter is that the NAS evaluations constituted a relay of the discourse of agencies but also beneficiaries towards the Congress and other entities (see for instance NAS, 2008 – where it is reported that DoE Office of Science in charge of SBIR considered the programme as a tax; or where it is reported that some beneficiaries considered that DoE “tight topics gave the impression that the topic may be designed to give a particular company an advantage in the selection competition”). One interesting example is the 2009 NAS Study on Venture Funding and the NIH SBIR Program in which a large number of references to stakeholders’ testimonies gathered during Senate hearing are relayed as qualitative inputs to the study. Also the influence of Strategic Intelligence in terms of promoting more flexibility and administrative support in SBIR management is to be highlighted. This is illustrated by the uptake of recommendations from the NAS related to the needs expressed by SBIR managers and led to the possibility of using up to 3% of SBIR funds for management purposes, as well as the possibility for Departments and Agencies to launch pilot programs, to utilize awards from other agencies, to skip Phase I (some Departments only), award sequential Phase II awards, etc.⁴¹⁷.

Informing politics is another function of Strategic Intelligence in the SBIR context. One interviewee –staffer from the Congress– explained that “To make our arguments, we would rely on data from NAS research (VC participation etc.)” as well as “studies from BIO, NVCA, and SBA online data” though these studies were less credible as “they were promoting their own agenda”. On top of the features previously described, the intelligence developed through monitoring and evaluation exercises allowed state representatives and senators to better take into account the interest of their State. There is indeed a clear concentration of awards in some of the states (in the case of DoE for instance, the 5 top States together obtained 57% of the Phase I awards, while the next 5 States got 16% and the next 20 States 25% of these awards; the remaining 20 States only reached 2.5% of the DoE SBIR Phase I awards; although the proportions are not the same, a similar and even more intense concentration phenomenon can be observed for Phase II awards⁴¹⁸). Therefore, the a priori interest of some political representatives in the programme can be observed, though this interest did not constitute a fundamental discrimination factor in terms of the position of the senators or representatives vis-à-vis the programme. Louisiana for instance is one of the less successful states when considering SBIR awards attraction. However, Senator Landrieu (Louisiana) was the main political advocate of the programme and its reauthorisation over the past 6 years.

Various roles of Strategic Intelligence. Over the three decades of its evolution, the SBIR Program moved and changed in shape and content. Strategic Intelligence clearly played a crucial role in that evolution, securing its path towards enlargement and prorogations.

⁴¹⁷ See NAS, 2014

⁴¹⁸ Source: NAS, 2008 and 2008a, the latest showing that California and Massachusetts are far ahead in terms of number of Phase I and Phase II awards (for Phase II awards: 21 and 14.4 respectively for California and Massachusetts against 5.8 for the next State in line holding the third position, Virginia –a similar repartition is observed with regards to Phase I awards-).

The present case study clearly shows how Strategic Intelligence influenced this evolution by shaping the objectives of the programme and their prioritisation, coming in support to the political willingness to orient SBIR towards more commercialisation-focused priorities. The first achievement of Strategic Intelligence in terms of cross-temporal policy learning can be described at a more abstract/paradigmatic level: it is about changes in the perception of the programme as well as in terms of re-shaping its concept. However, it also lies in the accountability and control functions Strategic Intelligence can have which are operated at a monitoring (metrics) and regulatory control levels. These two forms of learning should be linked to the political uses of Strategic Intelligence outputs, such as illustrated by the instrumental uses of Strategic Intelligence by political players in negotiations or to some extent the discursive function of Strategic Intelligence (in the case of the VC issue for instance where the NAS report reported conflicting positions and problematic issues to clarify the state of play and clarify some aspects of the programme).

One last (but not least important) is the role of policy diffusion: Strategic Intelligence gathered along the SBIR lifetime led to knowledge spill-overs at the State level where complementary initiatives have been put in place to play a leverage effect on the federal programme. The communication channels between State and federal level appear to be inter-agency connections and conferences and road tours organized around the country. Many participants from the State attend SBIR conferences which are sometimes organized by the States themselves.

3.1.2 From conceptualisation and problematisation to control

“When we first launched SBIR 30 years ago, none of us could have predicted that it would mature into the world-renowned 2-billion dollar a year programme it is today” Edward Kennedy Receives SBIR Tibbetts Pioneer Award, October 2007⁴¹⁹

Conceptualisation and problematisation. Strategic Intelligence and mainly in the context of the NAS studies allowed some conceptual development to better approach but also co-construct the evolution of the programme.

The comprehensive studies conducted by the NAS had in the first place a pedagogical role, providing an overview of the different components of the programme and key issues such as for the complex VC issue (NAS, 2009a). For instance, figures were drafted to illustrate the way SBIR works and is to deliver outcomes.

⁴¹⁹ Speech available at <https://www.youtube.com/watch?v=6OMYE8pSosl>

The inclusion of the Valley of Death is an outstanding example in that regard. The present case study shows that the notion of Valley of Death was added as a building block of the programme rationale later in its life cycle (about 20 years after its official start). The NAS studies made the Valley of Death a reason why the programme is “sound in concept”, identifying needs in this newly integrated view on innovation funding gaps and linking them to the assets and qualities of the programme. The same goes to some extent for the use of the Technology Readiness Level scale⁴²⁰, taken up by the NAS evaluation of SBIR as a standard grid to position the projects supported through SBIR (see NAS, 2009). Though this is not a new practice at all (NASA, DoD, DoE... already used this reference scale in their management routines), the use of this scale by NAS sets/stems in this conceptual grid to understand the maturity (readiness level) of SBIR-supported projects from a ‘technology’ standing point.

At a broader level, NAS studies also framed the concepts on which the programme is based (innovation, valley of death, etc.). Especially the NAS evaluations provided a cognitive frame to which benchmark the programme. The following figure presents for instance the vision of the innovation process as apprehended by the NAS when approaching SBIR (see Figure 36). One can easily note here that a conceptual choice is operated at the evaluation level, where the selected innovation model is not the systemic one but the non-linear model of innovation.

Figure 36: The innovation process according to the NAS evaluation of SBIR

Source: NAS, 2004a

⁴²⁰ Also called TRL; initiated by the NASA, this scale is described on http://esto.nasa.gov/files/trl_definitions.pdf and provides a segmented view on the innovation process from the emergence of an idea to its commercialization. More details are provided on <https://www.nasa.gov/content/technology-readiness-level/#.VRhdrvUeao>.

The model above was proposed as a basis for the evaluation repository during the conference reported by the NAS (2004a) and adding to the understanding of the innovation process on which the SBIR is based.

This illustration was taken up and will later be further referred to in presentations and reports (see for instance the NAS evaluations of SBIR published in 2009 or the presentations from C. Wessner in the late 2000s/early 2010s).

Instituting a vision of innovation and SBIR based on three analytical reading grids (non-linear model of innovation, valley of death and TRL), the NAS evaluations contributed to the (re-)problematisation of the programme and its objectives towards the targeted commercialisation-oriented focus. Initially imposed by the Congress, the commercialisation benchmarks also go together with a discourse against the opposition of the University lobbies against the programme. What is interesting here is that as expected, evaluations provided a reading grid of the program and its effectiveness, but also of its nature. Evaluation over the time helped structure what the programme is in practice, especially in terms of rationale (mainly objectives).

Strategic Intelligence is also a channel for external ideas to be part of the policy process (see for instance how Strategic Intelligence was used in the context of the 3 key controversies associated to the last Reauthorisation of the programme). Several interviewees explained that the longevity of the programme and the fact that its ground was well-established, one of these interviewees referring to the fact that new ideas could only come from 'outside'.

From concept to control. The importance of Strategic Intelligence is clear when one understands that in SBIR, Strategic Intelligence defines the repository according to which the programme will be benchmarked and which will be used for further control from Congress over the executive branch. Strategic Intelligence produces indicators, descriptors, criteria, questions which provide with a reference framework. The above examples of the innovation process, the Valley of Death and related use of the TRL scale are clear in that regard.

The relations between the different forms of intelligence are also interesting as the metrics recently designed for SBIR were based on indicators to some extent already exploited by the NAS evaluations (sales, third-party funding, etc.). The 2008 SBIR evaluation recommended to make regular evaluations of the programme and built the ground for new metrics and benchmarks.

This case study shows that the most significant (influential) reports produced along the years of existence of the programme were mandated by the Congress as to better control the implementation of the programme by the executive branch. Both comprehensive and normative forms of evaluation (essentially concretized by the GAO and NAS reports) played a role in that regard. The same goes for the development of metrics (transition and commercialisation benchmarks especially).

Two tracks were identified for Strategic Intelligence to play the role of control tool at the service of the Congress:

- ▶ Strategic Intelligence used to frame controversial issues around the programme.
- ▶ Strategic Intelligence used to ensure the direction of programme implementation, for example towards a reinforced commercialisation-oriented rationale.

Political use and the fight for credible evidence. Strategic Intelligence outputs were used by conflicting parties as described in the previous section on recent controversies. The use of expert knowledge mainly came with the intention of backing existing positions of the players who are active on the political stage (interest groups, Congressmen and Congress staffers, etc.). Some of them even made up fake figures⁴²¹ in order to defend their position. Limited content learning could therefore be observed as a filter was applied to the evidence-based arguments gathering strategies of these actors. The influence of Strategic Intelligence was indeed limited by its contradictory position with regards to political interests of certain organisations relayed by specific entities (House, Senate, etc.).

The value of expert knowledge derived from Strategic Intelligence mainly depended for SBIR on the value of the arguments that could be derived from related evidence. However, many discussions and debates took place around the value of the evaluations and their limitations.

This questioning starts with what one evaluates (commercial success? Technology breakthrough? Second-degree spill-overs and impacts? Social value? What about impacts on a longer-term?). The complexity of the programme is here at stake as politics push for fast and concrete results, while innovation benefits might appear on a longer run.

The role of expert is definitely a gage of credibility: the key evaluation leader of the program, who is also a main SBIR advocate, was identified as ‘neutral’, “non-partisan in all of this” by several interviewees. This according to several of them made him a stronger advocate since the results of the evaluations were released along the first decade of the 2000s. But the Mills and VC controversies also illustrate the limits of expert work and the importance of credibility to constitute the right ground for policy arguments to be held and defended in the political area. When coming to the NAS evaluations, the first limitations perceived by SBIR managers were raised in terms of the lessons learned and recommendations made at the operational level. Second range of criticisms were related to the limitations in terms of consultations (not “everybody” was involved in the process of the study –representatives from DoT and NIST noticed that no one from their SBIR management had been interviewed by the NAS in the context of the 2008 evaluation-).

⁴²¹ Fight for credibility also leads some individuals involved in political negotiations to making up data in order to push / argue further in their own direction.

This appears to limit the impact Strategic Intelligence can have on the policy process: when testifying before the Congress to recommend that SBIR funding should be increased, the NAS lead evaluator of the programme started on a shaky ground.

As one of the interviewees involved in the NAS evaluation through AAAS grant and consulting contract explained, “Very little research from the evaluation was published, only part of it. A lot of what has been done has been kept secret”. An impression remains: a number of interviewees consider that the NAS evaluation “lacks to show that it is a solid piece of work”. A number of interviewees from both policy making and expert spheres referred to the lack of compelling data. The lack of evidence for success is still a recurrent argument used by opponents to the programme (source: several interviewees opposed to SBIR).

Several interviewees explained the importance and convincing character of “Anecdotes” told through the NAS evaluation but also through the Congress hearings involving companies and stakeholders. The “anecdotal” telling of success stories appears to have a powerful effect on decision-makers as suggested by these interviewees.

Involvement of academics. The 2000 Evaluation of the Fast Track Initiative largely relied on papers drafted by academic experts having published on the subject (SBIR or assimilated issues such as venture capital funding, etc.)⁴²². These individual publications were however mainly thematic and did not contain clear reference to foreign policy experience but rather highlighted specific aspects of the American programme.

It is to be noticed in that regard that many academic authors having published on SBIR did publish on the basis of evidence gathered during the evaluation, and/or were involved in its evaluation thanks to their academic position with regards to their expertise of the programme or connected areas as committee or team members (D. Audretsch, A. Link, J. Lerner, D. Archibald, and to some extent D. Siegel, N. Vonortas, etc.). One interesting aspect is that some of the academic papers dealing with SBIR impacts are quoted in the NAS study of the programme. This implies to some extent that the reflection on the outcomes of the programme is partly being shaped by the ways used to frame it (in the academic literature or through internationally committed experts).

A link with international references and a possible international cognitive repository could be expected (N. Vonortas for instance has an extensive EU background), which could be illustrated by the approach and methods used to analyse the SBIR and its effects, etc. Such indirect influence is however very hard or even impossible to measure or assess as the uptake of any foreign lesson as such a level of abstraction does not take any concrete form in terms of the changes the SBIR Program has been undergoing over the past decade.

⁴²² As made explicit in the “Research Papers” section of the evaluation, these papers constituted the ground “on which the recommendations and findings [were] largely based” (NAS, 2000).

As an example, one can point at the four references to OECD publications in the bibliography of the DoE SBIR evaluation, as well as other international studies; but none of these references is quoted in the evaluation itself, and remain surrounded by many more US-focused references.

The other NAS evaluations follow the same pattern, while the more focused GAO and external studies usually do not even refer to any foreign paper or intelligence. One can conclude that though Strategic Intelligence (in this case NAS evaluations mainly) is a relay of academic and fundamental knowledge for SBIR, it is not a vehicle of ‘learning from abroad’ through it.

Branding. A positive image was built around SBIR: “despite some criticism of the rigour of the evaluations of the US scheme, the overall picture is that it has contributed to firm growth and innovation activities and, in a more limited way, to employment” (Edler et Al., 2013). The perception of the programme (while surrounded by regular controversies) is the one of a success, marking the programme with some “widespread popularity” (NAS, 1999).

By supporting the integration of SBIR into Departments and its development as a programme, the NAS evaluations contributed to improve the image of SBIR, highlighting its benefits to the Departments and arguing in favour of its further integration in agencies. In that sense, the comprehensive studies conducted tended to fight the perception of SBIR as an R&D tax scheme over the Departments.

Validation also goes through Strategic Intelligence. In its workshop report on “Partnering Against Terrorism”, the NAS (2005) explain in several occasions the SBIR Program as a successful example of how the Federal State and the private sector can team up and through industrial development contribute to the fight against terrorism.

3.2 Foreign Strategic Intelligence and the repository shaping function: internal legitimization and perception building

3.2.1 References to foreign experiences and foreign intelligence: legitimization and validation purposes

"The rest of the world thinks the SBIR program is the greatest thing since sliced bread. I could put up a list of 10 countries that have copied this program. And there's a source of dismay to us, the rest of the world is copying it, putting it on steroids, while we're debating it"

Contribution from Charles Wessner, Hearing entitled “Reauthorization of the SBIR and STTR programs, Small Business Committee SR-428A.

Strategic Intelligence as a way to problematize issues and challenges: leading in a ‘competition’ context. The problematisation of SBIR through Strategic Intelligence does not stop at the previously described aspects. References were made to international academic papers but also reports which relate to specific analyses (not policy oriented) on important issues just as to highlight their importance (but with no further implication).

This is the case of the 2000 SBIR evaluation, referring in introduction to the importance of high-tech industry as recommended by the Institute for World Economics (Kiel, DE) as well as similar arguments to address market failures and support industry, R&D and SMEs from the OECD (Paris; see also arguments presented in NAS, 2004 and 2004a, used to validate existing position on the importance of SMEs in US). The international dimension of the argument plays here the role of credibility marker and comes usually with the idea of international competition on the topic or issue discussed, such as illustrated by the contextual reference to the 1980s issue of “global manufacturing and marketing success of Japanese firms in autos, steel, and semiconductors—led to serious concern in the United States about the nation’s ability to compete” (NAS, 2004). Other similar arguments can be found in reports (such as GAO, 2006a) or hearing proceedings (where U.S. as a country is presented “AS A GLOBAL TECHNOLOGY COMPETITOR⁴²³” – see in Annex 4, Section 11 the extract from the 2007 House hearing in question, where an analysis of the decline of American innovator’s position is described). The use of foreign Strategic Intelligence is, in summary, focused on describing the position of US in international competition in order to define the basis for arguments held for instance in hearings or as ground for the presentation of the SBIR Programme or its performance.

However the conquest of foreign markets is not presented as an argument to illustrate SBIR commercial success stories although it is used in several occasions to justify its importance. No particular emphasis is put on the possible internationalisation of successful SBIR awardees, though sales to export markets, or partnerships with foreign entities (see NAS surveys in the context of the Department evaluations such as NAS, 2008) are considered as indicators in the evaluation of the programme which also takes into account other parameters⁴²⁴. It includes for instance interactions between awardees and foreign companies –referring to licensing, R&D, market, and distribution agreements, as well as customer alliances-, foreign investments received by the awardees, etc. (see for instance NAS, 2007).

The argument of international competition is mostly highlighted in conference, workshop and hearing proceedings (such as in the 2013 Small Business Committee hearing – SR-428A). Reference to the “rest of the world” has been made several times through hearings before the senate.

⁴²³ Source: 2007 House “Small Business Innovation Research Reauthorization on the 25th Program Anniversary” Hearing and related proceedings

⁴²⁴ Also one case study refers to the need of a “global patent strategy” (NAS, 2008)

The main evaluation leader of SBIR presenting conclusions and recommendations about the SBIR Program, used the reference to other countries copying the programme as a validation of the programme's success, as well as a pressuring point (see below: "the rest of the world is determining what that competition will be"):

*"I should just point out in a parentheses that while we debate whether we should be doing these things, Senators, the rest of the world is copying the program, often with larger awards. It is important to keep that in mind, that we do not live in a world where we determine the frame of competition. The rest of the world is determining what that competition will be."*⁴²⁵

Box 54: Reference the international competitive pressure - 4 examples

1) *"America is certainly not doing enough to promote innovation, especially given the state of competition from foreign countries that are graduating more scientists and engineers than we are and the state of our economy today. Our share of the global technology market is declining. Ten foreign countries have copied the SBIR Program. Major countries. Witness after witness, GAO [Government Accountability Office] study after GAO study, report after report say the program is working remarkably well and has for 26 years. Please don't mess it up (...) While the pie is getting bigger, the U.S. share is getting smaller"* and 2) *"Things are getting worst internationally"*

Source: Source: 1) Jere Glover, House Hearing on "The Role of The SBIR and STTR Programs in Stimulating Innovation at Small High-Tech Businesses", 2009 and 2) Gere Glover, 2013 Senate Small Business Committee hearing – SR-428A

2) *"He described a conversation with the Minister of Science from New Zealand, who wanted to sell more products to the United States. His country was planning to do so by training excellent scientists and forming an SBIR-like program to move products more effectively into the United States, the world's largest market".*

Source: Reported contribution of Dr Joseph Bordogna (NSF) to the Symposium on SBIR Diversity and Assessment challenges organized and reported by the NAS (2004a)

3) *"To be competitive in the global economy, the United States relies heavily on innovation through research and development (R&D). Recognizing the potential of small businesses to be a source of significant innovation, Congress enacted the Small Business Innovation Development Act of 1982. The act established the Small Business Innovation Research (SBIR) Program"*

Source: GAO, "SPACE ACQUISITIONS - Challenges in Commercializing Technologies Developed under the Small Business Innovation Research Program", 2010

⁴²⁵ Senate Hearing 109-968, <http://www.gpo.gov/fdsys/pkg/CHRG-109shrg36593/html/CHRG-109shrg36593.htm>

4) *“The ultimate goal of the SBIR program is to bring new products and technologies to commercialization in order to stimulate international competitiveness. This program is an important stepping stone in the overall goal to keep America's competitive advantage in the worldwide marketplace. (...) SBIR needs to be larger, not smaller. Even the smallest cuts in dollars actually going to the innovative small companies, however well-intentioned, will cost us internationally. Let us build on our SBIR success”.*

Source: 2007 House “Small Business Innovation Research Reauthorization on the 25th Program Anniversary”
Hearing and related proceedings;

Note: other examples can be given, for instance referring to the competitive position of US on a certain technology, or on the lack of US new technology support compared to other countries

Foreign experiences - The NAS Evaluation of SBIR published in 2008 dedicated a section as described in the following: “Finally, Section 1.5 looks at the changing perception of SBIR in the United States and the growing recognition of the SBIR concept around the world as an example of global best practice in innovation policy. The increasing adoption of SBIR-type programs in competitive Asian and European economies underlines the need, here at home, to improve upon and take advantage of this unique American innovation partnership program.” The reference to world-wide adoption of the SBIR model comes as to legitimate the programme and its conceptual approach to existing needs and failures in industrial economies. The argument is used as a sign of success by stakeholders supporting the programme: “The NAP study also found that the following countries have adopted an SBIR-type program – Sweden, Russia, The United Kingdom, The Netherlands, Japan, Korea, Taiwan and other Asia countries (Page 54). A European Union policy paper has a goal of 15% of EU R&D funding to SMEs” (Source: Testimony of Gere Glover before the Senate, 17 February 2011 on behalf of SBTC, under the section entitled “The SBIR Program – It Is Working!”).

Box 55: 1.5.1 SBIR around the world

“Increasingly, governments around the world view the development and transformation of their innovation systems as an important way to promote the competitiveness of national industries and services. They have adopted a variety of policies and programs to make their innovation systems more robust, normally developing programs grounded in their own national needs and experiences. Nevertheless, governments around the world are increasingly adopting SBIR- type programs to encourage the creation and growth of innovative firms in their economies. Sweden and Russia have adopted SBIR-type programs. The United Kingdom’s SIRI program is similar in concept. The Netherlands has a pilot SBIR program underway and is looking to expand its scope. Asia, Japan, Korea, and Taiwan have also adopted the SBIR concept with varying degrees of success, as a part of their national innovation strategies. This level of emulation across national innovation systems is striking and speaks to the common challenges addressed by SBIR awards and contracts.”

Source: NAS, 2008a and taken up (reformulated) by NAS, 2009d⁴²⁶

The diffusion argument comes back in several hearings as a sign of success called upon by the evaluator of the programme.

Foreign intelligence - Beyond the use for problematisation, legitimisation appears of great importance. The use of foreign references to reinforce the SBIR perception locally is indeed clear. References to international intelligence has for instance been used in the context of the 2000 Fast Track evaluation in order to refer to key challenges and reinforce the argument that US deal with these challenges. Referring to an OECD paper, a paragraph is for instance accompanied by this legitimating footnote: “Concerning support for small business, the OECD gives a positive review of U.S. programs” (NAS, 2000); a similar utilisation can be observed with a reference found several times in NAS (2008a and 2009b) in order to back a set of recommendations regarding evaluation (and more precisely the use of programme budget for evaluation purposes (reference to the 1-to-3% OECD benchmark)). The same assessment takes up a previous reference to Germany derived from an OECD source and already quoted in NAS (1999) as a reference to a German scheme; OECD sources are also quoted in hearings (see the Senate Small Business Committee hearing – SR-428A) in a similar way –show “how the rest of the world is doing” in order to better illustrate the international competitive pressure over US.

⁴²⁶ « Governments around the world are increasingly adopting SBIR type programs to encourage the creation and growth of innovative firms in their economies. Sweden and Russia have adopted SBIR-type programs. The United Kingdom’s SIRI program is similar in concept. In the Netherlands, a successful pilot SBIR program has led the government to expand its scope across the government. In Asia, Japan, Korea, and Taiwan have adopted the SBIR concept as a part of their respective national innovation strategies. And India has adopted an SBIR type program to advance its biotechnology sector. Other countries are actively adopting SBIR type programs. This level of emulation across national innovation systems is striking and speaks to the common opportunities and challenges addressed by SBIR awards and contracts. » (NAS, 2009d)

References to OECD are also kept in NAS (2014). Other European references are used in lobbying papers.

At the Department level, Strategic Intelligence not specific to SBIR is used for management to determine priority areas (larger-scale foresights for instance). These ‘policy environment-oriented’ studies are not a vehicle of Transnational Policy learning in se, but can still be listed as a vector of international positioning tool (economic studies positioning US in an international context influencing the priorities targeted by its policies).

3.2.2 Composition of a policy knowledge repository accessible internationally

An extensive Strategic Intelligence repository and a biased perception of SBIR. Rigby (2013) states that “Evaluation of the SBIR programme (of the United States of America) has led to increasing awareness on the role of the design of pre-commercial procurements”; He also adds that “there is increasing interest in the concept and a variety of schemes under development based on the US scheme”. Strategic Intelligence shapes the image of the programme. And to the extent it is accessible (through internet or other inter-institutional channels), it also shapes the perception other individuals and organisations abroad can have of this American programme.

The SBIR is more than 30-year old, longevity being taken as a sign of “success”. Such longevity also implies knowledge creation: 33 years of knowledge production – up to 2015 – (still new NAS evaluations of the programme at the Department level to come up in 2015 as a follow-up on the previous NAS evaluations; only the 2014 DoD one was taken into account in the present study) led to the constitution of an extensive repository of Strategic Intelligence. The present study grouped 56 items under “Strategic Intelligence” (including reports but also hearings) and this is far from an exhaustive list: other GAO reports and many hearings not included. 27 academic papers on the topic as well, though their use remains limited (focus on performance of the programme and its design, no international perspective; used in the evaluations of the programme as references). All files are publicly available on-line, providing an image of the programme and its achievement, leading to its reconceptualisation.

The repository does not reflect all realities (controversies around the validity of NAS evaluations for instance) as well as other asymmetric phenomena (across Departments for instance). In addition, the content available through the components of this repository does not imply any automatic uptake. Surprisingly, an entirely positive image of the programme has been generated and diffused to the world (“The SBIR program is widely viewed as a success story”⁴²⁷) while the controversies that agitated the SBIR community over the last 15 years are not known.

⁴²⁷ Wessner and Gaster, 2009

Strategic Intelligence repository and SBIR diffusion. Strategic Intelligence is a main part of the repository of material provided by the SBIR managers and officials to foreign delegations eager to learn more about the programme. Foreign delegations would “do their homework” before coming to SBA.

Strategic Intelligence is also a factor of legitimation of the descriptions made of the programme abroad, directing the way perceptions abroad are shaped. The importance of this repository is crucial but interviews show that only part of it is really known. This suggests that although Strategic Intelligence is statically available, dynamics should be created in order for it to circulate (should this be wanted of course).

Finally, a key characteristic of the SBIR Strategic Intelligence repository is that it is purely American and does not include any foreign source or author beyond a few experts involved in the NRC panel in charge of implementing the NAS evaluation. The Strategic Intelligence repository is therefore large, accessible, but monolithic and not connected to foreign spheres.

3.3 Strategic Intelligence and Transnational Policy learning dynamics in the case of the American SBIR

3.3.1 Limited learning from abroad? No or limited import dynamics

Preliminary comment: all statements in this section are not normative in nature and there is no inherent argument that learning from abroad should be the norm or would even be beneficial to the SBIR programme and related Strategic Intelligence.

Domestic constraints over foreign Strategic Intelligence sourcing. “Learning from abroad” is very limited in the American SBIR context. Though many devices exist to support feedback loops between State and Federal levels, policy makers in the US context do not refer to any foreign experience, though some of them (as well as key stakeholders such as BIO, etc.) are aware from the presentations of the NAS that other SBIR-like programmes exist abroad. Though Strategic Intelligence is used in both instrumental and managerial ways (especially through the design and application of monitoring metrics), knowledge and perceptions are shaped that provide an image of the programme: knowledge is created (reports, database bringing together data to monitor the programme, etc.), made available and might be transferred from abroad to the American SBIR policy sphere. But both desk and field researches showed that there was no or limited dynamics of inward policy learning percolating at the SBIR level. As already explained in the previous sections, very indirect effects of foreign Strategic Intelligence can be guessed through the involvement of experts with an international track record in the SBIR policy and evaluation cycles. Direct influence on the other hand remains limited.

Several programme managers referred to learning sources such as academic journals and (international) conferences but recognized that they usually learn about specific thematic (technological or economic) issues more than about international practices. Innovation reviews, entrepreneurship journals, academic literature overall are used in a more operational way to better understand topic-relevant issues. There are obvious constraints to learning from abroad: several interviewees identified the lack of administrative resources (time and human resources mainly) to look at policy practices outside the US while important efforts are required to run the programme. Even stakeholders (here mainly federations) mainly focused on the US experience, without drawing policy lessons from their international connections.

The fact that the programme is more than 30 years old as well as its unique scale are also viewed as arguments for considering it apart from the other SBIR-like programmes around the world (see for instance NAS, 2014; as well as several interviewees' comments).

A few interviewees quickly expressed their interest in learning from abroad but referred to material constraints to it, but only a few interviewees expressed an interest for countries or policy entities experiencing younger practices compared to the American raw model.

A cultural issue should also be highlighted here as it was acknowledged by several interviewees stating that the US practices are quite self-centred and that the US are "a large country with already 50 States to look at" (source: interviewee). This is a key interpretative conclusion about the overall setting for transnational policy learning: the entire SBIR is designed in a "closed way" (R&D to be performed in the US, no involvement of foreigners in peer reviews or evaluation committees⁴²⁸/panels, etc.). Even in practice, awardees tend to collaborate with American partners or sub-contractors (the preference for American sub-contractors being part of the legal requirements of the program). This together with the US self-centred perspective combined with an argument of 'US is a large enough country', creating a rather impervious bubble with no or few receptors to learn from abroad. No clear channel or entrance point for foreign knowledge is identifiable in structure or in content, the knowledge produced around SBIR being focused on the programme and its performance.

⁴²⁸ Though they are of international stature, no member of the evaluations' steering committees were coming from any foreign country.

Box 56: (Not) looking for foreign experience?

The NAS reports illustrate this focus on the US experience and the closure to learning from abroad.

Though the 1999 NAS project on SBIR challenges and opportunities quotes as one of the side objectives “benchmarking U.S. practices against foreign practices, “not necessarily to emulate foreign practices but to understand on one hand, what the competition is doing”; and on the other, identify opportunities for mutually beneficial cooperation” in order to arrive “at recommendations for improved American policymaking on national and international partnerships”, no such experience was reported in the available document. The discussion reported by the NAS shows a great focus on the American experience⁴²⁹ and suggests that the declared intention was not followed by any formalized exchange on foreign practices.

In the 2009 NASA SBIR evaluation report, the NAS referred to several comparison possibilities. It stated that the program can be compared to other NASA Programmes, to other SBIR Programmes (in other agencies and Departments but still in the US), as well as to Early-Stage Venture Capital. There is no reference here to any of the existing SBIR-like programmes abroad.

In the latest evaluation report available at the time of the present thesis (the DoD SBIR Evaluation of 2014), the methodology section is introduced by the following statement: “It is always useful when assessing government programs to identify comparable programs for appropriate benchmarking. However, comparable programs do not really exist in the United States, and those in other countries operate in such different ways that their relevance is limited. The SBIR/STTR programs are relatively unique in terms of scale and mission focus” (NAS, 2014)

In terms of the people aware of the existence of an SBIR-like programme abroad among the interviewees, it is possible to distinguish between a first half who are not aware of the programme, with half of this share (including one beneficiary) who are aware that one or more such programme(s) exist(s) abroad, mainly thanks to NAS presentations. A few active learners could be identified, who are either actors from the expert category or specific officials (such as one of the SBIR coordinators from SBA⁴³⁰).

⁴²⁹ The only reference to foreign policy making lies in an input paper found in the Annex –by J. Lerner- and stating “public venture capital programs have also had a significant impact overseas: e.g., Germany has created about 800 federal and state government financing programs for new firms over the past two decades, which provide the bulk of the financing for technology-intensive start-ups”

⁴³⁰ This interviewee explains his view on learning from abroad: “I’m interested in what countries are doing, my role being to improve US Program (SBIR is a national program, so the only comparison possible is with other National countries, as we need to compare at the same level). I do not have support for that –no information-. It is just a personal initiative that I maintain looking for other information sources etc. I have my own personal connections at the international level (...) I ask for information to my contacts; before I look around on the web, and people I talk to send me reports”

Relays remain: policy and learning entrepreneurs promoting the programme and working in an international context source lessons from their experiences abroad. But no concrete evidence could be gathered showing that any of the lessons from these foreign experiences impacted SBIR.

3.3.2 “Passive export” of the model: Strategic Intelligence in the administrative and expert responses to foreign demands and queries

Managers are aware of the interest of countries or organisations in the American SBIR model but rarely more. “We do not need to sell the idea to other countries – there is no self-interest in that” states a manager. Several interviewees explained that SBIR applicants having business abroad reported the existence of similar models abroad but not more. One of the interviewees whose work consists in supporting SBIR applicants along explained that such companies would apply in several SBIR (for instance in US “and in Germany” and pick up the one where they succeed or that eventually proves to be the more interesting. However, at the policy level this channel seems very limited or even absent (no transfer of first or second range SBIR-related policy experience could be identified with regards to this specific channel). Learning happens then at the level of visiting delegations and goes through inter-organisational exchanges.

Foreign delegations. Passive export exists at the Congress level, where several staffers received foreign delegations (an interviewee explains that Republican representatives received UK representatives [“because they had a similar model that did not work very well”], accompanied by the embassy). Another interviewee (ex- Congress staffer) explained that “We had met with a minister, parliament member, who had a similar SBIR policy initiative running. He came over to US just to get information on SBIR – and was Shadow secretary for BIS”. Visitors in this case would come to the Congressional office or straight to the political Office of a targeted representative. Most of the usual contacts are taken through the diplomatic corps (embassies).

But the main policy importers remain foreign delegations which are usually either administrative or mixed (bringing together officials, politicians, experts). Though visitors can address SBA or the embassy first, many also go the Departments themselves (which has been the case of DoE, DoD and EPA). Visitors can also benefit from events organized by stakeholders on the topic⁴³¹, though reported experience of that kind remains limited (generally focused on American experience and targeting an American audience). Many foreign delegations would first go to visit DoD and NSF. Thanks to the existing repository of SBIR-related Strategic Intelligence, delegation members would prepare through desk research; an interviewee comments on these visitors who usually “have done their homework”.

⁴³¹ One interviewee mentioned that in 2012, he participated in a briefing on SBIR (with NSF) for representatives from Kuwait; and that this meeting was facilitated by the AAAS

Mainly NAS reports are read by the foreigners as they are available on the web. NAS is the major source of feedback for programmes' administrators. NAS comprehensive evaluation is considered as a 'benchmark'. This first round of learning allow them come to their US counterparts with a first level of awareness, before a virtual or physical visit to SBA (and/or other entities) comes then with more technical elements. At the Department level, delegations would come directly to ask about SBIR, or to ask about other collaborations; either straight to the Unit in charge, or through the international relations office.

Box 57: Informing on SBIR - a DoE perspective

"I have met with people from Ireland recently, willing to launch a similar initiative. [A European Consultancy CEO involved in] the EU Framework Programme tried to connect them with people from US. We also met with people from Mexico; from the EU; [South Korea; Russia; Ukraine and several other Eastern-European countries]; Australia; countries interested in SBIR and willing to adopt it. Most of [them] went through their embassies and embassies found us. Ireland commissioned a few studies on this topic. [The officials came] from ministries essentially. [Another DoE colleague] went to Mexico, and the Mexican ministry came [visit us]. [My colleague also] met at the Australian embassy. [We] spoke over the phone with European countries representatives. They try to look to strengthen their arguments to launch [an SBIR Program] in their country, [requesting] statistics and evidence on returns on investment, economy factors, jobs. We provide information on that basis and always refer to formal documents (evaluations, etc.) as well as the SBA. And we do our own statistics on commercialization etc.

(...)It has been only since about three years that all those people come to us. [This is mainly due to some] pressure from the current economic times, as we all try to grow our SMEs. Also Enterprise Ireland came over in July. They come to us first because our website is easy to understand. They usually go to us and then other [Departments]. Discussions really focus on the SBIR itself and its achievements. I'm only authorized to speak about the program itself, not its implications for economy jobs etc. We might talk about research evaluation etc. but we never go deep. Sometimes visitors are accompanys by someone from the office of congressional and intergovernmental affairs. In the case of Mexico, high level people brought to our meetings so the Department of State was also present".

Source: Interviewee from the Department of Energy (DoE)⁴³² – Interview Transcript

Sourcing from the executive branch. The role of organisational learning calls for attention in an SBA context: SBA manages an office called the 'international visitors program' managing and organizing international visits to SBA.

⁴³² It is to be noticed that the interviewee could not identify any element he could have learnt from abroad while being in contact with the representatives from the areas mentioned

This office receives on average 2 visiting delegations a month, and welcomes delegations from all over the world (with an increasing number of Chinese delegations). These delegations would come in two types identified by an SBA interviewee as being the delegations interested in overall innovation policy and/or SBA, and the delegations interested in the SBIR program. These delegations would either call the relevant SBA contact (or be put in touch with this contact), or address the international visitor program before ending up in a meeting with this contact. The Small Business Administration (SBA) SBIR office is the main contact point of other countries' representatives. Implementing Departments and agencies (DoE, NIH, DoD...) also welcome visiting delegations; but SBA appears to be on the frontline as being the SBIR coordinator. Strategic Intelligence seem here to play a primary role: visitors "do their homework before coming (...) and have a feel of the program" (Source: SBA official) as they gather and analyse all knowledge available from internet sources to learn about the Programme as a whole (structure, guiding principles, etc.) before coming to SBA premises (usually not more than 3 times) in order to enquire about specific aspects. Strategic Intelligence stands here as a source of analytical knowledge with an informative role for foreign representatives. After using available knowledge, foreign representatives contact officials from SBA and/or the relevant American Departments before traveling to Washington in order to learn about specific aspects of the American SBIR, with a clear intention to fine tune it to their national context.

Among the delegations received⁴³³, the SBA received visitors from the UK⁴³⁴, China, Russia and others willing to learn about the programme and its specifics. The delegations usually come with specific queries. Some like Belgium and Netherlands would be interested in the government procurement and how to use it for innovation purposes; whereas others such as France would be more interested in the coordination of activities operated under the programme. Interviewees in charge of the SBIR at SBA confirmed that one to two foreign delegations were present in their administration every week, coming from all countries in the world to learn about SBIR ("they are here all the time"). SBIR being considered as a model, delegations would go online, hear from colleagues about the benefits of the programme. One of the interviewees explained that most of the time, 'learners' are about to start up an SBIR-type of programme or already manage an on-going one. Meetings are organized in SBA to answer questions and exchange best practices. Delegation members would fine-tune lessons derived from American experience and adapting the programme features to their national contexts.

⁴³³ An interviewee quoted "Israel, Italy, Spain, France, Netherlands, Eastern EU countries, Sweden, Kazakhstan, Denmark, United Kingdom -a couple of times as they started up a similar initiative, SBRI, and re-launched it again-" as well as "Australia, South America, Mexico" but also "Belgium and Netherlands".

⁴³⁴ The Head of a Deputy's staff would have met with UK visitors experiencing a difficult SBIR, and discussed this issue at the embassy.

In some cases such as for Sweden, the SBA would visit the country (and in that case meet two times with Vinnova⁴³⁵). In any case, according to an interviewee from SBA, the delegation members “tend to be interested in hearing a description of SBIR” or strengthening international relationships between administrations.

Conferences. One facilitating factor lies in the large amount of conferences on a variety of topics (several were referred to by many interviewees, including the international meetings of biotechnology federations during which SBIR examples have been quoted). But it is impossible to get a serious grasp on all the conferences existing and playing a channelling function. However, their role of awareness creation is clear, and interviewees refer to presentations in conferences and panels as having a triggering effect (raising some interest among the audience). Conferences are events during which learning entrepreneurs can connect to and learn from outsiders’ practices. 20 years ago already the interest for SBIR was internationally triggered by its founding father R. Tibbetts who travelled to different countries in order to present the program (among others, United Kingdom, Netherlands and Sweden were referred to, but also the European Union and NATO). Since then and in many other instances the programme was promoted outside US. The director of the NAS Innovation and Entrepreneurship Program (Dr C. Wessner) promoted the SBIR model and its success internationally (presentations made in conferences in different countries⁴³⁶ and referring to evidence from the SBIR evaluations performed by the NAS). This specific SBIR advocate made indeed as a primary argument of its success the fact that the SBIR was copied by many all around the world (see Wessner, 2008; Senate Hearings, 2011 and 2013; etc.). Also other academics involved in the SBIR evaluation have been identified as promoters of the program to some extent (Audretsch, and by experience/to some extent Vonortas).

This links with a key element to be underlined and which is the role of consultants and academic experts involved in SBIR design, implementation, evaluation and transfer. An interviewee from DoE refers to consultants specialized in commercialisation and SBIR who provided DoE with their expertise in 2011 and contributed to the setting up of similar models in South America. The same goes when considering the profile of the evaluators mobilized by the NAS (mostly academics active at the international level) as well as consultancies with a transnational network active in both US and other countries.

⁴³⁵ “The Swedish Vinnova official started the all connection; he was here when SBIR was an NSF program. Then he came back, I worked well with him and helped introduce him to a bunch of people. Then I put [he and his colleagues] in touch with officials/program managers involved (...) I provided them with statistics we developed but we have not developed that many ([it was mainly about] NRC Chuck’s evaluation; but [nothing new came up]; [also the] GAO former evaluations [and] Survey from ourselves –SBA- in 1999.” (Source: interviewee, SBA)

⁴³⁶ Among others, available evidence shows that the success of the SBIR Program was presented by the NAS Entrepreneurship and Innovation Program Director in Canada, Germany, Switzerland, Israel, and Slovak Republic.

The “expert” community and related networks definitely plays a catalytic role in SBIR knowledge transfer, though these transfers could hardly be identified in the case of the US given the generally limited “learning from abroad” identified.

The diffusion of the American SBIR model to a broad range of countries over the world is viewed as an indicator of its success. It is indeed assumed by SBIR advocates that the SBIR Program is a best practice. This argument has been taken up in different communication materials, conferences, etc. aiming at justify and/or legitimize the programme associating its adoption by foreign countries as a sign of success (see Tibbetts, 2008 or Wessner’s multiple presentations of the programme abroad). It was also used as a way to stimulate competitive spirit, such as suggested by Tibbetts (2008)⁴³⁷.

3.3.3 Active exports: expert communication and promotion of the programme internationally

When questioning interviewees on their knowledge about the possible existence of SBIR-like programmes outside the US, most interviewees would always point at the same person who would own such knowledge (and in a few cases, to officials passively responding to foreign queries).

The lead evaluator of SBIR at this time is a well-known member of the NAS (previously working at the OECD) and is considered as the reference expert on SBIR. He is also a central connection between SBIR and the rest of the world.

In his presentations -given outside USA-, the American NAS SBIR chief evaluator argues that SBIR is one of the ways to address the “innovation imperative”⁴³⁸, still in a growing international “locational competition” (Wessner, 2010) context that would be driven by innovation (such view is relayed by SBIR advocates such as the SBTC [2009; 2014]). Taking the example of how the United States address this issue, SBIR is there presented as a best policy practice.

⁴³⁷ When mentioning the growing competition with Western-Europe and Asia in order to justify a possible increase of SBIR set aside rate, Tibbetts also used the following argument: “The UK has just announced a new innovation program. Dozens of countries, notably including those that came here to study the SBIR program, are now increasing their investment in innovations by small technology firms, venture capital development, business schools, and basic research” (Tibbetts, 2008)

⁴³⁸ This innovation imperative is summarized in Wessner 2008 presentation to the United Nations Conference on Trade & Development in Santiago (Chile) in three points: 1) “Innovation is Key to Maintaining a Country’s Competitive Position in the Global Economy”, 2) “Small Businesses and Universities Play a Key Role in the Innovation Process” and 3) “New Institutions and Incentives are Required to Address New Realities in Global Competition”. In subsequent presentations, the second point is focused not on the aforementioned actors but on the imperative of collaboration.

It is described as a measure fostering innovation in small businesses which are considered key for the economy and supporting small businesses in overcoming the so-called “valley of death” and especially the lack of early-stage venture support. These arguments are supported by evidence from the NAS evaluation of the SBIR programme, from which key facts are presented to illustrate the key strengths of the programme.

Box 58: SBIR promoted as a best practice - an active “Push” approach illustration

What can an SBIR-type Program do for Israel?

- Focus on Innovation and Pull Technologies to Market
- Gated System Provides Low Cost Support for Promising Firms while Mitigating Risks in the Valley of Death
- Improve Government Procurement Markets by Providing Choice and Competition
- Convert Research in to Economic Progress

SBIR is Important for Slovakia’s Future, But SBIR is not a Panacea for Slovakia’s National Innovation Challenges

It is an important mechanism that works best with
21st Century Universities

SBIR is Important for Slovakia’s Future, But SBIR is not a Panacea for Slovakia’s National Innovation Challenges

It is an important mechanism that works best with
21st Century Universities

Source: Wessner (2011), “Financing Eco-Innovation - The Role of the Small Business Innovation Research Program”, presentation in Tel-Aviv, Israel; and Wessner (2013), “Addressing the Innovation Imperative - How can we Support Innovative Ideas and Start-ups?”, presentation in Bratislava, Slovak Republic

Public procurement of R&D: Small Business Innovation Research-type programmes

Innovative small firms often face difficulties in attracting investors to support their innovation projects - especially at the seed stage.

This has incited governments to play a role in funding the development of new technologies in small companies through R&D contracts.

The Small Business Innovation Research (SBIR) programme - introduced in the United States in 1982.

SBIR inspired similar programmes in Japan, Australia, the United Kingdom and the Netherlands.

47

Public procurement of R&D: Small Business Innovation Research-type programmes (cont.)

SBIR funding has led to increased growth, employment and venture financing (Lerner, 1999), but others cast doubt on additionality (Wallsten, 2000).

SBIR-type programmes must finance proposals not likely to receive funds from private sources, if additionality is to be maximised.

SBIR-like initiatives tend to develop a technology to a certain level of readiness, while major commercialisation successes usually require substantial subsequent funding.

48

Source: Nolan (2012), “Recent OECD work on Demand-side Policy”, presentation by the OECD in Helsinki

A similar presentation from Albert Link to the United Nations Economic Commission for Europe shows that operational knowledge derived from the lessons from the NAS evaluation of NIH SBIR are communicated as lessons (“Recommendation - If the NIH is interested in increasing the probability of commercialisation, it should consider conditioning new Phase II awards on university involvement and a commitment of own resources (...) increase in probability of commercialisation from 26% to 70%”). The details given on SBIR impacts focus on key numbers (commercialization probabilities). Other SBIR experts or advocate are invited to present their expertise abroad but can face practical constraints: the head of the SBIR Gateway (information portal about SBIR) has been invited to speak on SBIR at different conferences in UK and Australia. Costs, language, but especially the need to have an American background (that allow understanding the details of SBIR evolution) were barriers for him to move outside.

It is to be highlighted here that the diffusion channels are not created by or through Strategic Intelligence (no process use): Strategic Intelligence is here a resource used in non-SBIR-specific contexts (other channels and other platforms) and mainly used as source of evidence to promote the programme as successful during conferences.

Figure 37: Using Strategic Intelligence to promote SBIR internationally and using international copying as a way to legitimization

SBIR and the University: A Mechanism to Transfer Knowledge

- SBIR Innovation Awards Directly Cause Researchers to create New Firms
 - Faculty does not have to give up University post
 - Cooperation creates High-Tech Jobs
- Universities can diversify & grow the job base
 - Increasingly universities are the largest regional employer for all types of employment
- Cooperation validates Research Funding
 - Returns to Society in Health, Wealth, & Taxes
 - SBIR is a proven mechanism in an uncertain game

Conclusions

Innovation Awards like SBIR can be an Important Policy Tool to Meet the Globalization Challenge

SBIR Program: Leveraging Higher Returns on R&D Investments

- SBIR Capitalizes on Existing R&D Investments and Procurement Funds
- Focus on Valley of Death—Key Point of Vulnerability for Firms and Products
- National Program to Meet National Needs with National Firms
- Bottom-up Approach to Tech Transfer
 - Contributes to Innovative Solutions as well as Growth and Job Creation

SBIR can help Drive the Growth of a Knowledge Economy

- A tool to lift productivity growth & build a more modern knowledge-based economy
 - Helps government provide services at lower cost
 - Capitalizes on National R&D Investments
 - Catalyzes the Development of New Ideas and New Technologies
 - Addresses Gaps in Early-Stage Funding for Promising Technologies
 - Generates Jobs, Growth, & Effective Innovation

SBIR is Recognized Internationally as Best Practice

- Finland has adopted a 3-Phase SBIR Program
- Sweden & Russia have adopted an SBIR-Type program
- UK SIRI program is similar in concept; now being upgraded
- The Netherlands government has recently adopted SBIR, following a pilot program
- Japan, Korea, & Taiwan have adopted SBIR concept
- India has launched a SBIR Initiative for the biotechnology sector

➤ All had consultations with the NAS

Source (Figure 16): Slides from Wessner's presentation in Geneva entitled "Converting Research into Innovation and Growth – SBIR, the University, and the Park" (2008); in a 2011 and 2013 presentations, C. Wessner also takes the examples of Poland, Singapore and the European Union which launched or were considering launching an SBIR-like programme

When perceived success and innovativeness meet demand for new models. However, and despite the discourse of the SBIR advocates, not only positive but also mixed perceptions can be observed: in that regard, the 2012 OECD Economics Department Working Papers No. 1001 titled “Strengthening Innovation in the United States” (Karey et Al., 2012) explained that “Evaluation of the SBIR programme, however, has been mixed”. Feedback from SBIR managers in several American Departments also shows mixed perceptions about the SBIR effectiveness. Rigby (2013) observes that existing evaluations “are not clear as to whether the pre-commercial procurement approach in the form of the US SBIR is effective in dealing with market failures.”

The general perception outside United States still seems to remain positive as a number of foreign delegations “come to learn” from the SBIR experience. This positive perception built from the SBIR evaluation and its advocates made it a best practice with visibility that could attract the eyes of policy makers outside United States and scanning the country for best policy practices.

Annex 2 – CASE 2 - Positioning the role of Strategic Intelligence in transnational policy learning: the UK SBRI

1/ The case of the UK SBRI in context

1.1 A British version of SBIR: the Small Business Research Initiative (SBRI)

“Tell me and I forget, teach me and I may remember, involve me and I learn”

Benjamin Franklin

1.1.1 Diffusion of SBIR to the world... and especially Europe

Many countries (at least partly) emulated the American SBIR model: “largely influenced by the US experiences with the SBIR Program [...], Australia, Korea, Sweden and the UK are among the countries that have adopted their own versions of R&D or pre-commercial procurement schemes” (Lember et Al., 2014). It was acknowledged during the field research that countries in Asia were studying the possibility of copying the programme and tailor it to their own systems. However the multiple uptakes of the SBIR model by countries around the world took place at least 20 years after its first Congressional kick-off in the US. This raises the question about the overall context, conditions and opportunity windows but also “cognitive readiness” for the adoption of such a programme.

An interviewee from the American NAS pointed out a number of countries mobilizing his expertise to learn about SBIR, including in the European Union. Among countries that have adopted an SBIR-like programme in the EU, the first adopter was the UK quickly followed by the Netherlands.

Box 59: Active SBIR sourcing - eye on the Netherlands

Netherlands is one of the leading EU countries that got inspired by the American SBIR Program⁴³⁹. In that context, several forms of Strategic Intelligence plaid a role in the adoption, design and adaptation of the programme, which was launched in 2004⁴⁴⁰. Other sources of knowledge influenced its orientations, for instance the 2007 evaluation process that led to positive results⁴⁴¹ (mid-term evaluation drafted by EU consultants in innovation policy with a wide network [Source: interviewee]). Other sources were used such as TNO research.

The Dutch version of SBIR⁴⁴² was shaped through innovation platforms where issues related to the social innovation agenda and inter-departmental issues are discussed by public entities and stakeholders. An interviewee researcher in the Netherlands and who was involved in that process explains that it was decided in that context that critical mass was available to give SBIR a try in the Netherlands. The programme was identified as a best innovation policy practice by the Prime Minister think tank, but no particular political champion pushed for the programme. SBIR is run by NL Agency which is part of the Dutch Ministry for Economic Affairs, Agriculture and Innovation. It was not made mandatory and was initially considered as experimental. Some improvement tracks are clearly to be explored as the procurement part (last phase) seems not to be exploited.

The first SBIR adopter in Europe was the UK. The discussions around the adoption and implementation of such programme led to a number of impacts on domestic policy making: “Even in Anglophone Britain, the recent campaign to introduce a US-style approach to innovation has had a major influence on UK policy thinking”⁴⁴³. This second case study will focus on the UK version of SBIR and how Strategic Intelligence plaid a role in its adoption and evolution over the past 15 years in order to assess cross-temporal and Transnational Policy learning dynamics and how Strategic Intelligence was a vector for those to take place.

⁴³⁹ See

http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/nl/supportmeasure/support_mig_0005

⁴⁴⁰ See [http://www.sci-network.eu/fileadmin/templates/sci-](http://www.sci-network.eu/fileadmin/templates/sci-network/files/Resource_Centre/Case_Studies/Case_Study_-_Dutch_SBIR_-_Final.pdf)

[network/files/Resource_Centre/Case_Studies/Case_Study_-_Dutch_SBIR_-_Final.pdf](http://www.sci-network.eu/fileadmin/templates/sci-network/files/Resource_Centre/Case_Studies/Case_Study_-_Dutch_SBIR_-_Final.pdf)

⁴⁴¹ See <http://www.oecd.org/innovation/policyplatform/48136807.pdf>

⁴⁴² Which description is available at

<http://www.rvo.nl/sites/default/files/bijlagen/SBIR%20the%20Power%20of%20public%20procurement.pdf> but also on <http://mapeer-sme.eu/programmes-for-smes/search-in-the-online-database/dutch-sbir-small-business-innovation-programme-NL2>

⁴⁴³ Source: Linda Weiss (2014), “US Technology Procurement in the National Security Innovation System” in Lember et Al., 2014

In the UK, the Small Business Research Initiative (SBIR) clearly “aimed to emulate the US Small Business Innovation Research (SBIR) programme” (Source: Technology Strategy Board⁴⁴⁴) as illustrated to some extent by Box 60.

UK CAMPAIGN FOR A US-STYLE SBIR PROGRAMME

UK “SBRI” launched 2001, but ineffective.
“Innovative procurement” highlighted
regularly in government policy papers

Campaign launched in December 2004 with
press coverage and ‘White Paper’

Informal ‘supporters club’

Meetings with Government Ministers,
advisers and senior officials

“Private Members Bill” (Anne Campbell MP
in 2005) – carefully tailored to UK conditions

- **RESULT:** Inclusion of 2.5% ‘target’
mandatory for all Government departments
in March 2005 announced in annual Budget
(“worth £100m per annum, guaranteed”)

Source: Connell, 2009

Box 60: NESTA evidence on SBRI timeline and the original model (US SBIR) - emulation references

⁴⁴⁴ Technology Strategy Board (no date), “SBRI – Government Challenges. Ideas from Business. Innovative Solutions. – Public Procurement & Innovation – EU. Created by Mark Glover Head of SBRI. Delivered by David Connell Advisor to SBRI

Evaluating success and emulating – what does ‘working’ mean? (reflecting on the SBIR)

“The SBIR program is sound in concept and effective in practice.”
National Academies evaluation

US SBIR is circa \$2.5 billion a year – most countries need to consider vastly different scale (how to create a portfolio effect in smaller economies?)

Most successful approach? – 160 different parts of DoD make SBIR awards! Each process is somewhat different.

According to NAS surveys, 20% of responding companies were founded directly as a result of a prospective SBIR award (25% in Defence)

Source: NESTA, 2013⁴⁴⁵

While the initial programme in the US was initially a high-risk funding programme and presented in these terms (but not only), in the UK it was mainly presented through its procurement dimension as a demand-side instrument. As highlighted in the previous section on the American SBIR model, the evolution of the American SBIR progressively shifted towards an increasing focus on commercialisation, turning SBIR into a slightly different scheme than the original model from back to the end of the 1970s.

Beyond a shared interest for SME support in the policy area, the introduction of SBIR correlated with a growing awareness vis-à-vis the demand side of innovation, although the following sections will show that the very first introduction of the Small Business Research Initiative was driven by one specific aspect of the link between procurement and R&D small business performers.

A broader perspective also allows linking the introduction and development of the programme with a another growing interest in the notion of valley of death and -when considering policy briefs and communication papers- one can observe that the references made to the perceived needs of the UK innovation system are driven not by the share of the procurement markets by small businesses but rather correspond to needs in terms of risk capital⁴⁴⁶ to support their development.

⁴⁴⁵ NESTA (2013), “Buying Power – How does the UK Small Business Research Initiative (SBRI) drive innovation?”, presentation by Stian Westlake & Kirsten Bound

⁴⁴⁶ See for instance the references the RSC calls upon in its position paper available at <http://www.rsc.org/campaigning-outreach/realising-potential-of-scientists/research-policy/>

One of the key selling points of SBIR as a model for the UK (but also for other key evolutions in the British innovation policy such as the setting up of the Technology Strategy Board [TSB]) was the success of the American DARPA, very often seen as a model for procurement agencies all around the world.

1.1.2 SBRI as a PCP scheme: a European perspective

The EU view on demand-side innovation and PCP/PPI is an important perspective to be taken into account when studying SBRI as will be further explained in O. As for the Netherlands or any other country in the EU, UK innovation policy cannot be studied apart from the European innovation policy framework and the related context. It is widely recognized that the European Union plays a key role in the development of innovation initiatives (through the Structural Funds for instance⁴⁴⁷ or the Framework Programme⁴⁴⁸) and has some influence on Member States that is exerted in multiple ways.

In the UK, the SBRI is viewed and has been more recently promoted as a pre-commercial procurement programme. This corresponds to the last version and associated perceptions of the programme which are to be observed first in a wider context. In the 2000s with the Lisbon Agenda development plan (2000-2010), innovation was given a higher priority on the European agenda, leading to more attention to the demand-side of innovation and the recognition in 2003 that public procurement “is a leading or major component of demand in a number of sectors (...) where the public sector can act as a launching customer”⁴⁴⁹. Rolfstam (2008⁴⁵⁰ and 2013) describes the evolution of this perception towards the “belief that public procurement could be used to build on lead users creating lead markets, by driving demand for innovative goods, while at the same time improving the level of public services”.

Among other developments, a Committee was formed under the leadership of the Finnish Minister Esko Aho which released a report in 2006⁴⁵¹ promoting the use at the EU level of PCP/PPI initiatives on the basis of a demand-oriented approach (which is currently embodied by current initiatives such as the Action Plan⁴⁵², Lead Market Initiative⁴⁵³, etc.).

⁴⁴⁷ See http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=structural_funds

⁴⁴⁸ See the latest Framework Programme (Horizon 2020) on <http://ec.europa.eu/programmes/horizon2020/>

⁴⁴⁹ Reference to *European Commission (2003), “Investing in Research: An Action Plan for Europe”, COM(2003) 226, Brussels*

⁴⁵⁰ *Max Rolfstam (2008), “Public Procurement of Innovation”, CIRCLE – Lund University*

⁴⁵¹ See http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm

⁴⁵² See http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/news/index_en.htm

⁴⁵³ See http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/index_en.htm

New initiatives impacting Member States were set up in that regard. Beyond these specific types of influencing factors the European framework also plays an important role in legal terms as the EC directives on public procurement⁴⁵⁴ and State Aid regulations⁴⁵⁵ impose certain standards and norms to Member States policy initiatives.

The EU also played a crucial role in the promotion of PCP schemes, taking the SBIR Program as a best practice in many of its reports (mainly externalized to consultancies) and communication papers. Many platforms (such as the EU Procurement Learning Lab for instance) exist to inform Member States on the existing practices of procurement. The initial PPI/PCP approach developed by the EC was based on the limited auction theory according to which “public procurement is treated as a game in which the buyer and the supplier each try to take advantage of the other’s weaknesses. The supplier’s supposedly superior knowledge stands against the buyer’s advantage in being in control of the actual design of the auction rules” (Rolfstam, 2008). Studies were conducted on the topic and a reflection was engaged on the status of PCP in European countries (see Figure 2) showing UK as one of the first lead implementors of one or more PCP scheme(s).

Figure 38: Overview status of implementation of PCP across Europe

* Only one PCP approach has been notified to the Commission so far (UK Energy Technology Institute) and has been verified not to contain State aid. Other approaches referred to here (UK SBRI, NL SBIR, Belgium / Flanders pilot) have not been examined by the Commission from a State aid point of view.

Source: European Commission (2011), “COMPILATION OF RESULTS OF THE EC SURVEY ON THE STATUS OF IMPLEMENTATION OF PRE-COMMERCIAL PROCUREMENT ACROSS EUROPE – April 2011”⁴⁵⁶

⁴⁵⁴ See <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32014L0024> and for an overview of the public procurement framework of the EC http://ec.europa.eu/growth/single-market/public-procurement/index_en.htm

⁴⁵⁵ See http://ec.europa.eu/competition/state_aid/legislation/legislation.html

⁴⁵⁶ See <http://cordis.europa.eu/fp7/ict/pcp/pcp-survey.pdf> where it is explained that “Ten Member States (...) and 1 Associated Country (Switzerland) report that there is no awareness of any PCP related initiative in the

The UK appears in the above figure as one of the leading countries in terms of implementation of PCP. The Home Office in charge of the Procurement rules in the UK is here officially in charge from the side of the Member State. Aside the existing PPI policy currently based on the 2008 Innovation Nation White Paper commitment which resulted in the drafting of Departmental innovation procurement plans (Uyarra, 2013), the key PCP scheme currently implemented as a form of emulation of the American SBIR is the Small Business Research Initiative (SBRI).

This scheme falls under procurement rules which are based on and framed by the EU procurement legislation. Placing the programme under procurement legislation was the only solution for the UK to set up a programme funding 100% of R&D costs (which is not allowed by the State Aid rules); the trade-off being that an access restricted to SMEs only would not be permitted as the procurement rules in Europe do not allow such discrimination as the European Union forbids any form of preferential treatment in the light of the non-discriminatory principle” (Carpinetti et Al, 2006⁴⁵⁷)⁴⁵⁸. Moreover, “contrary to the United States case, the EU Directive does not allow for set-asides. Therefore, in the light of the increasing centralisation of procurement activity pervading the European Union, SMEs have to face even more difficulties to be awarded a public procurement contract” (Carpinetti et Al, 2006).

1.2 Common blocks and key different features

1.2.1 At the level of the social components in which SBRI is grounded

Innovation as a competitiveness factor in a globalized context: the “knowledge economy”. The overall approach to innovation at the national level is in the UK grounded into the idea of Knowledge-based Economy⁴⁵⁹ as presented in the 1998 Competitiveness White Paper issued by DTI. More recently the British innovation policy was re-formulated in the Innovation Nation White Paper (2008); an interviewee noticed that though the Labour Party was in charge when the White Paper was published, the measures proposed would usually not correspond to what a Labour government would do (risk investments, etc.).

country. In sixteen other countries PCP related activity is being observed: either pilots have started or are starting, or the framework for establishing those is under construction or under discussion.”

⁴⁵⁷ Source: Laura Carpinetti, Gustavo Piga and Matteo Zanza, “The variety of procurement practice: evidence from public procurement” - Nicola Dimitri, Gustavo Piga, Giancarlo Spagnolo (2006) “Handbook of Procurement”, Cambridge University Press

⁴⁵⁸ The interactions between SBRI and the European framework are further described in **Error! Reference source not found.** and **Error! Reference source not found.**

⁴⁵⁹ This notion refers to “economies which are directly based on the production, distribution and use of knowledge and information” (see <http://www.oecd.org/science/sci-tech/1913021.pdf>)

Knowledge-based economies are considered as facing growing international competition because of the globalisation context. Like in the US, the idea of competitiveness is therefore a dominant ground for the rationale of the programme. This view sees the programme as a response to current challenges that should be handled domestically before other economies (emerging powers especially as they become more and more competitive) take the lead (see Connell, 2006 and 2010⁴⁶⁰). These competitiveness challenges are very often proposed and presented as driving reasons for supporting innovation are supported in Strategic Intelligence. The 2007 Sainsbury Review itself is entitled “Race to the Top” (to be further elaborated on in the next chapter) while referring to the urgency of globalisation and its economic consequences (relocations and outsourcing, etc.): “At no time since the Industrial Revolution has the restructuring of global economic activity been so great, and we need to accept that China and India are now seeking to upgrade their industries. We can be one of the winners in “the race to the top”, but only if we run fast.” (Sainsbury of Turville, 2007). The entire review is based on this notion of “race to the top” confronting the UK to emerging and catching up countries such as China, Russia, etc. and the necessity to compete for jobs and economic growth.

Rationale picked up from the American SBIR. The SBRI clearly aimed at emulating its American model. The building blocks of the functioning of the programme have therefore been transferred but also tailored to the receiving country’s context. An interviewee explains that among other key elements of the SBIR, the elements that were particularly emphasized were that “there should be a genuine competition for procuring services above and beyond [previous] standard work” with innovation as a focus. The interviewee explains that the programme should not be about reporting but create a competition for SMEs even if the access to the competition cannot be restricted to SMEs only. The basis of that rationale was the interpretation of SBIR by an independent expert who produced a report to benchmark the American model: “David Connell had written a very convincing paper about the elements required” in the programme (...) that was a Framework as to what those elements should be, how to design the programme (...). That was a valuable input for sure, something to get back to, to test the implementation against to see if it matched the vision.” (Source – interviewee, NH).

⁴⁶⁰ For instance, Connell (2010) Foreword mentions that « We must continue to innovate, and that innovation must depend partly on basic research – if it is only on short-term targeted research, our competitors will beat us to it”.

Purchasing power: “Smart”⁴⁶¹ procurement rationale and PCP format. The promotion of innovation in procurement has been taken up by the Technology Strategy Board (see “Innovation in procurement”, 2014a⁴⁶² and “Concept to Commercialization – A strategy for business innovation 2011-2015”). In the 2008 “Innovation Union” White Paper drafted by DIUS, the SBRI is clearly part of the innovation procurement strategy presented by the Government: “each Government Department will include an Innovation Procurement Plan during 2008 as part of its commercial strategy (...) These plans will include details of how Departments and the agencies they sponsor will seek to increase their procurement of innovative products and services, fulfil their commitments under existing initiatives such as the Small Business Research Initiative”. The two lead procurement schemes in the UK are the Forward Commitment Procurement⁴⁶³ and the SBRI initiatives.

But the SBRI is also to be put in context: as already explained in the previous sub-section touching upon the European PCP/PPI initiatives, SBRI is considered as a PCP scheme oriented towards procurement (though it is usually perceived as a procurement scheme⁴⁶⁴). Though it is a mixed-measure in practice, it is usually considered as demand-driven (public authorities would drive innovation towards their/social needs). The SBRI is therefore not an innovative procurement initiative but lies in between procurement and direct support. Though it has been regarded as part of the procurement policy, SBRI is recognized by BIS as an example of PCP (OGC, 2009) and is still considered as apart from the overall procurement discussions (though it is quoted as part of the picture as an important procurement practice).

This component of the rationale of the SBRI lies in the idea that government purchasing (or ‘buying’⁴⁶⁵) power (DTI, 2004; CBI and Qinetiq, 2006) covers an important potential for innovation and growth, justifying a role for government from the demand side and from different perspectives –lead user/early adopter, etc.- (DIUS, 2008). As investment capacity in Government is important (260 billion a year in 2011), PCP has for long been seen as a “huge” opportunity (Golding, 2011) that is still being developed and scaled up such by Innovate UK. TSB (2014a) in its 2011-2015 strategy for business innovation aims at “scaling up the use of SBRI and creating a central support fund to engage other government departments” in that direction.

⁴⁶¹ See DIUS, 2008

⁴⁶² See <https://www.gov.uk/government/publications/innovate-uk-strategy-2011-to-2015-concept-to-commercialisation>

⁴⁶³ See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32446/11-1054-forward-commitment-procurement-buying-innovative-solutions.pdf

⁴⁶⁴ See <http://www.publications.parliament.uk/pa/ld201012/ldselect/ldsctech/148/14808.htm>

⁴⁶⁵ See NESTA, 2010

Public authorities as lead customer. TSB (2011) put forward the role of public authorities and Government in particular as lead customer, referring to the “power of government” from that viewpoint. Here the route to commercialisation is a focus point, justifying the importance of Government as lead customer but also as supporter of small entities through seed funding before deployment or upscaling stages are taken up by additional private support. Here, “acting as a lead customer means working closely with business in the pre-commercial stages of product development; sharing challenges and objectives, guiding specifications and testing prototypes before purchasing the resulting solution.” (TSB, 2014a)

Beyond its purchasing power, public support is also seen as vector of credibility (selected providers passed through competition and are awarded with official public recognition).

Several interviewees referred to a more recent influencing reference: Mariana Mazzucato’s ‘The Entrepreneurial State’ (2013) as a source for policy rationale: “The book comprehensively debunks the myth of a lumbering, bureaucratic state versus a dynamic, innovative private sector. In case study after case study Professor Mazzucato shows that the opposite is true: the private sector only finds the courage to invest after an entrepreneurial state has made the high-risk investments - from the green revolution to biotech and from pharmaceuticals to Silicon Valley. And she argues that by not admitting the State’s role we are socializing only the risks, while privatizing the rewards”⁴⁶⁶. The interviewees mainly explained that the book was a compromise between opposing ideological visions on the role of the State in the economy, and highlighted the importance of public support to innovation.

Improve public services: SBRI as provider of solutions for sectorial policy areas. The SBRI is seen as a way to improve public services to citizens. SBRI calls for projects are based on needs and challenges expressed by Departments and participating public authorities, which are in need for technological solutions. One example is the National Health Services procuring efficient solutions from SBRI projects with positive effects on patients and large estimated cost savings.

In that sense and also given its nature, SBRI is connected to the other policy areas: following with a second health-related example, the 2013 call from the Department of Health⁴⁶⁷ entitled “Improving experience for people with mental health illnesses” illustrates this connexion. The SBRI competition took place in the context of the Government strategy which in that case is referred to as ‘No health without mental health - a cross-government mental health outcomes strategy for people of all ages’. SBRI constitutes a platform for public entities to procure technical solutions to procure, which in that case were expected to “support improving experience for people with mental health illnesses and people at the end of their Life” (DH, 2013). Other mission-oriented examples can be referred to, such as a military SBIR aiming to develop lighter equipment for the army, etc.

⁴⁶⁶ Source: <http://marianamazzucato.com/projects/the-entrepreneurial-state/>

⁴⁶⁷ In partnership with NHS Midlands and East

Route to market and “valley of death”: Innovate and commercialize. UK as other EU countries is seen as a victim of the European Paradox The Good in Research but bad in commercialisation: need to overcome the European paradox acknowledged at the EU Level in many studies and described in the 1995 European Commission Green Paper on Innovation as the unbalance between scientific performance of Europe and its Member States compared their technological and commercial performances.

Commercialisation is therefore a critical point, and the main barriers for pre-innovations to reach the market have been identified. They correspond to the so-called Valley of Death (described in the first case study of this dissertation) which is used in many EU studies and policy papers as to illustrate the main “why” early-stage investments and procurement could be used by public authorities to foster their commercial performance. The low level of venture capital investments and especially early stage investment is particularly targeted by stakeholders⁴⁶⁸ who were consulted on the topic by the UK government. In Westminster the SBRI was presented as a way to overcome the Valley of death in many testimonies⁴⁶⁹. Commercialisation is today seen as a condition for success when considering publicly funded projects or companies at the EC level, and so is the case for SBRI.

The State as a player that can impact commercialisation performances is an idea that is now being further integrated into the UK administrative culture. The issue of State and market reconciliation also benefits from a renewed perception of the role of the State which came in with Mazzucato’s book “The Entrepreneurial State”, which is considered as influential in terms of the way policy makers in the UK look at innovation policy according to several interviewees. As an illustration of the trend that was already on-going before the book was published, Tony Blair and Patricia Hewitt, in the 2004 HM Treasury five-year programme of the DTI⁴⁷⁰, signed a foreword illustrating the renewed view of innovation supported by the Labour Party: no laissez-faire but also no interventionism⁴⁷¹ (as pointed out by more than one interviewees, this is to some extent illustrative of a “reconciliation” between State power and the market).

⁴⁶⁸ See the response of the Royal Society of Chemistry to ‘Bridging the “valley of death”: improving the commercialisation of research House of Commons Science and Technology Select Committee inquiry’ as well as the reaction of Nesta’s response to Budget 2013 (available at <http://www.nesta.org.uk/news/nestas-response-budget-2013>).

⁴⁶⁹ See House of Commons Science and Technology Committee (2013), “Bridging the valley of death - improving the commercialisation of research”

⁴⁷⁰ “We reject the interventionist command and control industrial policy of the past. Equally, we reject the idea that Britain does not need a strong voice for business at the heart of government”. Source: HM Government (2004), “Department of Trade and Industry Five year programme – Creating wealth from knowledge”

⁴⁷¹ “In the knowledge economy, government’s role is different: neither command-and-control nor laissez-faire” (DTI, 2004)

“Small” BRI? The SBRI is oriented towards small businesses, even though (because of legal obligation defined at the EU level and related procurement regulations) no possibility remains to focus on SMEs only when launching an open call for projects and that larger companies can apply. However, and starting from the title (SMAL Business Research Initiative), the general perception is still shaped by the objectives of the initiative which aims at targeting SMEs when possible. Although targeting SMEs only is not allowed by the EU legal framework, the intention remains and takes the form of communication: TSB (2011) describes for instance SBRI as “particularly beneficial to early-stage companies” and “Particularly suitable for SMEs”, points that are reminded in the competition calls and in many other instances. The design and amounts allocated are also seen as more adapted to SMEs and less attractive for larger companies. In practice however all organisations can apply, and not only SMEs were funded under SBRI. TSB (2014a) highlights support to small businesses as to be further developed and presents SBRI as part of the package available to them and which should be further developed.

1.2.2 Technical commonalities and variations

General Design. SBRI in the UK has no legal mandate or pre-defined budget (Glover and Connell, NoDate). It is therefore not set into law and until recently, no pressure was put on public authorities to make use of the scheme: “Small Business Research Initiative (SBRI) targets announced £100 M (~\$159 M) was committed to the SBRI at Budget 2013. The breakdown of this will be: £50 M for the Ministry of Defence; £30 M for the NHS (Department of Health); £7 M each for the Department of Transport and the Home Office; £3 M each for the Department of Energy and Climate Change and the Department for Environment, Food and Rural Affairs.” (Source: <http://blogs.fco.gov.uk/nicolarbour/2013/06/28/science-and-the-uk-spending-round-2013/>).

Implicit objectives of SBRI vary from the initial four objectives of the American model: First the initiative is for the Departments to make use of SBRI delivery mechanisms in order to lead to (breakthrough) improvements in Public Sector services or policy outputs; second it is to support innovation in the private sector, with a specific (but not restricted) focus on early-stage funding for SMEs.

The initiative consists in a challenge-based set-aside scheme driven by a competitive process after which the IP is fully owned by the awardees like in the US. Companies receive 100% funding for R&D activities but no focus on SBCs is possible because of the European framework (no preferential treatment in procurement). Activities supported correspond to R&D as defined by the UK R&D Tax Credit and presented in the BIS guidelines on the Meaning of Research and Development for Tax Purposes⁴⁷².

⁴⁷² See <https://www.gov.uk/government/publications/guidelines-on-the-meaning-of-research-and-development-for-tax-purposes>

This definition refers to projects and related direct/indirect activities seeking to advance science and technology and the resolution of scientific or technological uncertainty. In the context of SBRI, support is directly brought to feasibility studies and prototyping.

In the contrary of the US, the SBRI policy documents do not emphasize the objectives of the programme but rather the process taken up from the US and its potential benefits. The vision of the programme is therefore rather process-oriented than oriented towards targeted achievements⁴⁷³. When launched in the UK by the Department of Trade and Industry in 2001, the SBRI was particularly oriented towards the use of procurement to stimulate innovation (see Dimitri et Al., 2006). This was partly justified by the fact that only contracts were to be awarded (no grant, in which case the SBRI would have felt under the State Aid regulations not allowing 100% funding). Also, SBRI awardees can claim for R&D tax credit.

Inclusion in a broader policy-mix. SBRI is seen as a second key mechanism related to procurement of innovative solutions, next to the so-called Forward Commitment Procurement⁴⁷⁴ which is more about innovative procurement than pre-commercial procurement (the so-called “FCP” very roughly described consists in a practical toolbox for innovative procurement to take place in public organisations). Also in terms of policy mix, the SBRI initiative finds complementary measure at the sub-national level such as the “Small Business Research Initiative (SBRI) Innovation Catalyst Programme”⁴⁷⁵.

Along its structuration process, the SBRI initiative was positioned with other measures as highlighted by the Sainsbury Review: “Together with our proposals for the reform of the Small Business Research Initiative, the new formula for the Higher Education Innovation Fund, and the support of the Regional Development Agencies for incubators, high-technology clusters and business-readiness services, this should provide a significant boost for investment in early-stage high-technology companies” (Sainsbury of Turville, 2007).

Phasing. As in the US case, the SBRI is an early-stage programme and targets feasibility and prototyping stages in the development process of innovative solutions. The two-phase initiative⁴⁷⁶ is illustrated by TSB (2011) by the following steps:

⁴⁷³ See

http://webarchive.nationalarchives.gov.uk/20130221185318/www.innovateuk.org/assets/sbri_brochure_2011.pdf

⁴⁷⁴ See BIS (2011), “Forward Commitment Procurement – Practical Pathways to Buying Innovative Solutions”

⁴⁷⁵ See for instance <http://wales.gov.uk/newsroom/businessandeconomy/2014/8684035/?lang=en>

⁴⁷⁶ 1) Feasibility and 2) Prototyping

Figure 39: SBRI process

Source: TSB, 2011

The first phase of the SBRI process focuses on feasibility (support ranging from £20k to £100k over a period of 9 months) while a second phase emphasizes prototyping (up to 2 years and £1 million funding support to development). Unlike the American model though, the British version did not include any Phase 3 until recently. Since 2009 an additional Phase 3 specific to the NHS⁴⁷⁷ was added to SBRI that has been so far specific to the NHS. Not inspired by the American model and seen as of different nature⁴⁷⁸, this third phase was shaped for a “mixture of the companies who identified that they were still having problems connecting to SBRI” as NHS is perceived as “not orthodox” and some more embeddedness was perceived as needed (source: interviewee – KL). The initiator of this third Phase testifies: ““We needed to have a clear view on the impacts of the programme (...) they do a lot of data analysis, we have a health economist on our team who supports them.

⁴⁷⁷ See <http://www.sbrihealthcare.co.uk/past-competitions/sbri-healthcare-phase-3-competition/>

⁴⁷⁸ In the US, the third phase of the process does not imply funding but technical support, while in the case of NHS the third phase support scheme aims at bridging a funding gap

Why? To secure funding, but also to show the programme's impacts on health and bring in different offers to the health community so that others understand how it can benefit them. **Political leaders influence funding, so to demonstrate them as well.**" (Source: policy manager – KL; emphasis added).

Technical assistance is also provided to SBRI beneficiaries, with a particularity lying again in the SBRI Healthcare programme which offers support by health economists to the supported companies (see for instance SBRI Healthcare, 2014). As highlighted by an interviewee, the rationale behind such support is for health economists to bring to companies an understanding of their areas they do not always have, knowing that health economists are "rare and expensive" (source: interviewee – AB); although this idea might seem to have been emulated from the technical assistance provided under Phase 3 by US Departments, the evolution came as natural (the idea of such technical support was proposed independently by K. Livingstone, head of SBRI Healthcare, in 2009).

Table 19: SBIR/SBRI - A comparative perspective

	UK SBRI	US SBIR
Date established	Initiated in 2001; re-launched in 2009 (first pilots from 2008)	First pilots in NSF (1977-1978) followed by full-scale launch in 1982
Coordination	Technology Strategy Board, now Innovate UK	Small Business Administration
Mandated?	No, discretionary take-up by public authorities; although targets were recently fixed for 6 ministries by the HMT (starting 2.5%)	Mandatory. 2.5% of extra-mural R&D expenses over \$100million with a progressive evolution of the set aside rate over the years.
Eligible organisations	EU companies of all sizes (SBRI is exempt from advertising contracts in OJEU)	SBCs (less than 500 employees) with at least 50% American ownership; VC-backed companies (limited participation).
Value of contracts awarded per year	1190 contracts worth £99.4 million for 2009-2012	4000 contracts a year average, worth over \$2billion.
Phase 1	Feasibility testing for typically up to 6 months (usually up to £100 000 but flexible ceiling)	Feasibility testing for up to 6 months (up to \$150 000)

Phase 2	Prototyping/demonstration under £1million for up to 2 years	Prototyping/demonstration under \$1million for up to 2 years
Phase 3	Recently added, specific to NHS (SBRI Healthcare Phase 3 competition ⁴⁷⁹)	No direct support (funding); technical assistance to awardees. Link to procurement.

Source: adapted from Bound and Puttick (2010) and Rigby (2013)⁴⁸⁰ and complemented by the author

Use of SBRI. SBRI and SBIR operate in a similar range of support amounts and timing structure (amounts and timing of the awards). Between 2009 and the release of its 2014-2015 Delivery Plan, TSB/Innovate UK delivered more than 1500 SBRI contracts. The scale of the British initiative is however much smaller than its American counterpart. From £100 million in 2012/2013 to £200 million in 2013/2014 to go over £200m in 2014-2015 (Cabinet Office, 2014; TSB, 2014). The number of contracts but also the overall size of the programme grew since 2009 (see Figure 19). The overall amounts associated to both SBIR and SBRI are in constant positive evolution (see for instance the regular increase in US and a similar trends in UK⁴⁸¹).

Figure 40: Total SBRI contract (£M)

Source: Connell (2014)

⁴⁷⁹ See <http://www.sbrihealthcare.co.uk/past-competitions/sbri-healthcare-phase-3-competition/>

⁴⁸⁰ In reference to Courtesy TSB, 2013

⁴⁸¹ Such as illustrated by the following quote: “To help small firms, we’ll increase by fivefold the value of government procurement budgets spent through the Small Business Research Initiative.” (Source: George Osborne’s Budget speech in full, 2013 - the Chancellor of the Exchequer to the House of Commons)

1.2.3 Rules and governance: a centralized picture

Coordination and policy process. In terms of coordination, the SBRI has been following a centralisation process along the past decade. This centralisation of the coordination around TSB came together with an improvement in the uptake of SBRI mechanism by the Departments and agencies.

Initially not made mandatory to the Department, which was the key weakness of the programme according to many experts, SBRI centralisation was strengthened especially by two factors: the rise of the Technology Strategy Board (now Innovate UK) and the stricter views of the HM Treasury under the leadership of the Ministry of Exchequer.

SBRI was founded under DTI, later BERR and merged with DIUS into BIS (see figure below). In 2007 the Technology Strategy Board (TSB) initiated in 2004 under DTI became the UK's innovation agency and was given responsibility for SBRI management in 2009 (TSB, 2012). It is therefore under DIUS that the devolution of SBRI implementation was operated towards TSB, which should later become Innovate UK⁴⁸². InnovateUK (former Technology Strategy board created in 2007) acted since then as a one-stop shop centralizing the SBRI process management and expertise (though Departments can and are encouraged to launch their own competitions). Key functions are common to SBA and TSB, such as the repository function (both administrative bodies are in charge of designing and promoting the reference documents, templates, can support applications and competitions, are in charge of their programme's outreach, etc.) and the coordination functions (management and expertise).

Figure 41: Institutional leadership of the SBRI over its first 15 years

Source: the author, 2014

⁴⁸² In 2014 the TSB was renamed "Innovate UK"

At InnovateUK (former TSB), SBRI is coordinated by a Head of unit and 4 account managers. The mission of TSB in that regard is to promote, coordinate and support the SBRI (for instance co-funding or organizing competitions in cooperation with ministries). The SBRI crew calls upon the large pool of technological experts and the TSB competition team to complement their operational capabilities.

In practice, an interviewee explains that TSB runs most of the competitions and plays a support role when relevant, providing the ministries and agencies with templates, representatives, documentation, etc. to support them launching and implementing SBRI competitions. Though TSB is seen as below BIS, it has an important grasp on the programme. This could partly be explained by the nature of SBRI which is more a process adaptable to specific Departmental priorities than a usual policy initiative with clear-cut objectives (in which case the BIS would have probably been closer to the initiative's implementation, leaving less space for TSB to drive the programme). Strategic aspects (including policy design) are however still supervised at the BIS level. One should also note that the TSB since its creation has been and is still promoting the SBRI in many ways, pushing its utilisation by Departments and hosting and co-funding competitions. TSB/Innovate UK is therefore seen as the key administrative engine for SBRI at the moment, especially as resistances are perceived from the side of the ministerial administrations to take up SBRI. This centralized governance of the programme in the UK is also different from the governance model of the US in which competitions are ran at the level of the Departments (no one-stop shop, SBA being in the driving seat only as coordinator).

While the scale and organisation of SBIR in the US progressively led to the setting up of SBIR offices in the Departments and Agencies, in the UK the process remains centralized: practical implementation of SBRI is operated by the SBRI and the link with Departments is operated for instance through procurement (Defra for example) or operational units (NHS for instance). In MoD, SBRI is implemented at CDE (Centre for Defence Enterprise) for instance (no dedicated unit). However, one should notice some evolution, as NHS is making considerable efforts to internalize the SBRI process through the SBRI Health programme.

Implementation through ministries and agencies. By 2010, SBRI involved 19 Departments and agencies («Department of Health - National Institute for Health Research; Ministry of Defence; East of England Strategic Health Authority; East of England Development Agency; Design Council; Technology Strategy Board; Department for Communities and Local Government - Homes and Communities Agency; Home Office; Department for Transport; Highways Agency; NHS National Innovation Centre; Department for Environment, Food and Rural Affairs; Department for Energy and Climate Change; South East Coast Strategic Health Authority; South Central Strategic Health Authority; Home Office Scientific Development Branch; Food Standards Agency; Department of Enterprise Trade and Investment, Northern Ireland; Northern Ireland Tourist Board”⁴⁸³).

⁴⁸³ Source: TSB written evidence in House of Lords Select Committee on Science and technology, 2010a

Figure 42: Share of all SBRI contracts awarded by government agency 2009 to 2013 (£M)

Source: Connell (2014)⁴⁸⁴

Though the use of SBRI was initially not made mandatory to the Departments and agencies of the UK, since recently (March 2013), six of the largest departments were attributed performance targets (£XM in FY13/14 and £XM in FY14/15) by the Minister of Exchequer (with support from HMT) who took the decision of not making the programme mandatory although it recognized that some pressure should be put over the ministries.

In practice, NHS England through its SBRI Healthcare initiative is considered as a leading user of SBRI and appears to be the most proactive Department in that regard (see TSB, 2014). SBRI is ran on its behalf by the eastern academic health science network.

⁴⁸⁴ More details about SBRI awards since 2009 is available in Annex

Box 61: The particularity of SBRI healthcare

As explained in the above paragraphs, SBRI in the UK is a centrally coordinated mechanism that can be used by the Departments in collaboration with TSB (now Innovate UK). However, the NHS appear to be in the lead when coming to develop some ownership of the programme. The NHS developed their use of SBRI and even tailored it to their delivery structure as suggested below by the description of the SBRI Healthcare:

« The Small Business Research Initiative for Healthcare (SBRI Healthcare) is an NHS England initiative, championed by the newly formed Academic Health Science Networks (AHSNs), who aim to promote UK economic growth whilst addressing unmet health needs and enhancing the take up of known best practice. Part of Innovation Health and Wealth, the SBRI Healthcare programme sets industry the challenge in a series of health related competitions which result in fully funded development contracts between the awarded company and the NHS. Unlike many R&D projects which offer grant or match funding, SBRI contracts are 100 per cent funded and the company retains the IP. SBRI health related programmes have been running since 2008 and prior to the establishment of NHS England programmes were run by the Department of Health and Strategic Health Authorities with the support of the Technology Strategy Board (TSB). The programme is now directed by the Eastern Academic Health Science Network (EAHSN) on behalf of NHS England and the other regional AHSNs. Health Enterprise East is the management partner and supports the EAHSN to handle the applications, assessments and delivery against contracts. Following an open procurement call, companies have been selected to receive Phase 1 feasibility contracts under the SBRI Healthcare programme. The developments are 100% funded and suppliers for each project retain the IP generated from the project, with certain rights of use retained by the NHS. Health Economics support will add significant value to the SBRI Healthcare programme by helping the selected technology based companies to demonstrate the potential cost-effectiveness of their products and so aid their chances of adoption within the NHS or other healthcare markets in the future.» (Source: SBRI Healthcare, 2014)

The Academic Health Science Networks⁴⁸⁵ are based in 15 regions and deliver on behalf of the NHS topics for SBRI competitions while the operational management is with the Eastern Academic Health Science Network (mandated by NHS England); the national SBRI Healthcare is overseen at the national level by Health Enterprise East Limited (HEE, which is an NHS Innovation Hub active on the uptake of medical technology-based solutions) since 2009.

The field research shows that organisational learning happens in cross-temporal terms as the agencies start to see the programme as beneficial (especially for the public organisations not forced to use the programme but increasingly do) while ministries have been quite reluctant to use the programme beyond its reporting function (in the early 2000s).

⁴⁸⁵ See <http://www.eahsn.org.uk/>

2/ A decade of emulative interactions between Strategic Intelligence and SBRI

2.1 Strategic Intelligence in the SBRI context

Strategic Intelligence in an SBRI context. In both the UK and the US, the amount of Strategic Intelligence formalized through studies, platforms and other intelligence mechanisms exponentially grew over the past decade. This can be observed through different points of view (number of SBIR or SBRI-related studies, discussion of the programme(s) in policy committees...).

Strategic Intelligence is referred to in different policy documents (see for instance TSB, 2014) when it identifies needs and challenges to be addressed by the Government. BIS conducts many studies on a regular basis, which are published under different headings. More research-oriented papers for instance will fall under one of the following headings: “research papers”, “economic papers”, “occasional papers”, or “monitoring and evaluation”. The access is centralized on the BIS website⁴⁸⁶. Considering BIS research-oriented studies on the topic of “Enterprise and Economic Development Analysis (EEDA)”, many surveys on SMEs⁴⁸⁷ can be found which mainly emphasize the issue of setting up and growing a business in UK and are conducted on a regular basis.

Though overall Strategic Intelligence is quite formalized and institutionally embedded into BIS, neither BIS nor TSB (now InnovateUK) specifically commissioned any study on SBRI or related areas of needs until recently (programme-level evaluation on-going). Therefore most of the Strategic Intelligence related to SBRI is issued from self-initiatives at the stakeholders’ level.

The particularity of Strategic Intelligence in the UK is that it takes more diverse forms than in the US, and is not always commissioned by the public authorities legally in charge of the programme. Also, most of the influencing Strategic Intelligence did not focus on SBIR/SBRI as such but had a broader emphasis.

There is in the UK no legal mandate to evaluate SBRI. Monitoring is operated at TSB level and to some extent (individual competitions level) by the Departments and agencies launching competitions. However, a number of studies and reports have been released which generated knowledge about and for SBRI. Along its existence key forms of intelligence impacted the initiative, which mainly took the form of:

⁴⁸⁶ Follow <https://www.gov.uk/government/organisations/department-for-business-innovation-skills/about/research>

⁴⁸⁷ See <https://www.gov.uk/government/policies/making-it-easier-to-set-up-and-grow-a-business-6/supporting-pages/enterprise-and-economic-development-analysis-eeda-research>

Status reports by Departments. These reports published on behalf of a ministry or one outstanding political figure are meta-analysis reports which review an entire domain of policy making and are usually released by a ministry (BIS, DIUS, etc.). The reports are not proper studies but review meta-level evidence to point at needs and recommend future priorities. Some of them such as the 2007 “Race to the top” Report by Lord Sainsbury were used as the basis of a renewed policy.

In that sense the role of these status reports is mainly to provide some ground of evidence for new or updated policy orientations. Status reports can focus on a specific issue, such as the HMT 2008 report on “Accelerating the SME economic engine” or the 2014 Adonis report on “Contracts not hand-outs”.

Monitoring mechanisms. Monitoring is operated at TSB and HMT levels, on the basis of administrative numbers but also (at TSB) project and programme reviews. Key indicators are used (SBRI expenses, number of competitions per Department, etc.) at a meta-level by the HMT while TSB operate the initiative and its monitoring, and therefore evaluates projects and follows individual project holders’ performance in terms of the six thematic priorities of TSB (commercial success, etc.).

Monitoring mainly remains internal to the Departments, the HMT or TSB, although some numbers are published through the other forms of intelligence of policy briefs diffused to specific targets by the officials in charge. Only one monitoring report, the SBRI Healthcare Review (2014) presented a report using monitoring data to present the status of the initiative (see Figure 43).

Figure 43: Monitoring data - extract from the 2014 SBRI healthcare review

Source: NHS (2014), "SBRI Healthcare Review"

TSB/Innovate UK monitoring. An interviewee in charge of monitoring at InnovateUK referred to the 6 key evaluation criteria used as well as the output-oriented nature of SBRI (towards commercialisation for instance). However, the same interviewee confirms that the selection of such indicators is due to the nature of the organisation itself, which invests in risks and has a commercial focus. Several monitoring mechanisms internal to InnovateUK are here referred to (see Figure 23 in the first place), mainly consolidated reporting by the Lead Technologist or the Programmes monitoring manager at TSB on the basis of individual reports produced by the Monitoring Liaison Officers (MLO). An alternative mechanism also exists for when co-funding is involved. Monitoring at TSB/Innovate UK mainly covers each project's description as well as the state of each of these projects with regards to six key criteria which should acknowledge process, management, financial/spending practice and delivery information, all driven by commercialisation as highlighted by an interviewee. An interviewee explains that each of the six main criteria is "output and impact-based" (source: PT).

The criteria are the following (source: TSB monitoring guidelines, issue 5):

1. Scope (technological basis and progress towards planned TRL/Demonstration)
2. Time
3. Costs (costs/expenditure compared to plan, the extent to which expenditure is commensurate with progress, and robustness of forecast)
4. Exploitation planning (business case, exploitation plan, IP)
5. Risk management
6. Project planning (frequency of review and update, level of planning detail)

Project costs, timing, partnerships and performance as well as scope are dimensions that are monitored for each project.

Figure 44: Technology Strategy Board Monitoring Management System and framework

The left-hand figure summarized the organisation of monitoring at TSB, while the right-hand figure illustrates the framework used to monitor projects and the agency's performance.

Source: TSB (NoDate), "Project monitoring guidelines - Issue 5"

"Privately initiated" Strategic Intelligence (including self-initiated studies). Self-initiated studies are studies and reports which were not initiated by public authorities but by external organisations or individuals such as the NESTA "quango" or the reports drafted by the expert considered as "lead expert" on SBIR and SBRI in the UK. Though the initiative was not from public authorities, public support is brought to their implementation (through the UKNRC or direct support to NESTA for instance). The same goes for the MATRIX report (2008).

Box 62: Independent Strategic Intelligence? The example of NESTA

The self-initiated reports are usually perceived as unbiased, but not all the time. This is the case for NESTA reports, although they are referred to in many instances when actors look for evidence-based arguments. NESTA used to be part of the British administration before being progressively externalized and supported by public funds. It is today considered as a "quango", a quasi-NGO which is very close to Government bodies. Some interviewees pointed out this position which makes NESTA's credibility sometimes difficult, especially when it conflicts with other sources of Strategic Intelligence such as in the following case:

"In contrast to the Bound and Puttick (2010) review, Connell and Probert (2010) did not find such positive results when carrying out interviews with companies about the reformed SBRI; some contrasting issues were brought forward (...) It should be noted that the Bound and Puttick review was carried out within the previously publicly run organisation NESTA and so a more positive view may have been taken on the progress of the SBRI than would a non-government associated body" (Tredgett and Coad, 2014).

The difference between these reports and policy briefs is evidence (the reports rely on evidence-based analyses) and intentionality (although some of these reports clearly appear to be biased and defend particular positions, they are not intended to defend the interests of any specific group or organisation to which the authors would belong).

Strategic Intelligence from the legislative branch. The Strategic Intelligence coming out from the legislative branch at the UK and sub-UK levels took the form of 1) internal status reports such as the Northern Ireland Assembly Research and Information Service Briefing Note on the SBRI (2012) or the Northern Ireland Assembly Committee for Enterprise Trade and Investment internal reports from 2012 on SBRI; 2) Committee reports issued by Westminster and which could be found from both the House of Commons and House of Lords willing to enquire about issues that relate to SBRI (such as the Valley of Death or innovative forms of procurement).

Especially committee reports appear to be interesting as they are the output of a knowledge generation and discussion process with several layers. First, the relevant chamber would launch a call for evidence and contributions to which organisations and individuals would respond. Then hearings would be organized to discuss issues relevant to the legislative organ before additional contributions are sent by experts and stakeholders in a second round before full integration into the final committee report.

Other forms of Strategic Intelligence. Also the evaluation of the SBRI currently operated⁴⁸⁸ by a research centre specializing in innovation policy evaluation is expected to have a particular importance in the process of revising/reconsidering the programme. Also, one should notice less directly influencing forms of Strategic Intelligence which include stakeholder organisations' policy briefs which gather evidence to defend interests but did not play an impacting role with regards to SBRI, as well as EU Project outputs (processes and reports presenting FP-supported research on SBRI-relevant topics).

One of the particularities of Strategic Intelligence in the SBRI case is that it has been in some cases heavily oriented towards "learning from abroad". The trajectory of SBRI was heavily influenced by Strategic Intelligence all along its lifetime, starting from the emergence of its idea in the late 1980s.

⁴⁸⁸ Over 2014-2015 a proper evaluation of SBRI is being conducted (TSB, 2014) by experts who have been interviewed during the field research.

2.2 SBRI and Strategic Intelligence: co-construction over time

2.2.1 From the idea to real-life initiation: getting the SBRI off the ground

Origins. The origins of the SBRI are to be found in the late 1980s/early 1990s: a committee set up by Margaret Thatcher who was willing to develop a small business policy with the support of the UK Cabinet Office brought together experts on the issue. This is when, for the first time, the leading SBRI advocate in the UK came across the American SBIR for the first time: “It stroke me how it was recent but valuable” explains the interviewee who drafted “First recommendations and borrowed some ideas” from the American model to be introduced to the committee. The interviewee explained that his functions in the VC industry—complemented by an appointment at the Cambridge University since 2006—led him to understand and be aware of the relative advantages of American SMEs compared to their British competitors.

Following this experience that did not lead to any concrete policy action, the interviewee (through his Venture Capital organisation) invested in a company (Teraview⁴⁸⁹) in 2001 which was active in the field of terra-hertz and infrared technologies to generate spectroscopic information. Short after this investment which was followed by the 9/11 tragedy, the Government increased its demand for bomb detection technologies. After approaching the government, the interviewee understood that there was no mechanism available for the government to integrate the existing technologies developed by the VC-backed company while funding was available with significant amounts in the US: “*no-one could find a way in government to fund it. I thought this was wrong, madness, and in the meantime we could see that US competitors would get a lot of funding, from SBIR, for that to take place. So clearly it was a major disadvantage for us*” (source: interviewee).

The aforementioned interviewee—also considered by all interviewees as what I could call “lead SBRI expert” in the UK—started discussing the possibility of a similar SBIR mechanism to be implemented in the UK with members of the Government, other scientists, Lord Sainsbury, etc. who all “*could see the problem*”. Two drivers were identified, “*National interest and competition*” (source: interviewee) which explain why attention was caught by the expert. However, the lack of arguments, knowledge and understanding of the gap to be crossed by the UK⁴⁹⁰ led all interlocutors to agree with the principle of a British SBIR but not with its substance. By then no evidence would be available to support the idea that an SBIR-like mechanism was needed or would be useful to the British innovation system.

⁴⁸⁹ See <http://www.ttpventures.com/portfolio/venturefund/?artid=53&pageNum=0&blk=82>

⁴⁹⁰ The interviewee identified a “Lack of arguments. Lack of knowledge, lack of understanding of how far away UK innovation policies were”.

Official launch... and failure. However in 2001 the decision was taken to push the idea further: Lord Sainsbury by then Minister of Science and Innovation (1998 – 2006) launched the Small Business Research Initiative. The initial idea was for DTI to set up a minimum 2.5% target by 2004/2005 for Departmental extra-mural R&D expenses to be dedicated to SMEs (DTI, 2003). This first try was not to become successful: all sources point at the absence of uptake of this first version of the mechanism by the Departments as the SBRI at this time was only a reporting system concretized by a website for the Departments and agencies to report on the share of SMEs benefiting from their procurement, with a declared ambition of £15 million in total to be spent on external R&D but with no mandatory status (NH, DC). Interviewees referred to evidence from studies by the main SBRI advocate which showed that the funds mainly went to non-technological research and policy-oriented studies. This was later confirmed by Bound and Puttick (2010) who concluded that *“the UK SBRI got off to a very slow start after its 2001 launch. Of the few departments that did adopt the SBRI, most contracts were for policy studies or research grants, rather than technology development”*. In summary, SBRI was by then only a reporting mechanism to assess the extent to which Departments would meet a target related to the allocation of extra-mural R&D to SMEs. A website was later to be used in order to advertise R&D contracts to SMEs (Glover and Connell, NoDate); Departments and agencies would report the contracts allocated to SMEs in order to comply with the official objectives of the programme (show a certain percentage of procurement contracts going to SMEs).

“SBRI is a relatively new concept in the UK. In 2004 experts criticised the ‘gaping hole’ in government innovation policy, because it was failing to use programmes such as SBRI to help new businesses take off in the UK market” (NHS, 2012). But beyond the newness of the initiative, the non-mandatory nature of SBRI was widely recognized as the main source of its failure: *“I started trying to get an SBRI scheme in this country in 2001. We had one go then, which got nowhere because it was entirely voluntary”* (Lord Sainsbury of Turville in House of Lords Select Committee on Science and Technology, 2010a). In order to illustrate the issue of voluntary participation and its failure, Matrix (2008) referred to *“an unpublished analysis by David Connell”* showing that among the 150 SBRI advertised by then, *“only one was a genuine technology development opportunity for a business”*. Details were presented later in the Richard report (2008) where an additional comment was formulated on the *“misleading”* DBERR statistics, which among others showed that the targets were easily met though the activities supported were irrelevant to the objectives of SBRI (David Connell in Richard (2008), *“Small Business and Government – The Richard Report”*)⁴⁹¹.

In 2003, the DTI innovation report entitled *“Competing in the global economy: the innovation challenge”* identified SBRI as a way to achieve technological innovation.

⁴⁹¹ Bound and Puttick (2010) referred to this finding in the following terms: « where SME contracts were awarded, researchers found that less than 1 per cent of them were for research and development”.

The document reports in several instances that “The Director General of Research Councils will agree with each of the Research Councils, plans and goals for increasing the rate of knowledge transfer and the level of interaction with business through activities such as collaborative research, start-up companies and the Small Business Research Initiative (SBRI). Where these are not already in place, Research Councils will establish measures of collaboration, so that progress can be monitored. Furthermore, the level of interaction with business by each Research Council will be subject to peer review within Research Councils UK and to external challenge by a group including business representatives”. It is interesting to note that the first action to be undertaken in order to strengthen the SBRI is described in DTI (2003) as a reinforcement of *“the co-ordination and monitoring of the programme”*.

Recognizing a *“need to do more”* in order for SBRI to become effective, DTI pushed the collection of data across departments and emphasized the promotion of the programme as well as co-constructive dialogue with the departments to identify opportunities for SMEs. In order to make the initiative effective, DTI (2003) role was reinforced in terms of Departmental data collection and publication as well as in terms of reflection on the opportunities offered by the programme. Referring to SBRI set up, the DTI Innovation Report from 2003 stated that *“This was inspired by the equivalent scheme in the USA, which has played an important part in encouraging the growth of small high tech businesses”* before announcing a reinforcement of the role of DTI in the coordination of the initiative: *“To improve the effectiveness of the SBRI we will strengthen the DTI’s role in coordinating and monitoring the programme, extend the collection of SBRI data across departments, publish the results on an annual basis, and investigate how the wider range of R&D opportunities, arising from, for example, Regional Development Agencies (RDAs) and local authorities, could be included in the scope of SBRI”* (DTI, 2003).

Campaigning for an SBIR-modelled SBRI. Further development of SBRI was to some extent fostered by an overall context favourable to PCP. In 2004, the Five year programme of the DTI entitled *“Creating wealth from knowledge”* confirmed the British ambition of setting up a knowledge-based economy, supported by a competitive discourse⁴⁹² similar to the one found in the US. With as an objective to establish a renewed industrial policy, the plan described new or confirmed orientations for the country, compiling both strategic and operational initiatives to be undertaken by the Department. A particularity here is the importance given to the role of *“Government as a Driver of innovation”* (heading of an all section of the plan). The dedicated section introduces the State as the *“biggest customer in the economy”* having a *“huge purchasing power”*. The same section refers to the barriers faced by SMEs in terms of innovation and government uptake of their products, leading to 6 targeted actions among which was the following announcement:

⁴⁹² “How should we respond to the challenges we face? If we do nothing more than we are already doing, then we will be overtaken by other countries” (DTI, 2004)

“[We will] Foster the innovation and creativity of small businesses through the Small Business Research Initiative, which encourages government to purchase more R&D from small firms. We will remove barriers for small firms, including social enterprises, by reducing the cost of bidding for public contracts, improving the visibility of procurement opportunities through a new Supplier Route to Government website and better awareness of bidding Processes” (DTI, 2004). The position of the SBRI became clearer as it went here together with 5 other actions focusing on (or at least directly related to) public procurement, and was not included -for instance- in the section dedicated to entrepreneurship and SME financing.

Also in 2004 the SBRI lead expert started a campaign together with the MP for Cambridge at that time in order to promote the introduction of an SBRI that would go beyond reporting and be an emulation of its American counterpart (see Box 63).

Box 63: SBRI Campaign - first steps

The so-called SBRI campaign was initiated by a Cambridge researcher advocate of a UK version of SBIR and author of leading reports on the topic which placed him in the centre of the SBRI sphere. The campaign was jointly held by him and a political representative to the UK Parliament. Beyond transcribing the initiation of the campaign, the following extract illustrates the rationale behind it and in the mind of the SBRI advocates:

“Ten years ago, Anne Campbell, then MP for Cambridge and I launched a campaign to persuade the Government to introduce a radical new programme to foster the development of innovative products in small companies. The idea was very simple; namely that government departments and agencies could play a key role in building the high technology economy by funding the development of the products they themselves need as lead customers. In doing so they could help fill an important funding gap, obtain the technology they need quicker, reduce imports, give new firms the credibility they need to win export orders, and create jobs. Our aim was to replicate a highly successful US policy, the Small Business Innovation Research programme, that had been in operation for over thirty years, and which represents just one component of a procurement-based innovation system very different to UK policies. We were by no means the first advocates of this approach in the UK. Indeed they included Lord Sainsbury, Minister for Science and Innovation at the time. His Small Business Research Initiative (SBRI) was launched in 2002 with a similar aim. However, the Department of Trade and Industry was unable to persuade any other UK government departments to adopt the measure, and apart from a few small-scale contracts awarded by one or two branches of DTI itself, the programme was a failure”

Source: extract from Connell (2014)

It is when this “campaign for SBRI” started that the production of Strategic Intelligence was triggered to support a campaign supporting the SBRI lead expert’s proposals and publicly led by the MP for Cambridge in function until 2005. An interviewee involved in the process explained that the objective by then was for the advocates to reach a compromise over a rule that would be similar to the US: the one of 2.5% extramural R&D expenses to go to SMEs. This campaign was to be maintained: *“in December 2004, David launched a campaign in conjunction with Anne Campbell (then MP for Cambridge) to persuade the UK Government to introduce a US-style SBIR programme. This was supported by a group of high-profile scientists, entrepreneurs and venture capitalists. The campaign achieved partial success in March 2005 when a key element of the proposals was included in the Budget. The campaign to introduce underpinning legislation similar to that in the US has continued, with Kitty Ussher, MP for Burnley, picking up the political baton from Anne Campbell”*⁴⁹³ (Connell, 2006).

A letter to the Financial Times (FT) entitled “MPs are Urged to Back Programme for Innovation for Small Businesses” was signed by the aforementioned “leading academics, entrepreneurs and venture capitalists” under the supervision of the expert and the MP. The SBRI advocate explains in one of his report on behalf of NESTA: *“the cornerstone of our campaign was a Private Members Bill designed to achieve a similar result. This was supported by a ‘White Paper’ describing the rationale, an Early Day Motion to enlist cross party support from MPs and a series of meetings with Government Ministers and advisers in DTI and the Treasury”* (Connell, 2014). Using the parliament proposition was a way for the lead expert and his associated MP to flag the issue of the failure of SBRI, but also to turn the programme into “parliamentary readable language” (DC). At that time, the MP arranged meetings with two ministers and obtained the support of 88 MPs to sign and support the FT letter. A new coming MP (K. Ussher) finally took over from A. Campbell (whose mandate came to an end in 2005) as the political opportunity represented by the SBRI was perfect because the initiative could bring positive results and therefore could allow her become a spearhead of the Labour party in that matter.

Strategic Intelligence and Advocacy. In concordance with the campaign, Connell published a report by the end of 2004 under the banner of TTP Ventures on how to better exploit UK’s S&T base from a policy perspective. With a foreword by Anne Campbell (supporting MP from Cambridge and at this time Member of the Select Committee for Science and Technology). In this report one can find a proposal for the SBRI scheme on paper: *“through this analysis the paper offers a means by which Government can assist our small firms to grow. The proposal is that a small fixed proportion of all Government expenditure on Research and Development should be used to fund innovative technology developments in small businesses – not through grants or subsidies, but by tapping into Departments’ future requirements for new technology as informed customers.*

⁴⁹³ Connell (2006) also adds in its acknowledgement section that he has “a continuing debt to Anne Campbell for helping put the issue on the political map when she was MP for Cambridge and to Kitty Ussher, MP for Burnley for her support for getting a US-style SBIR programme established in the UK”

The approach proposed is to run regular competitions for companies to carry out research and technical feasibility studies, and supply prototype solutions. It is similar to a scheme that has been operated successfully by the US Federal Government for over 20 years” (Campbell in Connell, 2004).

In the same paper, Connell confronts the American model and its main features (supported by company case studies to illustrate its success) to the state of the British SBRI, reaching the conclusion that “Many of the R&D projects emanating from other Departments are in reality just academic research or ‘consulting’ projects, incapable of leading to technology that can be commercialised. Only one Government agency, the Biotechnology and Biological Sciences Research Council, has so far run anything like a proper, SBIR style programme” pointing in particular at the lack of participation of MoD compared to the US (Connell, 2004).

Box 64: The edge between expertise and advocacy

“Guidelines are not enough to counter the other pressures on Government agencies. The SBRI programme is the key, visible test of Government policy in this area. Making it work effectively should be a priority. It is an essential first step in changing attitudes to the procurement of innovation, and introducing effective processes right across Government. The failings of the SBRI scheme are well recognised by those within the DTI directly involved, and the author has had discussions with many of these at both ministerial and official levels. The DTI has declared its intention to address these issues. However, this is likely to be a difficult task. The difference between the US approach and the UK approach is simple. In the US, participation in the SBIR programme is compulsory for all larger Federal Government agencies. And the user-friendly way in which it is operated is largely defined by legislation. Government agencies are required to report regularly on progress. The UK approach is one of inter-departmental consultation and persuasion. There is no obligation to participate in the SBRI programme and no ‘template’ to which Departments are required to design their approach. Anyone with any experience of Government or the Civil Service knows that this is a recipe for inaction. Compared with other priorities, it is just too small an issue to grab the attention of senior officials. There are well-defined principles underlying all Government procurements and there are too many conflicting EU, Public Accounts Committee and Value for Money guidelines to prevent anything but ‘fudge’. If the good intentions of the Ministers and officials involved in this area are to be translated into reality before they move on to their next postings, Britain too needs a Small Business Innovation Development Act”.

Source: Connell, 2004

Connell’s 2004 paper reported on the needs identified in UK’s innovation system and on the basis of company case studies (success stories) starting from the role of innovation customers. He pointed out the success of the US in triggering innovation through Federal support to R&D. He referred to the SBIR in the first place and identified five aspects of the programme (especially the last two “contrasting” with the EU/UK pictures):

1. Delineating fields at agency level (technical goals to be met)
2. Evaluation of SBIR proposals through a consolidated process (simplified, standardised, etc.)
3. Phased approach
4. 100% cost funding
5. The role of IPR

Such identification work identified in this paper the most important section which puts in regard the American and British programmes in order to compare some of their (selected) key features and formulate recommendations, for instance on the role of the MoD in the UK as compared to the American DoD. The following introductory sentence gives an insight on the vision and argumentation line developed by the author: “what the SBIR programme does in the US (and SBRI should do in the UK) is to greatly simplify and speed up the process of awarding Government contracts to fund early stage, research and development programmes”.

As a result of the campaign, “a mandatory 2.5% target (worth around £100m per annum) was introduced by Gordon Brown for all departments in the March 2005 budget” (Richard, 2008). K. Ussher (MP for Cambridge⁴⁹⁴) shared her view on this outcome as follows: “the Chancellor's announcement represented a victory for a group of business people, scientists, venture capitalists and academics, who were admirably led in the House by Anne Campbell, the then Member for Cambridge, and outside by the venture capitalist David Connell. I congratulate them both on their achievements (...) That belief is shared by the 13 distinguished academics, scientists and entrepreneurs who signed a letter to that effect in the Financial Times on 19 October last year, and by the 80 Members of this House who signed the associated early-day motion 799.” (Kitty Ussher, 7 Feb 2006: Column 739⁴⁹⁵). The SBRI “Mark 2” got on track.

2.2.2 2004/2008: failure and stronger combination of cross-temporal and Transnational Policy learning through SI

From the 2004 campaign to the 2005 relaunch of SBRI. The campaign resulted in a mandatory spending target (Bound and Puttick, 2010). SBRI “after poor participation by departments was re-launched in the 2005 budget by Gordon Brown” (Connell/Nesta, 2010) who through the 2005 budget “mandated that every government department contract a minimum of 2.5% of external R&D from small businesses” (Nesta, 2007).

⁴⁹⁴ In May 2005 after the elections, K. Ussher (economist by training, experienced with DTI functions and MP for Burnley) took up the role of A. Campbell and supported the campaign for a UK SBIR Programme led by D. Connell, leading expert, advocate and (at least in knowledge and lobbying) initiator of SBRI.

⁴⁹⁵ See http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo060207/debtext/60207-05.htm#60207-05_head0

Bound and Puttick (2010) notice that such decision could lead to “£100 million per annum for the scheme, yet the metric generated frustration in departments and damaged its reputation as it was considered a ‘small business tax’”.

In appearance simple, this decision was the result of a complex iteration game between different players, and mainly the lead SBRI expert and policy makers (from the sides of both politics and policy). Meetings were organized including between Lord Sainsbury and the lead expert, during which the key issue pushed by SBRI detractors was discussed: the fact that setting up a set aside rule would be illegal vis-à-vis the European framework. One of the interviewees (DC) identified a key blocking factor in the decision making process: “ministers are busy, dependent on advisors, and in this case officials were full time civil servants against any risk who said nothing could be done”.

After a bill was produced, the Minister agreed that “maybe it can be done” and persuaded Gordon Brown (Chancellor of the Exchequer, equivalent of a minister of finance in other countries) to include the “SBRI Mark 2” in the budget. Connell (2006) explains that in order “to avoid breaching EU Procurement Regulations, the Kitty Ussher/Anne Campbell Private Members’ Bill was originally drafted by the author to allow phasing implicitly, rather than explicitly”. According to an interviewee involved in the process, the idea was to draft the “Members’ bill as much based on the US as we could, but tailoring to the UK”. After a subsequent meeting at Her Majesty's Treasury (HMT) with the Chief Secretary to the Treasury⁴⁹⁶ the £100 million target was introduced as recommended by the lead SBRI expert (proposal passed through John Healey who at this time held position in HMT as Economic and Financial Secretary to the Treasury) for an official announcement by G. Brown in March 2005 (source: DC) after an agreement by December 2004 which resulted from “meetings with government at both ministerial and senior official level” (Connell, 2006) and what an interviewee called “lobbying pressure”. The practical re-launch of SBRI Mark 2 took place by the spring of 2006 and eventually led to about 200 SBRI advertisements up to 2008⁴⁹⁷ while the Lord Sainsbury’s Review was being implemented in parallel. Bound and Puttick (2010) confirmed that “only 1 in 200 contracts placed before 2008 met the Treasury’s definition of R&D, with opportunities advertised ranging from the supply of Chinese library books to lawnmower maintenance services. The SBRI was no more than a small business spending metric”.

⁴⁹⁶ Number two ministerial position in HMT below the chancellor of the Exchequer

⁴⁹⁷ Source: <http://www.parliament.uk/documents/lords-committees/science-technology/publicprocurement/cST211210ev2.pdf>

Also in 2006 “the government also launched the supply2gov website⁴⁹⁸ which targets small businesses by advertising lower-value public sector procurement opportunities”. Though it was expected to strongly support SBRI from a technical point of view (as one-stop gateway online), this website would prove to be only an informative platform with no dynamic effect other than advertising contracts attributed to SMEs.

This renewed SBRI did however not lead to much more success by comparison to the American SBIR: the *“implementation of SBRI Mark 2 took the form of targets set for each Department to spend 2.5% of their external R&D budgets with small firms. This was, of course, a very undemanding target. The US legislation requires agencies to spend 2.5% of their external R&D budgets through the well-defined and completely transparent SBIR process, but SBIR awards represent just the first step on the procurement ladder. Figures published by the SBA suggest that the total share of US federal R&D contracts going directly to small firms is 13 per cent”* (Connell, 2010); this could be compared to the picture later described by Lord Sainsbury as follows: “In 2004–05, of a proposed SBRI baseline of £2,532.9 million, £269.1 million (10.6 per cent) went to small firms in the form of contracts” (Lord Sainsbury of Turville, 16 Feb 2006: Column WS108⁴⁹⁹). In any case, the key limit of the emulation was here that it had been limited to the targets (set aside benchmarks) but did not go further. Moreover, though the recommendations were picked in the 2005 budget by Gordon Brown, no Departmental behavioural change could be observed (Connell, 2010a). The perception of the initiative was that of one which success would be limited to these targets: achieving these targets was considered by some as the “success” mark of the initiative (see Alun Michael in response to Kitty Ussher, 8 Dec 2005: Column 1486W—continued⁵⁰⁰).

⁴⁹⁸ “The SBS’s new approach is limited to encouraging departments to participate in the Supply2.gov.uk website and the monitoring of undemanding departmental targets for R&D spending with SMEs. The Supply2gov.uk website is limited to contracts under £100k, whereas individual US SBIR projects are normally for approximately £500k. The SBS monitoring approach requires departments to provide annual returns showing the percentage of R&D expenditure with SMEs. Not surprisingly the first return shows that they already spend more than 2.5% of their R&D with small businesses, with the overall picture being dominated by the MOD. There is no information available to show how these figures have been compiled. In fact, 2.5% is not a demanding target. As we saw in Chapter 2 of this report, in the US 13% of federal R&D contracts by value go to small businesses. The 2.5% set aside for SBIR and more importantly the structure and programme management processes that go with it, just provides a mechanism to help small companies take a first step on the procurement ladder. By interpreting the Chancellor’s 2.5% figure as a target for the TOTAL share of external R&D spent with SMEs, the SBS has inadvertently undermined the whole principle of the initiative” (Connell, 2006)

⁴⁹⁹ See <http://www.publications.parliament.uk/pa/ld200506/ldhansrd/vo060216/text/60216-27.htm>

⁵⁰⁰ See <http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo051208/text/51208w15.htm>

With some distance, DIUS (2008) later concluded that “SBRI was made mandatory in Budget 2005 for participating Government Departments. In 2006/07, £2.3 billion was committed to SBRI and the value of contracts made with SMEs was £136.9 million. However, the scheme has not managed to reproduce the kind of success attributed to the Small Business Innovation Research (SBIR) programme in the United States. Specifically, there remains concern that the introduction of targets have not hard-wired innovative procurement practices into routine Departmental behaviour and that tenders for research remain focussed on policy development rather than the strengthening of research in scientific and technical areas (...) the Sainsbury review identified the need for Government to improve its performance in driving innovation through procurement” (DIUS, 2008).

Expertise and Advocacy combined: a powerful tandem for emulation. Right from the beginning, the SBRI campaign was oriented towards further emulation of the American SBIR. The SBRI lead expert campaigned in that direction “for the establishment in the UK of an effective US-style programme. A restructured scheme, based on the author’s proposals, was announced in the March 2008 Budget Report and accompanying DIUS and BERR White Papers” (Connell on behalf of NESTA, 2010).

The production of self-initiated Strategic Intelligence was particularly oriented towards the production of evidence-based arguments to emulate SBIR so that a domestic version could be put in place. The particular strength of the Strategic Intelligence produced was the direct channelling operated by the lead expert towards policy making and especially decision makers. The tandem “expertise” and “advocacy” was clearly the key to SBRI changes, from its introduction to subsequent adjustments in its design or implementation modalities. A quick illustration of this “double-hat” can be observed in Figure 24 where two slides from the lead SBRI expert suggest the interactions between Strategic Intelligence and advocacy through the entrepreneurial actions of the expert himself (producing evidence-based recommendations and pushing them through policy and political channels by lobbying relevant players).

Figure 45: Emulating SBIR through Strategic Intelligence – illustration

UK CAMPAIGN FOR A US-STYLE SBIR PROGRAMME

UK “SBRI” launched 2001, but ineffective. “Innovative procurement” highlighted regularly in government policy papers

Campaign launched in December 2004 with press coverage and ‘White Paper’

Informal ‘supporters club’

Meetings with Government Ministers, advisers and senior officials

“Private Members Bill” (Anne Campbell MP in 2005) – carefully tailored to UK conditions

- RESULT:** Inclusion of 2.5% ‘target’ mandatory for all Government departments in March 2005 announced in annual Budget (“worth £100m per annum, guaranteed”)

SECRETS REPORT PUBLISHED JULY 2006

- BUT approach of “target and encouragement” led to no action and no competitions for 2 years
- Campaign continued: comprehensive analysis published of SBIR process and economic impact
- Second report, with comprehensive analysis of US SBIR, published; detailed design template for possible UK programme
- Second Private Members Bill and letter to Financial Times signed by 13 leading entrepreneurs, academics and VCs
- More meetings with Government Ministers, advisers and senior officials
- Wide support from trade associations etc

Source: Connell, 2010

The coordination of Strategic Intelligence and advocacy was observed in this specific case as a unique form of tandem allowing Strategic Intelligence initiated by the lead expert have an impact none of the other forms of Strategic Intelligence could have had over the past 15 years. The combination of the outreach of several MPs and some high-level officials proved to be powerful when serving SBRI interests. The political channel was also mobilized to mobilize foreign Strategic Intelligence as illustrated below (Box 40); one can notice that this call for foreign Strategic Intelligence by MP K. Ussher could be perceived as an announcement of (or explicit demand for) the “Secrets Report” (see Box 65) which would come out a couple of months later.

Box 65: Political enquiry about foreign SI

Kitty Ussher: To ask the Secretary of State for Trade and Industry what evaluation he has made of small business innovation research programmes in other countries; and if he will make a statement. [45279]

Alun Michael: The UK's small business research initiative (SBRI) was modelled on the US Government's small business innovation research (SBIR) programme, which remains the most relevant international benchmark for SBRI.

Both the UK and US programmes aim to raise productivity and business innovation by providing research and development contract revenues to technology-based small firms, helping them to commercialise their intellectual property and supplying Government bodies with R&D services.

The Chancellor mandated Departments to take part in SBRI in his Budget on 16 March 2005. Until then participation had been voluntary. We aim to publish the voluntary phase performance figures for 2003–04 and 2004–05 under SBRI shortly.

Since its inception in 1982, the US programme has been subject to periodic evaluations by the US general accounting office and the UK Government keeps a careful eye on these. The reports to date have largely affirmed that SBIR is meeting its twin goals of furthering the economic development of technology-based small firms and delivering quality valuable R&D outputs to federal agencies.

Source: Bound Volume Hansard - Written Answers – 26 Jan 2006: Column 2350W—continued, available at <http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo060126/text/60126w32.htm>

Though the most influencing source of Strategic Intelligence (self-initiated studies by the SBRI lead expert) led to transnational lesson-drawing from SBIR, the emulation process up to 2006 had all along been perceived as a failure as suggested by Box 41. The first barrier to learning was clearly organisational. The role of the officials coming as a buffer between decision makers and the experts appeared to make SBRI launch and redesign difficult. Several interviewees observed the resistance to change from the side of administration employees (officials). Sometimes, dead-end scenarios could be observed, for instance when the Research Councils UK set up their own SBRI programme without launching any competition⁵⁰¹, supposedly to respond to accountability requirements without charging their functioning with the burden of SBRI competitions in practice. This came together with another aspect similar to the US experience: the notion of R&D tax appeared indeed very often as to point at a difficulty for the Departments to accept the constraint of the set aside and the related frustration.

⁵⁰¹ See <http://www.parliament.uk/documents/lords-committees/science-technology/publicprocurement/cST211210ev2.pdf>

Box 66: Failure of the emulation process

*“Attempts by the UK to emulate the US scheme have so far been unsuccessful. In 2001, the UK government introduced a similarly named programme called the “Small Business Research Initiative” (SBRI). It aimed to provide a web portal where government departments could advertise R&D contracts. The objective was for 2.5% of external R&D to be spent with SMEs through this mechanism, with an overall target of £50m. However, virtually no government departments participated and, up to 2005, it only ever advertised contracts worth around £2m per year. **In response to lobbying pressure** the Chancellor announced in his March 2005 Budget that in future there would be a mandatory requirement for all departments to spend 2.5% of external R&D expenditure with SME’s - a commitment believed to be worth £100m per annum. However, **the government did not establish an SBIR “process”, the key factor in its success in the US, and so the campaigners have continued to lobby for legislation.** Despite subsequent changes to the UK SBRI introduced by the Small Business Service (SBS) in April 2006, it **still bears little or no resemblance to the US SBIR programme.** This is perhaps not surprising. If it is to encourage spending departments to use procurement to stimulate innovation, **government needs to bring about a major culture change within them.** It must also address the conflicts between departmental objectives that arise from Office of Government Commerce procurement rules and Treasury budgeting systems. And it must steer a careful route through EU regulations. This is far too difficult a coordination job for the SBS, and its lack of practical experience of science and technology management makes it ill equipped to take it on.”*

Source: Connell, 2006; emphases added.

Pushing international emulation further through Strategic Intelligence: The “Secrets Report”. In 2006 a report that is considered by all and as by far the most influencing report in SBRI development came out. Known as the “Secrets Report”, it was entitled by its author (the lead SBRI expert) ““SECRETS” OF THE WORLD’S LARGEST SEED CAPITAL FUND: How the United States Government Uses its Small Business Innovation Research (SBIR) Programme and Procurement Budgets to Support Small Technology Firms” (Connell, 2006)⁵⁰². This self-initiated study was sponsored by several organisations such as TTP Ventures (previous employer of the author) and the Cambridge Network. After confirmation by all interviewees, this report is the most central piece of the Strategic Intelligence repository of SBRI, and clearly aimed at benchmarking the American model in order to emulate it better, though taking for granted some elements of its success that have been questioned in several instances⁵⁰³.

⁵⁰² This report was released under the Cambridge University affiliation of the author (member of the Centre for Business Research, CBR) since 2006.

⁵⁰³ See for instance <http://www.oecd.org/innovation/policyplatform/48136807.pdf> where it is for mentioned that “Econometric evaluation of the SBIR programme in the United States has raised some doubts about success of the programme, pointing to risk of non-additionality of SBIR funds (...)Data showed that SBIR awards a) did not lead to an increase in employment in firms and b) appeared to crowd out private money that companies previously spent on R&D (Wallsten, 2000). Analysis also pointed out an inherent

The report mainly refers to the NAS evaluations when coming to a description of the effects/impacts of the American role model, and starts from the observation that no change could be observed in the British Departments since SBRI was launched and re-launched.

Box 67: Extract from Connell (2006) 'secrets report'

"A UK initiative similar to the US SBIR programme would benefit the economy in many different ways:

- ▶ *It would stimulate innovation in public sector services, and help address policy challenges in areas like healthcare, energy, transport and environment;*
- ▶ *It would provide a method of financing start-ups which addresses key funding gaps, with major practical benefits to potential entrepreneurs throughout the UK;*
- ▶ *It would facilitate spin-outs and technology transfer from universities by providing a flexible approach for funding the transfer of people into the commercial world;*
- ▶ *It would provide validation of new technologies, helping firms to win the support of further customers as well as partners and investors;*
- ▶ *It would reduce time to market by facilitating early development and trials with lead customers;*
- ▶ *It would make it easier for small companies to access mainstream government procurement budgets;*
- ▶ *It would increase the number of "venture capital ready" companies, leading both to a stronger technology sector and to a healthy and growing venture capital industry to finance it."*

incoherence in the selection process of award-winners: SBIR managers aim at selecting firms on the likelihood of commercial success ("pick winners") as they are looking for "success stories". Research has shown that SBIR project performance is highest for those projects in industrial segments which themselves receive the highest level of venture financing (Gans and Stern, 2003). This means that if the programme administrators are given a strong incentive to identify projects with the highest performance, SBIR funding may precisely focus on those segments for which venture capital is already readily available. Instead, governments should fund proposals that are not likely to receive funds from private sources (Wallsten, 1998 and 2000), as these are likely to be those which yield great social returns, but negative profits for the firm".

The 2006 “Secrets Report” clearly looked into the American model in order to provide an appraisal of its effects and formulate recommendations for the establishment of a similar programme in the UK⁵⁰⁴. The report states that its purpose *“is to see what we can learn from the US experience, by examining the lead federal government policy for using R&D procurement to stimulate innovation in smaller companies – the Small Business Innovation Research (SBIR) programme (...) It makes specific and detailed recommendations on action that could be taken **NOW** to enable UK government departments to participate more effectively in the innovation economy”* (Connell, 2006; emphasis not added). The motivations for taking action in such direction are described in terms of facing the growing international competition -world-wide- and the idea that America *“does things differently”*. The competitive discourse is also expressed through comparisons such as the results from a survey from which the author refers to the fact that *“Small US firms benefiting from government support in the sample received around five times as much as UK firms, though the US figure probably understates the impact of government R&D “contracts” which were not necessarily all included in the comparison”* (Connell, 2006).

Why learning from the US and not another country? Because this country is considered as *“the world’s most successful economy at building science and technology based industries and its use of procurement, through the SBIR programme and other mechanisms, has played a key part in that success. We would do well to learn from its experience (...) **The US SBIR programme is one of the most successful and best regarded of such policies, and it comes from the nation which is probably the most successful of all in building science and technology industries. We would do well to study and imitate it**”* (Connell, 2006; emphasis not added).

Content-wise the report describes the particularities of SBIR through specific Departments (DoD and its main branches, NIH, NSF and USDA). The author went to the US in that occasion in order to conduct interviews and learn more about the American model. Case studies are used to highlight where a “UK opportunity” would be “lost”: several case studies used in the report underline when a company preferred the US thanks to its SBIR programme, or where some gaps can be identified in the British system as compared to the American one⁵⁰⁵.

⁵⁰⁴ “The purpose of this report is to examine how it operates and to assess its economic impact. It also looks at the relationship with the broader small business procurement “set aside “policies in the US, and at the market pull-through effect they exert on small US firms. The final section of the report makes specific and detailed recommendations on action that could be taken to replicate the SBIR programme in the UK so that government departments can participate more effectively in building the innovation based economy we need to remain competitive as a nation” (Connell, 2006)

⁵⁰⁵ For instance: “Neither the collaborative programmes operated by the DTI and EU, nor the DTI’s Grants for Research and Development, are appropriate for funding this stage in the exploitation process. And current public sector procurement processes, together with the absence of suitable R&D budgets, also make it very difficult for UK government departments who are potential end user customers to participate in funding the technology developments they need” (Connell, 2006)

The report is to a certain extent explicitly biased⁵⁰⁶ towards a positive vision of the American SBIR (seen as successful, effective) and the need of such a programme in the UK. For instance, the report accounts for the “mill-riding” issue which is described from the perspective of the 1999 NAS report’s conclusions on the non-validity of mill-riding criticisms; and to some extent embellished the perception of the programme through this specific issue⁵⁰⁷ while it has been one the most crystallized conflicts in SBIR lifecycle. The same goes for the references made to academic studies which showed positive impacts, though many others show limitations of SBIR effects in the US.

Along the first pages the report emphasizes the lack of such 100% funding in the UK and after describing some of its key features concludes that ***“As a result of these mechanisms, US early stage technology companies have access to Government R&D funding at a level which is much larger per company – probably by an order of magnitude – than in the UK”*** (Connell, 2006; emphasis not added). All key features of the programme are explained, especially those that contrast with the existing support modalities available in the UK (for instance the sole-contract function, the full-coverage -100% funding-, eligibility rules, size of awards, geographical scope, target group, etc.) as well as more generic ones (IPR detention, program phasing, topic definition, review process, etc.). The report explains quite in details while VC (and especially in Europe) cannot be expected to fund early-stage technology development. The economic benefits of SBIR are listed in the 2006 “Secrets” report under the following headings:

- ▶ Stimulating Innovation in Government Services
- ▶ Provision of Start-up Funding
- ▶ Facilitating Technology Transfer and University Spin Outs
- ▶ Supporting R&D that Meets Real Customer Needs
- ▶ Signalling to Further “Customers”, Partners and Investors
- ▶ Reducing Time to Market

⁵⁰⁶ While Connell (2006) states that *“Whatever weight one places on studies to measure the economic impact of the SBIR and STTR programmes in the US, one fact is indisputable. It is virtually impossible to find anyone neither the US public or private sectors who does not believe they play a key role in the national innovation system”*, the interviews conducted in the context of the present thesis clearly showed that the programme is clearly not consensual and even from the perspective of its reason to be. Several interviewees mentioned off the record that they found the programme should be “killed”. Connell also acknowledges his role in the SBIR campaign.

⁵⁰⁷ “It is highly regarded across both government and industry, and in its nearly a quarter of a century of existence has been the subject of repeated favourable reviews by the Government Accountability Office (previously the General Accounting Office) of Congress. Concerns raised over the detailed operation of SBIR, for example regarding the number of awards going to “frequent winners”, levels of commercialisation and the geographic concentration of awards in certain states, have not been serious enough to change this perception” (Connell, 2006)

- ▶ Easing Access to Government Procurement Budgets
- ▶ Improving Risk Management in R&D
- ▶ Exploiting Platform Technologies
- ▶ Niche Markets
- ▶ Stimulation of Soft Companies
- ▶ Increasing the Number of Venture Capital Ready Companies
- ▶ The Bottom Line (listing a couple of growth and jobs-related arguments as well as additional others linked to names such as Lerner or Tibbetts)

The Secrets Report goes into precise details and concrete budget calculations (even per Department) with anticipated views on its success based on budget-based approximations, showing appropriate budget break-downs and what outcomes could reasonably be expected from the recommendations formulated. (50/70 projects to further generate commercial revenue, etc.). One of the main features of the Secrets Report is that it is backed politically (support by A. Campbell, at this time already ex-MP for Cambridge, and Kitty Ussher, new MP for the same district) and explicitly oriented towards recommending a better emulation of the US role model. One other key point in this report is that the recommendations are based on their own conformity with European State Aid and Procurement rules and regulations.

The Secrets Report is still used now as a key source for judging SBRI. In a 2007 release entitled “Driving innovation through public procurement”, NESTA refers to this source in order to back the argument that “The UK’s SBRI bears little more than superficial resemblance to its successful US counterpart (SBIR)”⁵⁰⁸. It also welcomes the Sainsbury Review recommendations taken from Connell (2006), considering the US success as a “starting point” (see NESTA, 2007a).

⁵⁰⁸ NESTA (2007) also adds the following: “In particular, although the two share similar targets of 2.5% of external R&D being sourced from small businesses, in the US this figure is viewed only as a starting point. The UK SBRI must adopt a similar approach to the US model and introduce a flexible, phased structure and strong programme management processes to enable broader cultural change within government. Furthermore, it must recognise that a mandatory minimum target should represent only the beginning of greater engagement with small innovative firms”

Figure 46: Extract from Connell (2006)

1.7 What the UK Should Do

In an attempt to emulate the US SBIR programme, the UK government introduced a similarly named initiative in 2001. Called the "Small Business Research Initiative" (SBRI), it provided a web portal through which government departments could advertise R&D contracts. The objective was for 2.5% of external R&D to be spent with small and medium-sized enterprises (SMEs) through this mechanism. However, up to 2005, it only ever advertised contracts totalling around £2m per year, and virtually no departments participated.

In March 2005, Gordon Brown announced that the SBRI's 2.5% target was to become mandatory.⁶ However, subsequent attempts by the Small Business Service to improve the SBRI have achieved little. It still bears little or no resemblance to the US SBIR programme it purports to imitate.

To implement an effective US-style programme in the UK, it is necessary to address three important issues:

- (i) It must encourage individual government departments to identify areas where they need innovative new technology to meet their objectives and to commission R&D contracts to develop and trial this technology. This will involve an important change in culture, and a new approach to R&D for many departments;
- (ii) It must enable officials to do this efficiently without falling foul of "value-for-money" dominated Office of Government Commerce procurement rules designed for conventional products and services, and which inhibit risk taking;
- (iii) It must not conflict with EU regulations on procurement and state aids which would make a simple transposition of US legislation impossible.

Section 8 of this report proposes an approach which addresses these issues. It would enable a US style programme to be introduced **now** without breaching EU regulations.

The approach would involve the provision of £100m a year for "innovation contracts" awarded by departments on a similar basis to the US SBIR programme. Each contract would be worth up to £500k.

The details are based on work undertaken by the author with Anne Campbell (ex MP for Cambridge) and Kitty Ussher MP for their private members' bills. The approach proposed does not demand a legislative approach, though it will undoubtedly need initially to be driven from the top of government if conflicts between departmental objectives,

Image courtesy of UK Science Park Association

and the cultural barriers to innovation and risk taking within them, are to be overcome.

The major economic challenge for UK policy makers in the early part of the 21st century is to find a way of sustaining a high wage economy against competition from low cost, but increasingly technologically sophisticated, nations like China and India on the one hand, and from US based companies benefiting from its enormous R&D investments and the overwhelming dominance of its market for science and technology based products on the other. It is essential that the UK public sector plays its full role in the 21st century "innovation economy" we will need to create.

The US is the world's most successful economy at building science and technology based industries and its use of procurement, through the SBIR programme and other mechanisms, has played a key part in that success. We would do well to learn from its experience.

"I am a strong advocate of the US SBIR programme as I think there need to be channels other than traditional venture capital to seed new technology businesses. But they are also very helpful to the government on many levels, seeding businesses that are developing technologies useful to government agencies – and, often, to us all".

Dr Eric Fossum, founder of Photobit Technology Corporation.

"We would all have preferred to establish the company in Cambridge, rather than California, because Cambridge is where the research and development has taken place. But the funding gap for start-up biotech companies in the UK is such that we did not have a choice".

Dr Helen Lee, Cambridge University academic, founder of Diagnostics for the Real World and serial SBIR award winner.

⁶ This followed a campaign led by the author and Anne Campbell, then MP for Cambridge.

Source: Connell, 2006

From Strategic Intelligence to Policy: uptake of the Secrets Report by the “Sainsbury Review”. The “Secrets Report” was a key input to the 2007 Lord Sainsbury’s Review of Government’s Science and Innovation Policies entitled “Implementing the “Race to the top”” which became the reference document for UK innovation policy. Commissioned by Gordon Brown (at this time Chancellor of the Exchequer) in the context of the 2007 Comprehensive Spending Review, the Sainsbury Review of UK innovation system and policies formulated key recommendations for improvement of UK’s approach.

One of the particularities of this review is its strong affirmation of the need to go towards commercialisation-oriented priorities through a reinforcement of the role of the newly created Technology Strategy Board (TSB)⁵⁰⁹. The report foresees a central position for the newly created agency to be given a “new leadership role” in the British innovation ecosystem. TSB was indeed created in 2007 as a national innovation agency under BIS, one of its attribution being to act as a one-stop shop for SBRI solicitation processes from 2009 onward⁵¹⁰. Initially co-funded by private associations, TSB was and is still (as Innovate UK) industry-oriented.

Box 68: TSB and SBRI leadership

Technology Strategy Board and the management of the new SBRI scheme

Recommendation 8.9

In order to ensure this time that the new SBRI scheme achieves its objectives, this Review recommends that a central administrative role be given to the TSB. Government departments should be required twice a year to notify to the TSB in a standard form those technological areas where they would like to support projects. The TSB would then be responsible for publishing twice a year, at fixed dates, a list of the projects notified to it by government departments so that SMEs are readily able to find them. The awarding of contracts should also be administered by the TSB, with assessment of proposals being made jointly with the relevant government departments.

Source: Sainsbury of Turville, 2007

One should notice the section that is entirely devoted to the role of TSB seen in line with the need for more user-oriented innovation support. It is one of the central sections in the review (Section 3 entitled “Technology Strategy Board”) with as key recommendation to reinforce, extend and formalize its leadership to better structure the UK innovation ecosystem (recommendations 3.1 to 3.9 essentially).

⁵⁰⁹ The review mentions that “rather than seeking to raise the amount of research performed by all industries we should focus our efforts on the four major goals developed by the TSB”.

⁵¹⁰ “In 2008, Lord Sainsbury’s Race to the Top called for a far closer alignment of the SBRI with the US model. It fell to the Technology Strategy Board (TSB), a non-departmental public body, to implement Sainsbury’s vision, acting as a champion and steward of the scheme” (Bound and Puttick, 2010)

Recommendation 3.8 recommending some DARPA-like way of functioning for TSB (wrt the “proportion of staff in the TSB should be secondees from industry or academia, with an emphasis on selecting high-calibre candidates whose careers will be enhanced by spending two to four years in the TSB”). The enforcement of TSB is considered a vehicle for SBRI to finally take an effective shape that should be closer to the American model. A stakeholder noticed during an interview that “only when TSB was created [the SBRI] argument could be made credibly”.

Box 69: Learning from the US

“Lord Willis of Knaresborough: *You obviously drew from Race to the Top a lot of inspiration from the United States, in terms of the way they do things and I think that we’ve adopted some of that. SBRI is clearly an example (...).*

Lord Sainsbury of Turville: *(...) my impression always is that America is the interesting place to look at in these particular areas, mainly because they do so much more of this kind of work. As you say, the SBRI was taken directly as a copy of their SBIR scheme. I suspect other Governments are not much different from us. I remember discussing the SBRI scheme with a German Minister and he said he had seen that we had done this, and they had got everyone together and said, “We have to do this as well”, then when they looked at it two years later absolutely nothing had happened. So I suspect that they are very much in the same situation as we are on this”*

Source: Lord Willis of Knaresborough and Lord Sainsbury of Turville in House of Lords Select Committee in Science and Technology, 2010a

The first part of the report was presented as a “diagnosis” that framed the issues to be further developed in the review: the emphasis was placed on comparative challenges related to Globalisation and emphasizes the issue of Business Expenditures in R&D (BERD), knowledge transfer, STEM skills, science base, patents, as well as other innovation ecosystem-related issues. Bottom-line, positioning UK vis-à-vis international competition. Also skills and other elements are put on the frontline of the issues acknowledged by the review and to be put on the agenda.

Referring to the “Entrepreneurial Dynamism and the Success of US High-Tech” report released by the Joint Economic Committee of the United States Congress in 1999, the review introduces the SBRI section explaining that “In the USA, SMEs have driven the growth of the high-technology economy”. The review presents the American scheme as a successful one and gets back to the failure of the British one in terms of impacting the behaviour of Departments. Departmental expenditures associated to SBRI are said to be irrelevant to the programme’s objectives.

SBRI is referred to under several headings. For instance, supporting high-technology companies through early stage support in order to complement the existing equity gap, the review proposes several reforms including one of SBRI. But also when discussing the involvement of other Departments in innovation. It recommends in that regard to emulate closer the American model: “The Small Business Research Initiative [...] should be reformed to resemble more closely the successful US scheme. [...] It should be managed in conjunction with the TSB” (Sainsbury of Turville, 2007). The entire review is based on the willingness to compete better internationally in a globalisation context where emerging countries are getting increasing importance on the markets. The all report is structured accordingly, with as a guiding question (among others) “how to compete in the global economy while avoiding protectionism?”

Though Section 6 of the Sainsbury Review (focusing on Venture Capital) referred to the importance of small fast-growing companies in innovation systems and the importance of “The “catalytic effects” of small and medium-sized enterprises (SMEs) in the innovation process”, it is in Section 8 that SBRI is elaborated on. Section 8 deals with innovation across Departments, with the argument that “The USA has demonstrated the extent to which defence R&D can be used to stimulate innovation in the economy, and we believe that similar opportunities exist for the civil departments in the UK to stimulate innovation in their areas of responsibility” (Sainsbury of Turville, 2007). Still taking the American DARPA model as success benchmark, this is where SBRI comes about, part of four key areas (together with user-driven R&D, procurement, Innovation Platforms) where the Review “believes departments should concentrate their efforts and where significant improvements could be made”. SBRI is clearly made distinct from the procurement sub-section.

A main fact is that the Review team under the supervision of Lord Sainsbury visited the USA and among others DoD (and other Departments such as DoE and NIST) as well as the National Academies of Science where a meeting was organized with C. Wessner (at this time Director of the innovation and entrepreneurship programme of the NAS but also evaluator of the American SBIR) to discuss SBIR and during which the lack of success of SBRI was presented to the NAS (see Wessner’s written contribution to the House of Lords Select Committee on Science and Technology, 2010a).

Overall, the recommendations go in the direction of SBRI reinforcement: Recommendation 2.1 is about the increase of TSB funding and R&D support behaviour of civil Departments and MOD.

Box 70: SBRI described by the Sainsbury review - extracts

“8.57 It aimed to reproduce, as far as possible, the highly-successful US Small Business Innovation Research (SBIR) programme. This was established in 1982, at a time when a “failure to translate [the USA’s] research prowess into commercial advantage” was held to be undermining US competitiveness⁵¹¹. SBIR was introduced, with some controversy, as a wholly new initiative that was structured towards creating innovation and delivering new, commercialised products to market. 8.58 It is generally agreed that the SBIR has played an important part in sustaining the demand for new – and often radically new – products and services that are vital to support innovative activity⁵¹². Each year, on average, over 4,000 awards are made under the scheme to US small businesses, worth over \$2 billion in total⁵¹³. Furthermore, SBIR funding can act as a lever for future capital investment: with a guaranteed government contract and the likelihood of future commercialisation of products, much of the risk of early-stage high-technology investment is reduced. 8.59 The UK SBRI has so far failed to achieve anything like the success of the US scheme, even allowing for the different legal frameworks and smaller budgets it operates under”

Source: Sainsbury Review (2007)

The recommendations made for a “new SBRI scheme” are explicitly based on the proposals made by Connell and Campbell in the “Secrets Report” (see Connell, 2006) but also on discussions with C. Wessner, chief evaluator who led the NAS evaluations of the American SBIR Programme⁵¹⁴. These recommendations were brought to attention in several ways: the SBRI lead expert was called upon along the design of the review in order to provide expertise and orientations wrt a new SBRI scheme; and is listed in the submissions list as interested party; this expert advice was provided at the highest level (Lord Sainsbury himself). An illustrative typo mistake is made in the quote “David Connell and Anne Campbell have presented a well-developed set of proposals for reforming the current SBIR system” (instead of “SBRI system”). The Review takes up the recommendations from the Secrets Report and summarizes recommendations 8.8 as follows (see Box 71):

⁵¹¹ “America’s Industrial Resurgence: An Overview”, Mowery, D.C., in Mowery, D.C. (ed.), U.S. Industry in 2000: Studies in Competitive Performance, 1999, p. 1.

⁵¹² See, for example, “The Government as Venture Capitalist: The Long-run Impact of the SBIR Programme”, Lerner, J., Journal of Business, July 1999. Lerner finds a strong positive relationship between SBIR awards and growth of high-technology firms.

⁵¹³ Figures cited in Secrets of the World’s Largest Seed Capital Fund, Connell, D., Cambridge Centre for Business Research, 2006, p. 2.

⁵¹⁴ C. Wessner in House of Lords Select Committee on Science and Technology (2010a) refers to the “Discussions on SBIR with Lord Sainsbury at the National Academy of Sciences (January 22, 2007), which contributed to recommendations in the Sainsbury Review on revising the SBRI program”

Box 71: The Sainsbury review guiding international emulation of SBIR

“The SBRI should be reformed, adopting the following principles of the successful US SBIR scheme:

- ▶ *departments should focus on active engagement with innovative businesses and act as intelligent customers to fulfil their departmental objectives;*
- ▶ *departments should specify up front, in a simple and standard format, and update on a fixed and regular basis, the technological areas in which they would like to see projects, in a simple, standard format;*
- ▶ *SBRI contracts should adopt a two-phase structure, tendering a second, larger award after successful completion of a smaller, early-stage development, so as to minimise risks associated with innovation;*
- ▶ *SBRI awards must take the form of contracts, not equity loans or grants; this will ensure that departmental objectives are clearly identified and met, and will enable the award of an SBIR contract to act as a “seal of approval”, reassuring future investors and customers of the firm’s value;*
- ▶ *SMEs should retain the intellectual property associated with any new technology, boosting incentives for high-quality small businesses to bid for SBIR awards; and*
- ▶ *to maximise the SBIR’s effect, award availability should be restricted to products and services meeting the HM Treasury’s R&D tax credit criteria; this would exclude humanities and social science research and consultancy, for which the scheme was never intended”*

Source: Sainsbury of Turville, 2007⁵¹⁵

These recommendations issued from the Secrets report are deemed to figure what the American model is and in which sense the UK SBRI should go in order to get in line with the success factors of its US counterpart. The review eventually states that the targets for extramural R&D expenses should increase from 1.5 to 2.5% over three years and recognized that “this will mean government departments having to fund projects they have currently not been paying for, and that this will put pressure on their budgets” (Source: Sainsbury de Turville on behalf of DIUS, 2007).

⁵¹⁵ These recommendations correspond to the recommendations under 8.9 in the version available here:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243607/9780108507175.pdf

2.2.3 2008/2009 further efforts to get closer to the US role model

Strategic Intelligence as a source of expert recommendations to overcome SBRI failure(s). The previous version of SBRI is presented by some as a clear failure or even a disaster (Connell, 2009). The Secrets Report recommended to establish two main objectives for the British SBRI: “(i) to facilitate the identification of requirements for innovative new technologies with the potential to enhance the effectiveness of government departments and agencies in meeting value for money and strategic objectives, and; (ii) to facilitate the solicitation and commissioning by government departments and agencies of “Innovation Contracts” with industry for the development and trialling of technologies and solutions capable of meeting those objectives” (Connell, 2006). Recommendations went in the sense of a consolidated and centralized process (though Department-based) to take place in two phases, with a specific range of support amounts and standard contracts, the possibility for 100% funding and to run several awards simultaneously, and funding only 1) technical feasibility studies 2) technology demonstrators 3) prototype products and systems 4) technology trials and evaluation projects (etc.).

The recommendations from the Secrets Report that percolated into the Sainsbury Review led to new spending targets as a main change in the way SBRI worked so far; nevertheless, setting up targets was quickly perceived as an insufficient evolution⁵¹⁶ for the mechanism to work effectively. However some progress was made: following up on the Sainsbury Review, “TSB developed a new model process for the SBRI and began advertising contract competitions in April 2009 following a late 2008 pilot” (Bound and Puttick, 2010). It has been acknowledged by several interviewees that the new role of TSB was highly instrumental in getting SBRI finally off the ground and bringing it up across Departments. TSB’s uptake of SBRI leadership by 2009 was a clear advance in the life of the initiative. These changes came as a result of the work of SBRI advocates, among which one stated that “only in 2009 did a genuine US style programme get off the ground, after further political campaigning” (Connell, 2014). This new “post-Sainsbury Review” SBRI is called “Mark 3” (Connell, 2010a; interviewee-FH) and is still coordinated by TSB.

⁵¹⁶ “NESTA believes that targets are not the most important element in SBIR’s success. It highlights instead SBIR’s unique two-part contract, which allows the risks inherent to innovative procurement to be spread. The first part of the contract allows SMEs to experiment with new approaches; the second, available following successful completion of the first, allows for actual delivery of the product or service in question” (HM Treasury, 2008)

Box 72: Strategic Intelligence to flag a new SBRI failure

“By March 2008 the programme had still failed to meet its objectives (...). The fundamental problem was the lack of recognition by senior officials in spending departments that government can benefit from funding the development and trialling of new technology as a lead customer, or that it has an obligation to do so if it wishes to encourage the growth of innovative new companies. This was coupled with the fragmentation of R&D budgets within departments and a procurement culture which inhibited anything smacking of risk-taking and dealing with small companies. As a result there has been a systematic and major disconnect between the intentions of Government ministers and the collective actions (or lack of them) by officials”

Source: Connell/Nesta, 2010

Strategic Intelligence and SBRI “Mark 3”. The role of the lead SBRI expert continued to drive the trajectory of this SBRI “mark 3”. Among others, the lead expert made a relatively important contribution to the Richard report (initiated by David Cameron and published in 2008). This report formulated recommendations to further the emulation of the American SBIR and correct for the UK SBRI failures, in line with previous conclusions shared by the lead expert himself. The panel here confirms its support to the recommendations previously formulated in the “Secrets report”⁵¹⁷. But the pivotal role of Strategic Intelligence is far more evident when considering the uptake of the Sainsbury Review in policy making.

The Sainsbury Review of UK’s innovation policy covered SBRI and was indeed taken up further than any other document considered so far: “the Prime Minister accepted Lord Sainsbury’s recommendations in full, and asked the Secretary of State for Innovation, Universities and Skills to take forward its implementation” (DIUS, 2008a). This illustrates how the Sainsbury Review played a critical role in relaying the Secrets Report’s recommendations towards policy in practice. The “2009 version of SBRI was championed by Lord Sainsbury and John Denham, Secretary of State for Industry, Universities and Skills” on the basis of the proposals pushed forward by the lead SBRI expert (see Connell, 2014). All recommendations described in Box 46 were taken up word by word by the DIUS 2008 Progress Report under the “Department” section (see DIUS Progress Report, 2008a referring to the Lord Sainsbury Review as reference repository for assessing the progress of the implementation of the 2008 Innovation Nation⁵¹⁸).

In March 2008, the DIUS launched the “Innovation Nation” White Paper taking stock of the recommendations made in the Lord Sainsbury review⁵¹⁹.

⁵¹⁷ “The Task Force believes that something similar needs to be established in the UK and fully endorses the detailed proposals for doing so made in the “Secrets..” report by David Connell published by the Centre for Business Research at Cambridge University” (Richard, 2008)

⁵¹⁸ The orientations of DIUS are clearly in line with the 2006 Connell “Secrets Report”

⁵¹⁹ Lord Sainsbury of Turville (2007), “The Race to the Top: A Review of Government’s Science and Innovation Policies”

Under the heading “Demanding Innovation”, the White Paper foresees that “DIUS will reform the Small Business Research Initiative, refocused on technology based research, prototyping this with the Ministry of Defence and the Department of Health and will extend the revised SBRI to all participating Departments by April 2009”. Following the inclusion of SBRI as part of the innovation procurement lines of the Government, the White Paper stated that “Government Departments participating in SBRI agreed to a target of purchasing at least 2.5% of their R&D from SMEs”.

Box 73: From Strategic Intelligence to policy

“A restructured scheme, based on the author’s proposals, was announced in the March 2008 Budget Report and accompanying DIUS and BERR White Papers. Government commitment to innovative procurement, including through SBRI, was re-emphasised in the October 2008 Pre-Budget Report. In December 2008, DIUS published guidance for departments on the preparation of the ‘Innovation Procurement Plans’ which each Department has been required to produce annually since spring 2009 (...) Pilots were run with the Department of Health and Ministry of Defence in 2008. During 2009 the programme was extended to other departments and agencies, including the Home Office, Department of Transport and Department of Communities and Local Government”

Source: Connell, 2010

This approach was corroborated in the same DIUS progress report confirming on-going discussions with the Departments and the feasibility of reaching an extension of SBRI from a pilot form (to be ran by 2008) to a full-scale initiative by 2009 in which TSB would take the lead in administering the programme⁵²⁰: *“DIUS and the Technology Strategy Board will work with Departments to address the deficiencies of SBRI identified by the Sainsbury review.*

⁵²⁰ See also Connell on behalf of Nesta (2010) who describes: “Government commitment to innovative procurement, including through SBRI, was re-emphasised in the October 2008 Pre-Budget Report. In December 2008, DIUS published guidance for departments on the preparation of the ‘Innovation Procurement Plans’ which each Department has been required to produce annually since spring 2009. This states that “these Plans will include details of how Departments will seek to increase their procurement of existing products and services, fulfil their commitments under existing initiatives such as the Small Business Research Initiative and how they will make use of innovative procurement mechanisms.” The Technology Strategy Board (TSB) is taking a lead in coordinating the roll-out of the new SBRI across departments. Pilots were run with the Department of Health and Ministry of Defence in 2008. During 2009 the programme was extended to other departments and agencies, including the Home Office, Department of Transport and Department of Communities and Local Government. The problems arising from the perceived inflexibility of procurement rules have largely been solved, so that a simple ‘out-of-the-box’ SBRI process, with standard contracts and competition procedures, is available for use by any government department or other public sector agency. The attractiveness of the process to smaller firms is illustrated by an SBRI competition organised by NHS East, which in June 2009 attracted 177 applications, a much bigger response than most other government R&D funding competitions, which tend to be less suited to smaller firms”

The reformed SBRI will refocus on SBRI projects on technology-based research (using a tightened definition of technology developed by HMT, the same as that used for assessing the eligibility for the R&D Tax Credit) and be coordinated by the Technology Strategy Board acting as a central point for advertising tenders and providing expert advice to contracting departments. The Technology Strategy Board will also exercised an oversight function and ensure Departments participating in the SBRI meet their commitments. DIUS and the Technology Strategy Board will pilot the reformed SBRI with the Ministry of Defence and the Department of Health” (DIUS, 2008)

Followed two pilots⁵²¹ (a first one ran by the Centre for Defence Enterprise and a second one by the Department of Health – see FreshMinds, 2008-). Both pilots followed a “new model process” developed by TSB for which the competitions were advertised “in April 2009 following a late 2008 pilot” (Bound and Puttick, 2010) before rolling out to the other Departments in 2009 (Connell, 2010a). After 18 months of functioning between 2009 and 2010, 42 competitions were organized involving a total of 19 public organisations and leading to more than 500 contracts (which overall value was estimated to about £36m). SMEs got more than 80% of the contracts awarded, and micro-companies with less than 10 employees reached 40% (TSB in House of Lords Select Committee on Science and Technology, 2010a).

Eventually, learning appeared to be limited by the national culture of policy making. Though the key bottleneck in SBRI success has from the beginning been attributed to its non-mandatory nature, the Mark 3 stuck to the “voluntary” model: *“there is no requirement for departments to spend any given amount on innovative procurement, or to use the SBRI process and they have been unwilling to commit to targets. The Technology Strategy Board has therefore had to market the process actively to a range of individuals in spending departments and the public bodies they sponsor. In principle, “problem owners” have to fund projects from their own budgets, but in recent months the TSB has co-funded some competitions to encourage participation”* (Connell, 2010a).

The notion of “upscaling SBRI” started spreading, with a first recommendation from Connell and Probert (2010) to allocate a SBRI co-funding budget to TSB as well as to make some shifts in R&D programmes’ budgets to support SBRI. In 2010 the “Buying Power”⁵²² report was published by NESTA, considered by some as a preliminary evaluation of the SBRI (see TSB, 2014a)⁵²³.

⁵²¹ The competition topics were defined by Department officials, and the pilots ran on Departmental budgets (without additional fund). Under a separate policy, all departments also required to prepare annual “Procurement Innovation Plans”.

⁵²² Kirsten Bound and Ruth Puttick (2010), “Buying Power? Is the Small Business Research Initiative for procuring R&D driving innovation in the UK?”, Research report on behalf of NESTA

⁵²³ The perspective of the report was the following: “The new SBRI finally resembles the American SBIR with a clear model process to help public sector bodies work with innovative SMEs and a strong focus on technological R&D (...) it is timely to assess whether the newly reformed SBRI is on track to deliver the

With as a main conclusion that SBRI should be scaled up, the report describes SBIR and SBRI programmes and their key historical and technical features, reporting on success factors and challenges. This short (22-page) report is an example of the use of the US as reference benchmark. For instance, one of the arguments used to recommend an upscale of SBRI lied in the fact that the “US public sector spends around 20 times as much as Europe on procuring R&D” (Bound and Puttick, 2010)⁵²⁴. Georghiou and Edler (House of Lords Select Committee on Science and Technology, 2010a) already pointed out the fact that the NESTA “report is not an evaluation”. As noticed by Tredgett and Coad (2014), the positive nature of the results presented by the authors of the “Buying power” report was not echoed by Connell and Probert (2010) who found more limitations to the SBRI process and its effects. Tredgett and Coad (2014) also add that “Bound and Puttick review was carried out within the previously publicly run organisation NESTA and so a more positive view may have been taken on the progress of the SBRI than would a non-government associated body”.

However, the “Buying Power” report remains one of the most visible ones (though its credibility is limited by the perceived proximity between NESTA and the Government as confirmed by several interviewees) and recommended to scale up the initiative; the fact that it served as a basis for NESTA to lobby on SBRI is here the most important element to consider. The recommendation to scale up the SBRI was diffused by NESTA to different channels and sources including HMT and experts (see Connell or Bradshaw’s contribution to the House of Commons Science and Technology Committee, 2013), with a difference between experts and policy makers’ views on the scale itself (Connell recommending to scale up to £250m per annum while the Government ambitions £50m)⁵²⁵. To support the argument submitted in a written version, the oral contributions of several experts do not even mention the SBRI initiative in the first place but refer to the US (see). A similar “upscale” perspective was adopted by Connell’s 2010 report on behalf of NESTA where an entire section is entitled “The US Small Business Innovation Research program: A role model for UK policy”. Similar to NESTA’s main recommendation, other voices rised claiming that the programme should be scaled up (see Iain Gray in House of Lords Select Committee on Science and Technology, 2010a). The recommendations were progressively channelled to policy institutions; an interviewee from NESTA describes the approach of the quango:

desired innovation benefits” Though the report states further that it is about « a ‘health-check’ rather than an impact assessment” (Bound and Puttick, 2010).

⁵²⁴ With regards to the legal status of the initiative, though Bound and Puttick (2010) stated that “Mandates have been ineffective in the past and risk damaging perceptions of the SBRI (...) experience suggests that this would be very difficult to monitor in the UK, and could lead to unsuitable competitions being funded that would not have the desired impact”

⁵²⁵ Holding a middle ground, Bradshaw stated in his oral intervention that “Yes, we would agree SBRI is a very good vehicle. It is underfunded and could be expanded (...)if Government money was available, increasing the overall budget for the TSB so things like SBRI could be increased would be good”

*“We did lobbying work on its expansion in 2011/2012 (...) one of the key things we argued was an expansion for SBRI. There were recommendations from HM Treasury in that regard and in that time HMT was reorienting towards more macro-economic perspective. J*** K***** was HMT second most senior official with a prestigious position. HMT became more interested in innovation policy, and got more interest in our recommendations to expand the programme. They heard us.”* (Source: SW). The interviewee also explains that they introduced the SBRI lead expert to HMT, presenting him as legitimate through his “UKIRC” report on the topic. Other organisations lobbied the government in the directions explicated by Connell and NESTA’s reports, such as illustrated by Box 74.

Box 74: Strategic Intelligence as a tool for lobbying - the example of the institution of engineering and technology

In 2010 some organisations like The Institution of Engineering and Technology (IET) plaid a platform role, combining Strategic Intelligence and lobbying functions:

“In 2010 we worked with TSB (SB) to invite most senior civil servants (lead top civil servants) to hear about the benefits of SBRI, not only promoting business but also delivering their jobs. The idea came from me and TSB colleagues. We got 7 or 8 senior deputies and a minister. We ran for more than two hours. TSB spoke with examples; the presentation was only about the UK, and we got David Connell to speak as well. It is roughly around this time that we made the SBRI policy paper. (...) We went to Whitehall and Treasury to explain that we should revive SBRI. Then, pressure came from Whitehall and the Number 2 in the Treasury to make reality of the programme”.

Source: interviewee – DE

Westminster committees. The same year, a number of contributions were submitted upon request of the House of the Lord Select Committee on Science and technology (see for instance Connell, 2010a; and House of Lords Science and Technology Select Committee reports on Public procurement as a tool to stimulate innovation, 2010). The resulting information was discussed and integrated in reports presenting written and oral evidence on the topic. The information that was synthesized plaid a pedagogic role with extensive explanations on the role of lead customers in innovation systems, the importance of the demand-side of innovation, etc. The written and oral contributions to the work of the Committee pushed forward the perception of the possible success of SBRI overall and contributed to conceptually frame the discussion on PCP and PPI⁵²⁶. It also put forward arguments on SBIR success and SBRI (potential) success to justify why the British initiative should be scaled up (see Box 50).

⁵²⁶ One interesting fact is that a PPI discussion has been on-going in the UK in parallel of the SBIR/SBRI one, with some interactions when coming to develop understanding of the potential and constraints related to procurement mechanisms and support rules (framed by the EU State Aid rules); but however not related more in terms of content. Two discussions that appear almost “impermeable”, even on the paper as no

One should highlight that this specific piece of Strategic Intelligence marked the link between existing Strategic Intelligence (for instance knowledge and recommendations from existing studies and papers) with Westminster. Though officials were consulted mainly on accountability and SWOT elements, experts came in as analytical speakers highlighting perspectives for SBRI in the UK⁵²⁷. Arguments could also be relayed by officials from the highest level of the administration, such as suggested by the following recommendation to scale up the initiative while modelling it on the US scheme: *“the big thing that the US scheme offers that we now need to work on, other than the scaling up that I’ve already talked about, is in the US scheme there is a step that can then take you from that second phase, and a number of companies that then go on to full scale major multi-million pound procurement programmes. So making that linkage between the early phases of SBRI and the opportunity for full blown procurement, I think, is the important link that we need to make.”* (Iain Gray in House of Lords Select Committee on Science and Technology, 2010a).

Box 75: When experts define the needs and references to be addressed and taken up by policy

“David Connell: (...) In the US there is a very effective programme which does this called the Small Business Innovation Research Program, which is worth about \$2.5 billion a year. (...) I would argue that what the UK should do, and this applies also to the European Commission, is to switch a substantial part of its innovation budgets—and in the case of the UK I am talking about TSB money and also R & D tax credits—into private and public sector programmes of this kind.

Dr Robertson: What Government can do, and it is a tough call in a recession, is to invest. (...) The US, which is lauded as a private sector-led economy, invests far more in co-investment with business through the SBIR scheme than any other country in the world. The public sector intervention is a real challenge in the early stages of technology development, but for the UK I do not think there is much alternative”

Source: House of Commons Science and Technology Committee, 2013

mutual references are made in PPI reports and documents to the SBRI-related discussion and the other way round—even when dealing with PCP - (see for instance DTI, 2007).

⁵²⁷ Although SBRI was only part of the topics dealt with here, it took a quite central place in the discussion

The resulting House of Lords Science and Technology Committee (2011) report on “Public procurement as a tool to stimulate innovation” took up the idea of developing SBRI further as recommended by the Sainsbury Review (and the initiator of these recommendations as highlighted in Box 51) but also the suggestion that the initiative should be better monitored and evaluated⁵²⁸.

As a reaction, the response from the Government came in 2011⁵²⁹ specifying that “*The Government is committed to continuing to invest in successful procurement programmes that have proved to be effective in supporting innovation, such as the Small Business Research Initiative (SBRI) and Forward Commitment Procurement*”. It also came to consider the necessity of evaluating SBRI as suggested by academic contributors to the House of Lords Committee’s discussion (see oral and written advice from Georghiou and Edler in House of Lords Select Committee on Science and Technology, 2010a).

Box 76: Extract from Connell’s submission to the House of Lords Select Committee on Science and Technology

“My recommendations are therefore as follows:

- ▶ That Treasury allocates £20m to TSB in 2011/12 to enable it to cofund departmental SBRI competitions. This should be increased in steps to £75m per annum over the next three years
- ▶ That all departments, including the Research Councils, be asked to participate in SBRI during 2010/11
- ▶ That details of all awards, including the recipient, amount and project description, should be published on the TSB web site within 1 month of contracts being signed (this should be a condition of TSB cofunding)
- ▶ That TSB, jointly with Treasury, publish a full, factual analysis of SBRI competitions each year
- ▶ That Treasury use this analysis to agree innovation budgets and programmes with spending departments in subsequent years
- ▶ That within two years, spending departments be required to publish an annual breakdown showing in detail how R&D and innovation budgets are used

⁵²⁸ “We were struck by the lack of key performance indicators or measurable objectives in IPPs, such as the number of outcome-based specification contracts or the number of times that SBRI and FCP have been used” (House of Lords Science and Technology Committee, 2011)

⁵²⁹ See the 2011 response from the Government entitled “Government Response to the House of Lords Science and Technology Committee Inquiry into Public Procurement as a Tool to Stimulate Innovation”

- ▶ That departments, with the help of TSB and major systems suppliers, identify component and subsystem level technologies likely to be needed in future years and use part of their SBRI expenditures to fund their development
- ▶ That additional budgets are made available, when finances permit, to fund larger scale lead customer projects outside SBRI
- ▶ That government lobbies the European Commission to use a significant part of the FP8 budget to cofund national SBRI budgets.

6.5 The aim should be to build up a suite of lead customer programmes worth £500m per annum in total by the end of this Parliament, sufficient to play a major role in rebuilding the UK's high technology manufacturing sector."

Source: Connell, 2010a

The House of Lords Select Committee on Science and Technology's report was followed in 2013 by a new report based on a similar model (written and oral evidence) and dealing with an issue that translated into the following title: *"Bridging the valley of death: improving the commercialisation of research"*. The process, initiated in 2011, followed a similar inquiry process although there was no clear link between both. However, similar experts were involved (Georghiou, Connell, Nightingale⁵³⁰ in the first place) to discuss SBRI (and de facto SBIR) as one of the best policy practices to cross the valley of death.

Learning to grow SBRI VS persistent resistance to change. Most of British Strategic Intelligence was publicized after 2006, with influential reports from different sources published in 2007, 2008 and 2010⁵³¹. A 2010 submission by the lead SBRI expert to the House of Lords Select Committee on Science and Technology pointed out the (at this time) limitations of SBRI Mark 3, for instance in terms of use (by MoT for instance), fragmented and limited budgets (especially for Health and Defence ministries), content and impact of the activities supported, or the disappointing absence of competition ran by the Research Councils. The submission correlated with a new co-publication from the lead expert pointing at the underuse of SBRI by government bodies (see Connell and Probert, 2010⁵³²).

⁵³⁰ Who played an important role as advisor The House of Lords Select Committee on S&T in 2010/11

⁵³¹ It is to be understood that the reference Strategic Intelligence remained the one generated under the supervision of the SBRI lead expert

⁵³² "In contrast with UK public sector R&D contracts, Owlstone, which is a Cambridge-based, majority USowned firm, has won \$4 million in US government-funded R&D contracts, starting with two Small Business Innovation Research awards that helped it onto the first rung of the Department of Defense procurement ladder. We conclude that very few UK public sector R&D contracts are awarded each year and, indeed, all the firms we interviewed effectively discounted the UK public sector as a customer for innovation, certainly outside the defence sector. This is a disappointing finding given the contribution that private sector-funded technology contracts make to building science and technology companies and economic growth, and the emphasis placed by the Government on innovative procurement in recent years (...)R&D contracts have

This underuse is to be correlated with the non-decision from the executive branch to make the initiative mandatory and instead define targets with limited pressure effects (the targets being perceived by all Departments as unrealistic): several interviewees explained that most of administrative organisations will lag behind the targets that have been set up by the Treasury.

Although HMT could call back some budget from the ministries, it is expected that these targets are not to lead to penalties for this specific round. A number of Strategic Intelligence sources identified this issue, which was relayed in the previously quoted committees (see Box 77).

Box 77: Committee as relays of Strategic Intelligence - pointing to organisational resistance to change

The House of Commons taking up the advice of experts flagging organisational competences issues

“We were concerned that the SBRI scheme fails to assist companies to gain Government commercial contracts. We recommend that the Government ensure that its procurement officers, and those of other public sector agencies, are properly trained to take into consideration the wider public benefits of procuring services from small technology companies that have been developed through the SBRI.”

Source: House of Commons Science and Technology Committee, 2013

Since the Innovation Nation White Paper, two Departments were put on the frontline of the SBRI (potential) users and which should be the first to test the renewed targets of the initiative before its extension to other Departments: the NHS and MoD. With regards to the MoD, the situation proved to be more difficult for reasons which are mostly depicted in Box 83. An interviewee emphasized different aspects of the MoD difficulties to integrate SBRI: beyond the budget cuts from which almost all institutions currently suffer, two main limiting factors were the organisation of MoD procurement as well as the kind of systems (large systems such as aircrafts, etc.) the MoD deals with and which make the involvement of SMEs more difficult. Recent recommendations from Connell (2014) cover the set-up of a “mini-DARPA” in MoD as well as an “Interdepartmental SBRI Programme for IT and Digital”. Other recommendations go in the sense of further emulation of the American model⁵³³ which could benefit the MoD as other Departments.

derived almost entirely from the private sector and that there is little appetite among government agencies to engage with SMEs on a similar basis, let alone in the sustained way that US federal agencies procure technology from small firms through programmes such as the SBIR.” (Connell and Probert, 2010)

⁵³³ « SBRI is not designed for universities, which have substantial sources of research funding already. As in the US, award winners should be allowed to subcontract up to 35% of the value of a project to a university department” (Connell, 2014)

Less difficulties were encountered from the side of the NHS which work with different technologies and markets. Since 2009 the commitment of NHS to SBRI through the Strategic Health Authority in East England NHS is perceived as the most optimistic sign that the initiative already leads and will effectively lead to positive outcomes. According to an interviewee, the NHS was considered back in 2009 as an innovation hub and soon grew up SBRI while giving its leadership to the East England Strategic Health Authority (to run SBRI on its behalf). From around 3 million Pounds to around 20 million committed more recently, the SBRI kept on growing in gross mass.

Another interviewee explains about the origin of SBRI healthcare that expert advice played a particularly stimulating role in the uptake of the initiative by the NHS: *"I know D**** C***** from the Regional development Agency and this is where we met. He just came to us with his study research, saying we should take a look with the study saying we should take a look"*. After looking into it, the organisation –interface between industry and public sector in the field of health- took the lead and adapted a version of the initiative to become SBRI Healthcare. The trajectory remained similarly positive over the past years: *"it is testament to the Government's belief in the Small Business Research Initiative (SBRI) that earlier this year saw the Department of Health announce that it would be investing £4 million in businesses to develop new ideas to address some of the UK's biggest health problems of our time"* (NHS, 2012).

Box 78: MoD proposal to further adapt SBRI

"The MOD commitment to SBRI needs to be nuanced and be appropriate to the defence and security sectors. The BIS / Technology Strategy Board (TSB) format is too prescriptive and 100% reliant upon managed calls. Unlike the Centre of Defence Enterprise (CDE), there is no reactive mode within SBRI where companies can bring forward radical, game changing, proposals. The present mechanism is argued for on the grounds of competition and tension, but, in fact, it reduces innovation by seeking consensus and defining competitive calls. Thus it actually delays investment (by months and years). Tension, as it appears in research council responsive mode, must be provided by competition for resources, not through simplistic like-for-like comparisons. Defence Science & Technology (DST) should welcome such competitive tension between proposals since it fosters a culture of aspiration, adventure and openness to new entrants. For this reason, BIS - should be persuaded to accept a responsive SBRI funding stream, for fast evaluation of research for defence and security applications. (...)

The MOD's SBRI commitments should include the funding of thematic, multidisciplinary consortia including HEIs, primes, SMEs, start-ups, and international partners. These should include a balance of public and commercial interests. National centres, designed to draw in the best HEIs and minds, could be similar to those that are presently funded by EPSRC, other RCs and BIS.

Most UK multinational companies involved in science or technology businesses including Rolls-Royce, BP, GSK and Unilever have open innovation University Technology Centres embedded inside world-leading UK universities where industry works with academia at multidisciplinary pre-competitive research across a breadth of topics that no single company can now afford to resource internally. US Department of Defence (DoD) and DARPA have funded similar centres in US universities for many decades. MOD, in partnership with a hosting world-class university, could provide the open-ended research platform (and critical mass funding). In turn, the centres could manage the further MOD investment to co-fund novel and collaborative projects, exploiting the core, with small and large UK companies (spin in, spin out, SME, to primes), accounting for part of SBRI commitment.”

Source: Defence Scientific Advisory Council, 2013 (alineia added)

In 2013, the Government took “a step change in SBRI spending” (NESTA, 2013) increasing “by fivefold the value of government procurement budgets spent through the Small Business Research Initiative” (Source: George Osborne’s Budget speech in full, 2013⁵³⁴ - the Chancellor of the Exchequer to the House of Commons). It also set up targets specific to the main six Departments that should make use of SBRI (MoD, NHS, DfT, HO, ECC, and Defra⁵³⁵) which are reported in Box 54. The Spending Round released by HM Treasury for 2013 set out priorities among which spending lines for infrastructure and long-term planning covering science and innovation. Among other priorities, the point 1.17 followed up on the Government announcement of an expansion of SBRI in 2013 with an objective of £100 million to be channelled through it.

Beyond the general spending objective, the spending review describes the targets assigned to the selection of six Departments for 2013-2014, though explaining that all Departments should “expand their use of the scheme” (HMT, 2013). The targets were taken up by the Departments who adjusted their goals and confirmed their engagement with the programme such as in the case of the Home Office (2014).

Box 79: SBIR targets in 2013-14 for selected departments

Department	SBRI target 2013-14, £ million
Defence	50
NHS (Health)	30
Transport	7
Home Office	7
Energy and Climate Change	3
Environment, Food and Rural Affairs	3

Source: HMT, 2013 (note: based on HMT data)

⁵³⁴ Available at <http://www.telegraph.co.uk/finance/budget/9942779/George-Osbornes-Budget-speech-in-full.html>

⁵³⁵ With targets for 2013-2014 ranging from £3 million (Defra and ECC) to £50 million (MoD)

According to the 2014 Innovation Report published by BIS, *“Budget 2013 announced Government’s intention to ramp up the use of SBRI and committed to expand SBRI among key government departments such that the value of contracts through this route will increase from £40 million in 2012-13 to over £200 million in 2014-15”*. The report dedicates a box to Eykona (SBRI-supported company) as success story justifying the relevance of expanding the budget for SBRI. However a recurrent impression remains that (according to some interviewees) the Departments or at least some of them might fall short and still hardly participate in the SBRI; this impression is shared by Connell (2014): “despite SBRI’s successes, implementation has been fraught with difficulties, and major departments, including the MOD, and the Department of Transport, are still not participating in any real sense. SBRI spending in 2014/15 is likely to fall far short of the £200m a year to which the Government committed in the 2013 budget”.

The TSB, re-baptized in March 2014 “Innovate UK”, has therefore now as a key function (due to the non-mandatory character of the SBRI) to promote the SBRI across public organisations all around the UK. SBRI is indeed strongly supported and promoted by Innovate UK⁵³⁶ for which today’s main challenge (addressed by one of the key SBRI-related activities for Innovate UK which) is to raise awareness on SBRI⁵³⁷ and its possible benefits, for instance through discussions held with ministerial officials and other actors of the system (talks were also initiated in that sense at the ministerial level⁵³⁸). American Strategic Intelligence (especially the NAS evaluations of SBIR) is used by InnovateUK to raise awareness across Ministries on the benefits the programme could have in the UK. Another aspect of active learning is more technical and related to “follow-on contracts” following the approach according to which the Government is lead customer. Eventually, one of the new targets of TSB became to have the mechanism evaluated by 2015 (see Box 80).

⁵³⁶ “Effective public sector use of SBRI is an important part of our strategy in this area, and we will continue to champion its use across central government, support departments and agencies” (TSB, 2014a)

⁵³⁷ The triennial review on TSB published in 2013 mentions that “it was also noted by some stakeholders that in some areas, such as procurement and SBRI, the TSB had insufficient power to influence departments and agencies”.

⁵³⁸ “Both the Minister for Business and the Minister for Science and Innovation have met with a number of Ministerial colleagues cross Whitehall to discuss the use of SBRI and how departments could make more use of SBRI and the knowledge which exists in the Technology Strategy Board” (source: Government Response to the House of Lords Science and Technology Committee Inquiry into Public Procurement as a Tool to Stimulate Innovation, 2011)

Box 80: TSB SBRI targets for 2014-2015

The SBRI targets fixed by TSB in its 201-2015 plan were quite clear and based on previous recommendations from Strategic Intelligence that rolled up to decision makers and high-level officials. These targets are namely:

- ▶ *“continue to work with and across government to increase the scale of SBRI, helping to realise the target of £200m of new contracts issued this financial year*
- ▶ *work with the emerging NHS innovation organisation, particularly through the new Academic Health Science Networks, to help the NHS behave as a lead customer and become an engine for growth*
- ▶ *encourage the Ministry of Defence to work more with innovative businesses through SBRI to develop new technologies addressing operational needs*
- ▶ *carry out an evaluation SBRI’s process and impact by February 2015”*

Source: TSB, 2014

In view of this expansion, the key action N°29 of TSB (Innovate UK) Delivery Plan focused on SBRI promotion and development. At the time of the release, TSB stated that it “will champion the SBRI process energetically across government, to help deliver a five-fold increase in the programme – in which government departments tackle the challenges they face by seeking the help of innovative small companies” (TSB, 2014)

2.3 Strategic Intelligence and SBIR/SBRI integration: 15 years of (difficult) cross-temporal learning

Though they vary in design and practice, both SBIR in the US and SBRI in the UK “aim to raise productivity and business innovation by providing research and development contract revenues to technology-based small firms, helping them to commercialise their intellectual property and supplying Government bodies with R&D services” (Alun Michael, 26 Jan 2006 : Column 2353W⁵³⁹). The trajectory of each those two policy initiatives has been quite influenced by Strategic Intelligence in different ways.

⁵³⁹ See <http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo060126/text/60126w32.htm>

Box 81: Learning from monitoring

Intertemporal policy learning remains one of the most regarded sources of learning in the UK. According to an interviewee for instance, organisational learning in Innovate UK mainly happens from a management point of view through the agency's monitoring procedures, and essentially when:

- ▶ *"Projects starting with issues (when project does not start well, because not well thought)*
- ▶ *Projects well thought with stronger outcomes*
- ▶ *Giving the possibility to the people to adapt*
- ▶ *In terms of outcome it is also good to monitor to limit costs (in case of bad management, etc.)" (Source: PT)*

In the present case Strategic Intelligence as such was clearly instrumented more than it played a structural role, such as structuring networks or platforms of actors to be connected through expert panels or participative features of Strategic Intelligence. Though one could have expected that evaluation criteria, indicators and descriptors from the American Strategic Intelligence would be taken up by UK experts or monitoring specialists, it was not the case. Most of the American Strategic Intelligence was not known or only to a superficial extent by the interviewees, except for a few policy officers more interested in the design or delivery mechanism than such items.

Methods, indicators, descriptors and methodological frameworks (including approaches) used in the reports were not inspired by foreign models in the specific context of SBRI. The same goes for reporting modalities as noticed by TSB interviewees. The organisational goals took the step on the analytical grid which is therefore adapted to the goals of TSB and not blindly copied from the American experience.

The general perception of the programme and the orientations it has been taking over the past years are slightly differing from the initial "soft companies" focus presented in Connell (2004) to progressively follow the general/dominant preoccupation of market uptake. The commercialisation and procurement arguments are indeed probably the most central ones sustained by Strategic Intelligence all along the report releases and committees organized that touched upon the topic of SBRI. The design but also practice of the programme was bended to the policy demand for better commercialisation-oriented performance (see Box 82).

Box 82: Pushing towards market uptake at NHS

An interviewee involved in the management of SBRI Healthcare shares her vision of the (currently) unique SBRI Phase 3, explaining the following about the position of the institution regarding market uptake and the technology solutions developed through SBRI: “We recognize that (especially for medical devices) it takes a lot of time to get to the market; a long time”. Moreover, the interviewee adds:

“NHS has a reputation for not being the fastest adopter of new technologies; we need to help companies to build business cases. As programme, SBRI can help companies to bring their products to the market, but if NHS does not buy them, then we do not see the savings. This is an interesting thing about SBRI: as a programme, it can bring something to market; but then who is buying? We do not pay for marketing costs or the rollout of technologies but we help them showing how the technology can change the health pathway” (Source: interviewee – AB).

The interviewee explains that some technologies can disrupt the healthcare pathway and should not only be effective but also “safe for patients” and “cost-effective”; such new technologies should therefore be “doped”.

Nevertheless, the dominant perception at the ministerial level is that SBRI hardly fits with existing organisational structures and goals of the ministries. Up to now and as for the US case, the fact that no dedicated budget was put in place was a major concern as the initiative was perceived as a burden more coming on top of other financial constraints (budget cuts, etc.) facing public institutions. Therefore Strategic Intelligence was mainly instrumentalized by some actors (InnovateUK, experts, etc.) to promote the initiative mainly as a mechanism to foster the uptake of technologies and solutions useful to government bodies but also to support companies bridging the valley of death. As already explained above, the role of Strategic Intelligence in the current state of play is to be used as a repository of arguments to convince and incentivize Departments to make use of the SBRI mechanisms.

Strategic Intelligence is mainly channelled through policy learning entrepreneur(s) towards new SBRI adopters or organisations willing to expend its scope (for instance NHS). As in the American case, the British scheme only channels funds and is not about any additional budget that would be attributed to the Departments. Several interviewees underlined this point as one of the reasons why SBRI required more awareness raising about its possible benefits and contributions to the Departments’ missions, the main reason remaining in the UK that the programme has not been made mandatory and is still perceived by the majority as an R&D tax over departments.

Box 83: "Why has it been so difficult" - expert vision on the barriers to SBIR/SBRI learning

- In the UK, it has not been government's job to fund technology development as lead customer (*"it's the private sector's job; government's job is to procure best available, risk free solutions and get value for money"*)
- Departmental R&D budgets are fragmented, academically orientated and largely pre-allocated
- Managerial responsibility for innovation is non-existent or fragmented
- Often seen by departments as a *"small business tax"*
- Procurement rules and objectives have tended to get in the way (and *"best practice guidelines"* will not prevent "innovation" always taking 10th place to "value for money" and risk avoidance)
- Confusion over EU State Aids and Procurement Regulations (often used as an excuse to avoid change)
- No budgets or legislation to force through implementation
- Ministers and officials change frequently leading to simplistic solutions
- The basic idea is a "no-brainer", but the *"devil is in the detail"*

ENCOURAGEMENT AND GOOD PRACTICE GUIDELINES ALONE WILL NOT LEAD TO WIDE USE OF PCP

Source: Connell, 2009

The UK case shows political and policy learning as embedded in a same arena. Political learning is indeed about the uptake of new information by political actors; this knowledge is indeed used as a tool for political interplays –actors getting a better understanding of the political conditions in which they play⁵⁴⁰. One of the key aspects of the interaction between policy, politics and Strategic Intelligence lies in the socio-construction of the transferability of the SBIR model through Strategic Intelligence. It appears from the field research that the transfer of SBIR to the UK was more oriented towards main building blocks, challenges addressed, objectives and overall rationale of the programme. Only to a limited extent did the transfer process emphasize technical aspects (for instance when studying the form of allocation –grant versus contract- in the light of EU obligations). However, political learning was mainly concentrated in the executive branch rather than the legislative one (in the contrary of the US where political learning took place in Congress). However here, Strategic Intelligence opened an 'arena'⁵⁴¹ designed to build up the transferability of the programme through stakeholders and policy makers' interactions around existing evidence.

⁵⁴⁰ See May, 1992: "Political learning takes place within advocacy coalitions, leading to more sophisticated advocacy of particular proposals or problems. As policy advocates improve their awareness of the relationship between the political strategy they employ and its impact on the political prospects for a given proposal being enacted, they become more sophisticated in their policy advocacy. Political learning is concerned with lessons about manoeuvring within and manipulation of policy processes in order to advance an idea or problem"

⁵⁴¹ See Kuhlmann in IPTS (2002), "RTD Evaluation Toolbox", available at http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/assessing_the_socio_economic_impact_of_rtd_policies_2002.pdf

3/ Role of Strategic Intelligence in transnational policy learning: understanding the UK SBRI “emulation” process of SBIR

3.1 Strategic Intelligence and transnational uptake of SBIR in the UK: forms and conditions for the uptake

3.1.1 Depth of the diffusion: the case of Northern Ireland⁵⁴²

Diffusion to devolved governments. The diffusion of the SBIR model to the UK national government did not stop spreading and rolled down to other government levels. The first to be quoted is the sub-national level. Initiatives and actions have indeed been undertaken by regional governments and authorities, making use of Strategic Intelligence as a way to provide some political/policy ground for their orientations, as suggested by the discussions taking place in devolved governments (Wales⁵⁴³, Scotland⁵⁴⁴ and Northern Ireland⁵⁴⁵), all three of them having taken part to at least one SBRI competition.

Box 84: Eye on Wales

In Wales, the Department for Economy Science and Transport brought together a team of four people dedicated to business and innovation issues to enter in a closer collaboration with TSB. After a recent meeting between the Director of TSB and the Welsh Minister in charge, the conclusion came out that Wales was not part of SBRI competitions. After a screening of various programmes and the elaboration of a proposal, the decision was taken by the Minister that SBRI should be used, despite of some resistance from the Departments. An official acting as policy entrepreneur came up with an “SBRI innovation catalyst programme” (Source: GB) with key sectors identified. After a first competition of 3 million Pounds followed by another one of 4 million Pounds, SBRI was structured as a competition for which Departments could come present challenges and go through a selection panel to approve the competition topics derived from these challenges. In collaboration with the procurement department a toolkit was produced to support the stakeholders involved in the process (applicants, departments in need of clarifications with regards to EU procurement and exemption rules, etc.).

⁵⁴² I would like to warmly thank Yanchao Li from the Manchester institute of innovation Research (MioiR) for her brilliant recommendations without which this section would have never seen the light.

⁵⁴³ See <http://business.wales.gov.uk/news-events/news/funding-public-sector-work-welsh-businesses>

⁵⁴⁴ See <http://business.scotland.gov.uk/view/funding/small-business-research-initiative-sbri>

⁵⁴⁵ See http://www.detini.gov.uk/dt1_13_0160607_sbri_-_evidence_pack_-_final.pdf and <http://www.niassembly.gov.uk/Assembly-Business/Committees/Enterprise-Trade-and-Investment/Reports/End-of-Session-Report-1-September-2012---31-August-2013/>

Though references are made to the US model in meetings where arguments have to be presented to convince Departments officials to use SBRI, the knowledge was sourced through TSB and the Secrets Report but also Northern Ireland. However, the use of Strategic Intelligence as such seems rather limited as shown in the following quote: “Lots of talking with TSB and NI. In terms of material we looked at case studies, draft contracts and documentation, then we looked a lot at the Innovate UK website with the competitions, and that became the toolkit (...) There is no report, just check the Procurement root plan. A lot has been reported at the national level. The only thing we have is a best procurement practice academic report from a researcher on best procurement practices” (Source: GB). SBRI is not here promoted by the actors outside the UK although their experience is shared in the country. Limited relations with the EC or international connections are seen as a main issue for being proactive from that side.

Since 2008/2009 a growing number of sources for Strategic Intelligence sources (mainly reports) can be identified in the UK that relate to SBRI. Strategic Intelligence has been developed at the country (UK) level but also more recently at the level of devolved governments (Scotland, Wales and Northern Ireland) which tend to mobilize resources to take advantage of the opportunities offered by the national scheme.

SBRI in NI⁵⁴⁶: context and opportunity window. Following the indications and recommendations from interviewees, the field research led to information gathering at the level of devolved governments, with a particular emphasis on the Northern Irish case. With £3billion annual procurement expenditures, Northern Ireland appeared was the first devolved authority to engage with SBRI (FSB, 2013; Northern Ireland Executive, 2014). By the time SBRI came about in Northern Ireland (NI), 98% of companies were SMEs there among which 95% employ 0 to 9 people (FSB, 2009).

The uptake of SBRI in Northern Ireland was triggered in a certain context. When interrogated about the mega-trends he could identify that were related to SBRI set up, one of the Northern Ireland interviewees pointed out the entrance into function of a new Finance Minister with a “*very interesting character, very young (37 years old), passionate, aware of the need to reform the State, and who helped driving the agenda across the Northern Ireland government (...) he was interested in SBRI*”; The context was also then one of a dead-end as “*government is very bad at procuring and is risk averse*”. A general awareness of PCP, the unbalance between large corporations and SMEs in procurement despite of the quality of the work from the latter, as well as a general “*willingness to commercialize and grow companies*” to procure “*better services*” were listed as important pieces of the landscape in which SBRI was to be grounded (Source: EmF). In the context of the PCP discussion already on-going at this time in Northern Ireland, a window of opportunity was open by the relaunch of SBRI at the national level in 2009 which was an occasion for Northern Irish authorities to commit further to SBRI.

⁵⁴⁶ NI stands in the present document for “Northern Ireland”

This opportunity window clearly played a crucial role as early discussions on PCP did not lead to any positive outcome, some considering as explained by an interviewee that “*innovation and procurement are like oil and water*”. But if the window was the right opportunity to jump further, some pre-conditions were already in place for SBRI to be integrated, which were in place thanks to the release of the highly influencing MATRIX Report, basis

The MATRIX Report. In 2008, the Matrix⁵⁴⁷ panel published the “Public procurement of innovative science and technology solutions” report which benefitted from the advice of the author of the “Secrets Report”. Following up on European and national trends with regards to the role of procurement for innovation, the report refers to the “successful” American SBIR “universally recognised as the main inspiration for” these developing policy trends⁵⁴⁸; the report refers to the failure of the UK SBRI because of the voluntary nature of its targets and its lack of funding “recognized in, among other reports, the Sainsbury Review” (Matrix, 2008). The report goes even further in international comparison, referring to the European PCP approach and the related State Aid and Procurement constraints, but also referring to the Dutch SBIR pilot managed by SenterNovem and presenting lessons such as the following: “Although European rules mean that the Dutch version has to allow Europe-wide competition at key stages of the process, the experience to date has shown that this does not necessarily detract from the objective of working with ideas from small innovative Dutch companies and funding the development of the most promising of those ideas” (Matrix, 2008). Key to the overall analysis is the final proposal for a similar pilot⁵⁴⁹ (to the Dutch one) presented by the Matrix report.

Box 85: Strategic Intelligence rolling down from the Secrets Report to Northern Ireland

“Lord Sainsbury endorses David Connell’s report (ref. 1) and concludes that the SBRI should be reformed to resemble the US SBIR more closely. He also ‘welcomes the ‘transforming government Procurement’ report (ref. 4) and recommends that the government urgently press ahead with plans to improve procurement capability.’ however, this latter report only discusses relatively minor changes to existing procurement practices. the same approach is evident from a broader review of policy and guidance documents issued by UK government bodies (primarily the office of government commerce) and European sources on the subject of how the UK or Europe could use public procurement to achieve the kind of outcomes achieved by the US SBIR (references 5-15). The recommendations that are most often put forward are:

⁵⁴⁷ Advisory body to the Government, MATRIX is the Northern Ireland Science Industry Panel led by business experts and working on issues related to the commercialization of research, technology, innovation in Northern Ireland

⁵⁴⁸ In that regard, the report mentions that the benefits of SBIR have been « extensively described elsewhere », taking as main examples two papers authored by D. Connell (2004 and 2006)

⁵⁴⁹ To be focused on ICT or medical Services - for demonstration purpose.

- ▶ *Early engagement of suppliers by procurement bodies (this is often referred to as ‘concept Viability’ or ‘competitive dialogue’) in order to alert prospective suppliers, as early as possible, to potential tendering opportunities, help develop procurement policy and strategies and inform the public sector about new innovative solutions.*
- ▶ *The use of whole-life costing, to take into account the total costs and benefits (including the wider benefits to society beyond the body that is procuring the solution) over the lifetime of the product or service procured.*
- ▶ *The use of outcome-based procurement that avoids focusing too early on particular solutions and leaves open opportunities for entirely new ways of solving the issues in question, and allows variant bids. • Aggregating demand between public bodies in order to create large enough demand to stimulate innovation.*
- ▶ *Allowing the transfer of Intellectual Property to suppliers, enabling the wider commercialisation of the innovations.*
- ▶ *Adjusting targets and incentives for procurement staff to encourage the procurement of innovative solutions”.*

Source: MATRIX (2008), “Public Procurement of Innovative Science and Technology Solutions”, MATRIX REPORT: VOL 7⁵⁵⁰

An interviewee highlighted that the “*best thing brought by the Matrix report was that -thanks to the Dutch and American examples- we need to move outcome-based specifications. This is the single most important thing SBIR does. This means also that projects we can work on might not become SBRI*” (Source: NORTHERN IRELAND interviewee). This emulation work was convincing enough for NORTHERN IRELAND to sponsor two competitions between the relaunch of the SBRI nationally and the announcement of the 2013 budget announcement by the Chancellor of the Exchequer (March 2013). While the involvement appeared to be limited, some capacity building progressively took place in the administration.

Setting up SBRI implementation modalities. One of the particularities of SBRI in NORTHERN IRELAND is that it is absolutely not political, meaning here that it does not entail any confrontation of/synergy between political parties or stakeholder groups in the political arena (Source: JC). However, a few officials highly committed contributed to develop administrative and policy arrangements to allow SBRI to function and develop in NI. Following up on the results of the MATRIX report, the SBRI advocates from the side of the administration lobbied the highest level of the government in order to set up right conditions for SBRI to be implemented across Departments.

⁵⁵⁰ Available at <http://matrixni.org/wp-content/uploads/2014/11/MATRIX-Public-Procurement-of-Innovative-Science-and-Technology-Solutions-October-2008.pdf>

The issue of critical mass is important here as no single Department could be perceived as capable of managing an SBRI alone because of the insufficient level of investment/procurement. The mechanism in NORTHERN IRELAND is “coordinated through Technology Strategy Board (TSB) by Invest NI/DETI” (Source: interviewee from Invest NI) and in cooperation with the Matrix panel” (TSB, 2012).

An interviewee involved in the process explains which source of inspiration was used: *“management we took completely from Innovate UK, not Netherlands or the US”*. The permanent secretary member in charge of the *“innovation procurement board pointed to SBRI as best practice in NI, and we did try to check for competitions across Departments”*: some first success obtained thanks to a first “Tourism Application” competition (first to be held in NI) breded some further interest in SBRI, which for this first time did not lead to a solution that would be procured but rather to a solution going to be taken up by the private market.

Dedicated human resource positions were created in 2013, with as a main job to raise awareness across Departments. The officials in charge are leading advocates of the initiative in NI. These human resources (officials at the service of the government) constitute a cross-ministerial team which is composed by representatives from Invest NI, DETI, CPD⁵⁵¹ and DHSSPS⁵⁵². The appointment of the four key team members was seen positively by stakeholders who produced material to comment on the issue of SBRI (the Federation of Small Businesses [FSB] even called for setting up a complementary co-funding pot at the regional level). The main function pursued by the team appeared to be quite similar to the one pursued by TSB when coming to SBRI: raise awareness and convince Departments to make use of SBRI, in order to push organisational learning and allow cultural change for SBRI to be further integrated into the administration.

Learning SBRI: other influencing factors. The combination of the contribution of the MATRIX Report with the national opportunity window illustrates how policy change was unlocked. But other factors played a driving role in the uptake of SBRI by Northern Ireland. The uptake of SBRI was here clearly held by officials willing to push change in the administration towards an emulation of the programme in NI. These officials took initiative in that direction, as one of them -main champion of NORTHERN IRELAND SBRI from DETI⁵⁵³ - depicts: *“I joined the Department in 2006, [and] came here to work on innovation policy with an industry focus. Very early I was asked to be part of the Matrix panel. The sub-panel of which I was member was a panel on how to create/use PCP in an SME-friendly way (...) we brought David Connell on the panel”* (Source: interviewee). This is in that occasion that SBRI was introduced by the national SBRI lead expert to the associated members (Source: interviewee).

⁵⁵¹ The Central Procurement Directorate; see <http://www.dfpni.gov.uk/cpd>

⁵⁵² The Department of Health, Social Services and Public Safety; see <http://www.dhsspsni.gov.uk/>

⁵⁵³ The Department of Enterprise, Trade and Investment of Northern Ireland also called DETINI

Later on, other sources were vector of learning from abroad, such as the 2012 Briefing Note published by the Northern Ireland Assembly Research and Information Service on SBRI, linking to TSB and summing up success stories presented on the SBRI website. But what might have played a more important role is to some extent the cultural proximity which would explain why the NORTHERN IRELAND SBRI mechanism would be also inspired by the Dutch model but also some EU influence through an EU project that played the role of learning platform:

*“A*** is Dutch and came across the Dutch SBIR managed by CenterNovem. We got access to Dutch documentation (published in English, and when it was Dutch it was translated by Alex for us). The recommendation was that PCP should be part of NORTHERN IRELAND policy. We identified a field as well (connected health). At this time I was involved in an EU project on PCP”* (Source: interviewee from DETI).

The interest in the American model was however revived when a research paper published either in 2013 or 2014 by DETI on SBRI dedicated a section to “Evidence of SBIR in US and SBRI in UK” for which the first point was the following: *“The evidence from the similar US Small Business Innovation and Research programme and more recently from SBRI at a UK level is that it is highly successful in encouraging innovation across traditional sectoral boundaries and in driving improvements in efficiency and sustainability. SBIR has been described as the “World’s Largest Seed Fund” and is credited with transforming the future of many of the USA’s best technology based start-ups such as Qualcomm”* (DETI, no date⁵⁵⁴). And to add that *“if the Northern Ireland public sector is to be the leading practitioner of SBRI in the UK and EU we will need to see a minimum of 10-15 SBRI competitions run in NI per annum”*, putting forward a competitiveness argument to promote the use of the initiative. Another link, however weaker, to the American model was referred to: a contractor providing *“SBRI master classes”* and considered as the only one “in-house” aware of the American model apart from the author of the Secrets Report who was involved in the activities of the MATRIX panel.

The direction of policy learning even went the other way around (not only top down or sourcing from abroad, but also from the bottom to the top), from devolved to national level of government. An interviewee from DEFRA depicts the sources of inspiration used by the officials of the procurement unit in their practice of SBRI: on top of TSB, *“we have good connections with the Welsh government, advised by TSB. They were doing some good work, so we spent a day with them in a workshop to build interest in the SBRI funds they were running”* (DEFRA interviewee).

⁵⁵⁴ The research paper should however date from 2013 or 2014 as it quotes the 2013 Budget announced by the Chancellor of the Exchequer

Overcoming organisational resistance? A similar organisational resistance to the one observed at the national level was pinpointed by an official in NI: *“many departments are not looking for the best solutions because it takes high risk and government is particularly risk averse, people are concerned, they fear of being brought to committee. The culture is about making sure there is no problem, not taking risk”* (Source: JC).

Box 86: EU state aid rules and organisational resistance combined - example of Wales

One interviewee active at the government level in Wales explains that the overall process is not without difficulties: “The challenge is to find good people who have got commitment to run competitions. You need resources (manager etc.). That’s where the struggle is for organisations, and to understand the benefits too” (Source: GB). Challenges remain then, for instance at the administrative level when it comes to the State Aid framework issue. An official explains in that regard that “it is hard to get into the culture that what we do is legal. Constraints are those of legality and the State Aid exemption rules, the fear of it. We have a lot of funding through ERDF etc. so we understand more and more how it works, but when it is about offering contracts, we are used to grants, and this procurement is not a grant. Difficult to get that in people’s mind”. The legal framework of the EU in that regard appears to set an additional layer of complexity that adds to initial organisational resistance.

TSB estimated in 2012 the share of businesses supported by SBRI at the UK level and coming from Northern Ireland to be of 4%, calling for Northern Ireland to run proper competitions (until then, only one competition was launched by Northern Irish authorities) and formulating suggestions in that direction. But the demonstrated commitments of a few institutional entrepreneurs shows potential for SBRI to be further integrated across departments. The official position of the Northern Ireland Assembly Committee on Enterprise, Trade and Investment can be illustrated by the following quote: *“The Committee highlighted and promoted the benefits of the Small Business Research Initiative (SBRI) through engagement with businesses and other committees; through evidence sessions, and a debate in plenary. The Committee continues to monitor uptake by departments of initiatives under the SBRI. The Technology Strategy Board has welcomed the Committee’s work on the SBRI. The Initiative has shown increased interest in Northern Ireland as a result”*⁵⁵⁵.

The 2014-2025 Innovation Strategy for Northern Ireland was released by the Northern Ireland Executive in 2014⁵⁵⁶, setting up priorities for the NORTHERN IRELAND Government and highlighting the willingness of public authorities to further reinforce the participation of Northern Ireland to SBRI.

⁵⁵⁵ Source: Northern Ireland Assembly, <http://www.niassembly.gov.uk/Assembly-Business/Committees/Enterprise-Trade-and-Investment/Reports/End-of-Session-Report-1-September-2012--31-August-2013/>

⁵⁵⁶ Northern Ireland Executive, 2014 and 2014a

The new strategy committed to “provide further investment into the SBRI model and investigate the development of a central fund, to co-fund SBRI projects across public sector organisations” (key action N°15). These orientations led to two actions listed in the strategy directory: actions D9 and D10 related to Knowledge Exploitation and aiming to “*increase the number of Small Business Research Initiative (SBRI) projects*” and “*investigate the potential for the establishment of a central fund, for SBRI projects*”, both on a short-term perspective and with DETI in the lead.

The presentation of SBRI in the strategy makes use of all the key terminology associated to the scheme by Innovate UK (“procurement to stimulate innovation” etc.).

3.1.2 Combination of a “British Inward Perspective” to the “American Outward perspective”

Strategic Intelligence as a domestic “policy sourcing” tool. It is widely known in the policy making sphere that SBRI “*was modelled on the US Government's small business innovation research (SBIR) programme, which remains the most relevant international benchmark for SBRI*”⁵⁵⁷. Reasons for emulating the scheme are clear to everyone, and essentially focused on missing bricks in policy support and the need to foster the growth and competitiveness of domestic companies⁵⁵⁸. In the Secrets Report itself, justification is brought by Connell (2006) who explicitly stated that “*the United States does things differently; and from the strength of its high technology economy, one must judge with some success. The purpose of this report is to see what we can learn from the US experience, by examining the lead federal government policy for using R&D procurement to stimulate innovation in smaller companies – the Small Business Innovation Research (SBIR) programme*”.

The transfer process remains however silenced as no question seems to be asked on how and for which results the model was emulated and adapted in the UK. The US passive export and limited promotion phenomena explored in 0 show how, except for a few isolated exceptions, American officials were responding to foreign queries in a quite passive way, providing delegations with the relevant Strategic Intelligence (mainly NAS evaluations) and vulgarizing their experience in SBIR matters. Only the lead SBIR expert in the US (lead evaluator of the programme) plaid a clear promotion role in and outside the US.

It is to be noticed that the translation process of SBIR in order for it to be tailored to the UK context was entirely shaped by Strategic Intelligence which achieved a broad and effective outreach under the leadership of the lead expert.

⁵⁵⁷ Source: Bound Volume Hansard - Written Answers, 26 Jan 2006 : Column 2350W—continued, available at <http://www.publications.parliament.uk/pa/cm200506/cmhansrd/vo060126/text/60126w32.htm>

⁵⁵⁸ See for instance DTI (2003) where it is explained that SBRI “was inspired by the equivalent scheme in the USA, which has played an important part in encouraging the growth of small high tech businesses”.

Domestic Strategic Intelligence linked back to American Strategic Intelligence as a repository of information where arguments are basically stored in the form of evidence: as already highlighted by Connell (2006), information is transparent and accessible on the web, but the role of the expert was to identify and pick up the “right” pieces of information to brought in. In that sense, the inference of the expert in the process of importing policy-relevant knowledge is the one of argumentative filter. Other connections were found, for instance between NESTA and the American system, although the impacts of the NESTA reports were less significant than the Secrets Report and the Sainsbury Review: “we had lots of conversations with the US: desk research, SBA discussions, companies involved in the process, as well as US academics (P. A. and Josh Lerner). We looked at evaluations” (Source: interviewee – SW).

Moreover, Strategic Intelligence opened a transfer channel through which other players could be connected to the American system, for instance when Sainsbury and Connell joined by relevant staffers went to visit the American NAS in order to learn more about the SBIR Programme and American innovation policy⁵⁵⁹. The same dynamic was followed when the lead SBIR expert in the US was conveyed to testify before Westminster (see Box 87) in order to draw lessons from the American view on British experience, with a particular (though implicit) focus on SBIR.

Box 87: U.S. - U.K. Cooperation on innovation policy

“27. Innovation in the United Kingdom is facilitated by the relatively low regulatory burden on small firms, and by the high quality of scientific research. The challenge for the United Kingdom is to capitalize on its investment in research and development, and to generate returns to British taxpayers in the form of new, welfare-enhancing products, and jobs and growth that new companies can offer.

28. Critical Mass: At a time when the UK Government is making a sustained effort to foster innovation-based growth, we would caution against the British tendency to develop well-conceived programs and then to provide only modest funding. This “tyranny of small scale” does not permit the realization of the scale and reputational effects needed for innovation award programs like SBIR to succeed, short-changing in turn the potential of the UK’s excellent science base. There is also a tendency for UK policy makers to change innovation programs before they can develop a track record.

⁵⁵⁹ C. Wessner from the NAS advised Lord Sainsbury on SBIR when the Minister visited the US in the context of the “Race to the Top” Review.

29. A scaled-up innovation program can, over time, help stimulate small business innovation while addressing the Britain's national missions in transportation, defence, health, and beyond. We would welcome the opportunity to cooperate more closely with the House of Lords as it investigates the role of public procurement programs like SBIR in stimulating innovation."

Source: Final section of C. Wessner's submission to the UK House of Lords Select Committee on Science and Technology (2010a)

The inward perspective: sourcing, reception, use, integration. The translational policy learning dynamic was clearly driven by the willingness of the lead SBRI expert and supporting actors to import the SBIR model. "Expert demand" for a similar model to the American one in the UK was therefore the engine of the transfer process. As the model on which to shape the British initiative was originated from another country, and that domestic Strategic Intelligence was the key tool in its design and evolution, both intertemporal and Transnational Policy learning appear to be clearly embedded, with sourcing from abroad happening thanks to the involvement of experts (lead SBRI expert in the first place) in other existing Strategic Intelligence exercises, or with the use of the Secrets Report as main repository to which benchmark the SBRI still in development.

But as shown in Box 88, learning from other countries than the US was surprisingly limited though one could have expected bilateral cooperation between ministries and innovation agencies to lead to more mutual learning. Although SBIR diffused to many other countries in the world over the past three decades, only the American model was used as a benchmark in the UK, except when considering the Northern Ireland integration process of the mechanism (see Section 3.1.1).

Box 88: Limited learning from other countries than the US

Beyond the usual cultural proximity argument, the fact that the SBRI was not inspired by other models than the American one is explained in different terms. As for the US, limited organisational capacity and interest in experiences from abroad can be observed.

When enquired about other European experiences, interviewees mainly pointed out the fact that the UK was on the frontline of the first-wave adopters of PCP and could therefore hardly learn from other EU countries on that matter. Although the Netherlands was one of the first to adopt an SBIR-like models in the EU as well, learning from that source was limited to Northern Ireland as the country appears not to be "very far" in its experience of SBIR, even compared to UK (source: interviewee). Also, a natural interest in the US as the leading innovation performer in the world drove the interest of the policy sphere members in the US model rather than the Korean or Russian one, knowing that only an extremely limited number of people are aware of the existence of other similar programmes in the world.

However, there is a clear ambition from the side of Innovate UK to collaborate with the US and other EU agencies in order to learn from each other; already now collaborations exist with “other Government agencies in other countries such as Norway, China, India, all EU market places, Brazil, US, Canada” or in the context of the European Framework Programme and related projects.

Source: PT

The process of embedded learning appeared to follow easy-to-identify steps:

1. **Detection.** Awareness was randomly raised by practical experience: the initial idea of the programme came about as a committee was in place in the context of which a screening of the US experience led to the identification of SBIR as a best policy practice. In parallel, the professional activity of the lead expert already identified the programme as an interesting source of early-stage funding.
2. **Sourcing:** Sourcing happened at all levels. While the rationale and building blocks (social components and partly technical features of SBIR) were taken up in design from the Secrets Report, some technical sourcing happens at the level of the administration of the programme.
3. **Reception and uses.** Many forms of reception were described, leading to a translation of SBIR into SBRI, but also resistances from the administrative side to the integration of the mechanism. The utilisation of Strategic Intelligence was both political and technical (happening at the design level and through the advisory role of experts to the British administrative bodies involved in SBRI). References to the American Strategic Intelligence (such as in Connell, 2004; 2006; and following reports and sources of Strategic Intelligence) were used in order to back the arguments supporting the uptake of the American model viewed as a successful programme. The 1999 GAO evaluation of SBIR is for instance quoted in the 2004 paper from Connell to support the idea that the benefits of the American program ‘outweigh’ its imperfections. Other references, mainly the NAS evaluations of SBIR from the first decade of the 21st century, were referred to as to support the argument of SBIR proven success in the US.
4. **Cascade integration.** Though resistances are obviously hampering the development of a fully-fledged SBRI for now, difficulties seem to be progressively overcome for SBRI advocates to anchor the mechanism into the British administration. Also, a “rolling down” dynamic could be observed towards devolved governments, with a parallel channel linking devolved government with foreign entities, through EU projects and inter-agency screening.

Transnational Policy learning entrepreneurship. The all SBRI case study illustrates the crucial importance of what I would call “Policy Learning Entrepreneur(s)” promoting the introduction and further emulation of SBIR in the UK, NORTHERN IRELAND or EU on the basis of Strategic Intelligence-based lesson-drawing.

This proactive attitude was in this case not driven by any economic interest but rather strong beliefs in the potential benefits of the programme. Symbolic retributions clearly play a role as well as the acquisition of social capital, although the latest can be seen as rather instrumental in the sense that when acquiring further political influence for instance the SBRI lead expert would use it to feed in his ambition to see a British SBIR as recommended in the Secrets Report.

Box 89: Transnational Policy learning entrepreneurship

It has been acknowledged by the previous sections of this case study that the all SBRI was grounded into the Secrets Report; also Mark 2 and Mark 3 are concerned⁵⁶⁰:

“Over 20 years, many people involved in technology exploitation, including the author, have highlighted the attraction of the SBIR programme in UK Government reports on innovation policy and exploitation of the UK science base. And eventually, in July 2001 the UK Government launched its own version, helpfully called the Small Business Research Initiative (SBRI)” (Connell, 2004).

The 2004 paper from Connell illustrates the role attributed to the US benchmark in the UK process, where for instance the participation and outputs are put in comparison with the American ones to illustrate which path Departments should follow in the UK in order to succeed through SBRI. Such approach relies on the “What the SBIR programme does in the US (and SBRI should do in the UK)” rationale of the paper.

Connell (2009) in a presentation to the EC⁵⁶¹ explains that his role of advocate was the result of experience: “Increasing awareness through VC experience that absence of US style Small Business Innovation Research programme was a DISASTER for UK (and EU) companies”, which led him to campaign “for a UK SBIR”.

Policy learning entrepreneurship when considered transnationally could be observed not only from an “out -> in” perspective but also an “in -> out” perspective as illustrated by Box 65. As will be further explained in O, the proactive attitude of the lead SBRI expert led to the setup of an additional learning channel between the US and the EU. The interface role plaid by the expert was the result of his voluntary and quite active approach towards the EU institutions that was based on the use of political contacts to push the idea of an EU-like SBIR, which was further set in stone by the EC as the “SME-Instrument” of the European Union.

⁵⁶⁰ See for instance this extract from a slide issued by Connell (2009): “New SBRI (Small Business Research Initiative) scheme announced March 2008; based on detailed proposals for a US style programme”.

⁵⁶¹ David Connell (2009), « CREATING AN EU SBIR PROGRAMME: LESSONS FROM THE UK AND PROPOSALS FOR EC ACTION »

The introduction of such an initiative at the EU level was (at least partly) the result of the lobby work of the expert over national and EU contacts but also took place in a European context in which discussions over PCP were already triggered by the newly installed Dutch SBIR and British SBRI, opening an opportunity window for the learning entrepreneur to promote SBIR with in addition to American lessons, the British experience of the SBRI mechanism.

Box 90: Interfacing: active promoters at an intermediary level

The example below illustrates the role of the lead SBRI expert not as a relay but clearly more as an active promoter of the American SBIR model.

WHAT ARE THE LEARNING POINTS FOR EUROPE FROM THE US SBIR PROGRAMME?

- Defined budgets each year; run as a “SEED FUND”, not a set of “targets” or guidelines. (We must replicate this without legislation)
- Total value of US Federal Government R&D contracts with small firms is 3-5 times the SBIR budget
 - more important than VC for early stage S&T based firms.
 - SBIR is just the first step on the procurement ladder
 - the 2.5% rule is just part of the story
- Topics are defined by informed officials in customer agencies, with ongoing dialogue with potential users and small companies with ideas for projects
- Key role of Department of Defense and NASA in funding component level technologies with dual (military and civil) use
- Diverse range of topics, mostly tightly defined

PROPOSED EU PROGRAMME

- Establish EU Framework programme to cornerstone “Procurement Innovation Competitions” (PICs) in individual member states
- EC supported competitions must be compliant with standard rules and processes similar to US SBIR (all innovative firms eligible, but designed mainly for SMEs)
- Projects must be related to government needs, objectives and policies as customer (direct or indirect) or specifier
- Single company contracts with no requirement for collaboration
- Target programme budget for FP8 : €800m per annum
- Successful bids from public sector member state organisations awarded EU contribution of 40% of programme costs. Total programme therefore worth €2 billion
- Pilot during FP7 with annual budget of €100m from 2010 to 2013 ; experience sharing across EU

PAN EUROPEAN COMMERCIALISATION ENCOURAGED THROUGH SUPPORTING MEASURES

Source: Connell, 2009 and 2010

3.2 Perspective on the role of supra-national organisations

3.2.1 Supranational organisations pointing at successes, failures and controversies: the instrumental use of Strategic Intelligence by the OECD and European Commission

Supra-national organisations in a policy learning context. Globalisation is an ancient phenomenon that took a new form over the past century. With the emergence of a connected “world-wide village”, blossomed supra-national organisations based on multi-lateral agreements between nations willing to strengthen international cooperation or even regional integration. Two key organisations are particularly influencing over the UK when coming to innovation policy: the Organisation for Economic Co-operation and Development (OECD) and the European Commission (EC) which acts on behalf of the European Union.

Rose (2005) already identified the European Union institutions and the OECD as being “official forums for cross-national learning”. According to Rose, those forums are combined with “informal forums” constituted by a broader community of experts and stakeholders (see for instance Box 71). Because of a lack of legitimacy and a conflictual political environment, the European institutions have been led to develop new instruments (especially “soft” instruments, see the Open Method of Coordination [OMC]⁵⁶²) and are constrained to innovate all the time (Kassim and Le Galès, 2010). The field research showed that Strategic Intelligence is one of these instruments, with its history and its own effects. Strategic Intelligence shows “new ways of governing” (Kassim and Le Galès, 2010) and is a technique of government that is often underestimated in this regard. Rose explains that “since the EU is concerned with detailed regulations, meetings of member states usually focus on narrow programmatic issues. In this way national officials learn about distinctive features of programmes of each national government. The cumulative effect is that most departments of national governments in Europe now have a number of officials who have learned a lot about programmes in other countries through participating in discussions at Brussels” (Rose, 2005). Radaelli (2000) attributed a ‘catalytic’ role to the European Commission; the European institutions would indeed have a catalytic effect on what Radaelli points as “isomorphic processes”⁵⁶³.

The role of supranational organisations tends to be clear in that respect: heading towards internationalisation and the strengthening of transnational relationships (Evans, 2009b), those institutions structure supra-national governance while calling upon various instruments (one could for instance quote the European conditionality⁵⁶⁴ tool for instance). However, the production, use and diffusion of knowledge by those institutions remains a black box.

⁵⁶² See http://europa.eu/legislation_summaries/glossary/open_method_coordination_en.htm

⁵⁶³ Concept borrowed to organizational sociology and emphasizing the external influences on internal change

⁵⁶⁴ See for instance Simon Wibbeling (2011), “EU political conditionality and compliance in the accession process of the European Union”, available at <http://essay.utwente.nl/61126/>

The way expertise has been investigated so far was through the “epistemic communities” reading grid. But only a very few scholars paid attention to the instrumental dimension of expertise in the EU context (see Radaelli, 2009) although it is widely acknowledged that since its creation the EU calls upon a number of Strategic Intelligence mechanisms to shape its policy⁵⁶⁵, partly for legitimization purposes (and in order to counter-balance the views of those who consider that the EC is the centre of the EU democratic deficit⁵⁶⁶ and might even use expertise in a “misplaced” way⁵⁶⁷). The role of expert groups is even ruled at the EC level by a number of official clauses⁵⁶⁸.

As Lember et Al. (2014) rightly put, the PPI/PCP issue has *“been picked up by international organisations, which suggest that developed as well as developing countries ought to introduce their own public procurement of innovation policies as part of a demand-side innovation policy-mix”*; this is especially the case of the EC and the OECD. Both organisations initiated processes aiming to the diffusion of demand-oriented innovation knowledge and policy models among their members (Edler, 2013; Uyarra, 2013).

The OECD, Transnational Policy learning organisation? “The Organisation for Economic Co-Operation and Development (OECD) is a forum for ideas rather than a cash-dispensing machine” (Rose, 2005). It is indeed true that one of the key functions of the OECD is to develop knowledge and foster Transnational Policy learning to improve and strengthen economic development through improved cooperation across its members. But although the OECD is positioned as an international forum and a usual channel to some global transnational policy knowledge repository, it was not influential in the present case. Interviewees did not access or look for OECD-framed knowledge on the topics of PPI and/or PCP, or even on SBIR itself.

It is to be noticed that the initiatives taken on demand-side innovation and innovation-oriented procurement came later at the OECD level compared to the British experience of SBRI. The OECD studied SBIR and SBRI initiatives and even spotted them as good policy practices (though in a less positive way than what could be observed in domestic Strategic Intelligence studied in the US and in the UK in the context of the field research). The first OECD Project on Demand-Side Innovation Policies was launched in 2008 and followed by a second one (entitled “Demand-side Innovation Policies”) in 2011.

⁵⁶⁵ One of the most central forms of Strategic Intelligence at the EU level relates to the comitology form of work which favored the involvement of expert groups as depicted for instance on <http://ecpr.eu/filestore/paperproposal/63641599-bead-4925-9c01-02832d78f402.pdf>

⁵⁶⁶ See http://europa.eu/legislation_summaries/glossary/democratic_deficit_en.htm

⁵⁶⁷ See for example <http://blogs.lse.ac.uk/euoppblog/2013/10/01/concerns-over-the-european-commissions-use-of-expert-groups-are-misplaced/>

⁵⁶⁸ See <http://ec.europa.eu/transparency/regexpert/index.cfm?do=faq.faq&aide=2> and http://ec.europa.eu/dgs/internal_market/expert-groups/index_en.htm

The OECD follows a tradition of mobilizing national experts (mostly academic) in the process of drafting its key reports. In that sense, the OECD sourced knowledge on “intelligent demand” from UK-based experts (from MioiR but also others⁵⁶⁹) but also others with knowledge of both SBIR and SBRI in the context of the OECD work on “Intelligent Demand: Policy Rationale, Design and Potential Benefits” (OECD, 2012).

But if the sourcing worked in that direction (from national to supra-national), no observable – or at least significant- spill-overs could be observed at the national policy level. The OECD drafted a policy brief entitled “*Public procurement programmes for small firms – SBIR-type programmes*” mainly based on Connell’s and NAS reports as well as a very few academic papers which entail the limitations of SBIR and similar initiatives. Other OECD demand-side innovation Strategic Intelligence could be quoted, such as the on-going work being conducted on measuring the link between public procurement and innovation. But these elements of the OECD Strategic Intelligence repository did not reach officials and most of the experts involved in the British SBRI.

The European Union. The European Union covers several key institutions and runs according to complex rules. The institution which essentially develops or commissions Strategic Intelligence is the European Commission, which is also the most influencing reference institution with regards to innovation policy towards the Member States. A variety of possibilities exist by which the EC makes use of Strategic Intelligence in an instrumental way, as a connector and diffuser of policy practices, norms, knowledge, concepts, etc. In the context of this specific case, the generation and diffusion of policy features followed a process that is not that easy to transcript. Although there is a central red line underlying the raise of PCP discussions at the EU level, other Strategic Intelligence processes contributed to the diffusion of SBIR/SBRI to national Member States in contexts such as the “Exchange of good policy practices promoting the industrial uptake and deployment of Key Enabling Technologies” (KETs) to which the author of the present thesis contributed in 2011 and 2012⁵⁷⁰.

Especially since the Aho Report in 2006⁵⁷¹, the European Commission positioned itself as a knowledge developer on innovative and pre-commercial procurement matters. Among other goals, the EC aimed at refining its legislative framework in order to better support innovation without allowing any distortion of competition in the EU area.

⁵⁶⁹ One could for instance mention “Public Procurement of Innovative Solutions A policy tool for the service sector?” by Dr Ptries Boekholt, Managing Director Technopolis Group in Amsterdam in the context of the OECD Expert Meeting KNOWINNO on the 20 March 2012; noticing that the Technopolis Group headquarters are based in Brighton – UK.

⁵⁷⁰ See http://ec.europa.eu/enterprise/sectors/ict/files/kets/ex_of_practice_ket_final_report_en.pdf

⁵⁷¹ See http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm ; other pre-existing references can be mentioned, such as the “Public Procurement for Research and Innovation” Expert Group Report (on Developing procurement practices favourable to R&D and innovation) published by DG RTD in September 2005

A number of reports were authored by external experts, and the distinction was progressively developed and then set in legal stone between PPI and PCP⁵⁷². The EC even developed its own SME instrument⁵⁷³ under Horizon 2020 –called the SME-instrument-, based on the American SBIR model (which was initially subject to discussions across the DGs with different views on how it could be implemented) and externalized intelligence⁵⁷⁴.

Among other initiatives, a Procurement of Innovation Platform (<https://www.innovation-procurement.org>) was developed and many reports, briefs⁵⁷⁵, conferences and workshops⁵⁷⁶ were drafted and held on behalf of the Commission to improve knowledge and diffuse best practices around PPI and PCP⁵⁷⁷. The EC launched a guide entitled "Public Procurement as a Driver of Innovation in SMEs and Public Services"⁵⁷⁸ but also supported FP-funded projects in which UK institutions took part as highlighted by several interviewees involved in SBRI. Among key studies commissioned by the EC one could quote European Commission (2011) *"Study on pre-commercial procurement in the field of Security" conducted by Ecorys, Decision, TNO in collaboration with MioiR and Corvers Procurement Services, the influential work commissioned by DG INFSO (now DG CONNECT) to Rambøll Management on the "Opportunities for Public Technology Procurement in the ICT-related sectors in Europe"* (2008) or the GHK 2010 study *"EVALUATION OF SMES' ACCESS TO PUBLIC PROCUREMENT MARKETS IN THE EU"* on behalf of DG ENTR.

These studies presented the SBIR programme as well as other on-going or emerging PCP initiatives in Europe (such as SBRI), bringing altogether experts to discuss the features and (possible/observable) impacts of PCP. The OMC-PTP project "Exploring Public Procurement as a Strategic Innovation Policy Mix Instrument" funded under FP6 led to a report that is considered as central by those interested/involved in EU work on innovative/pre-commercial procurement-related issues.

⁵⁷² See <http://ec.europa.eu/digital-agenda/en/innovation-procurement> and

http://ec.europa.eu/enterprise/policies/innovation/policy/public-procurement/index_en.htm

⁵⁷³ However, it is to be emphasized that the absence of procurement in the scheme itself (driven by "Grand Challenges") makes the EC-instrument not fall under the PCP category.

⁵⁷⁴ Both in informal (discussions with experts interviewed in the context of this study – see Connell, 2009; and subsequent presentations from the same author) and formal such as through the Feasibility study on future EU support to public procurement of innovative solutions conducted in 2012 by external organizations on behalf of DG ENTR.

⁵⁷⁵ See the Innovation for Growth – i4g Policy Brief N°2 on Public Procurement of Innovation by Lena Tsipouri

⁵⁷⁶ For instance the HIGH LEVEL EXPERTS WORKSHOP "Public Procurement of Innovation: Towards a European Scheme" which took place in Brussels by the 31st of March 2011 under the supervision of DG ENTR.

⁵⁷⁷ See for instance <http://ec.europa.eu/programmes/horizon2020/en/news/modernizing-public-sector-and-boosting-economic-growth-through-innovation-procurement> or <http://www.knowledge4innovation.eu/public-procurement-support-innovation>

Another one (“Pre-Commercial Procurement for Intelligent Transport Systems”) led to the publication of the “P3ITS Handbook – A Guide for PCP Actors” in 2011; others could be quoted (such as the PRECO and RAPIDE projects) which also contributed to the accumulation and dissemination of PCP-knowledge across Europe⁵⁷⁸.

Legal steps were taken as well, among which I will only refer to the “Pre-commercial procurement: Driving innovation to ensure quality public services in Europe” (2008) Communication of the Commission initiated in 2007. A model was even developed by the EC (see Figure 47: The European PCP framework) to approach PCP and mainly steered by DG CONNECT. The knowledge developed on PCP at the EC level was inspired (through SBIR and SBRI case studies) by the American role model but also by the British and Dutch initiatives⁵⁷⁹ considered as being on the forefront of European practices as described in the “COMPILATION OF RESULTS OF THE EC SURVEY ON THE STATUS OF IMPLEMENTATION OF PRE-COMMERCIAL PROCUREMENT ACROSS EUROPE” published by the EC in 2011. Most of the reports were aimed at informing policy making (at both EU and sub-EU levels) on PCP issues as well as to disseminate best practices⁵⁸⁰.

⁵⁷⁸ See Ministry of Economic Affairs, Agriculture and Innovation (2011), “SBIR – The power of public procurement: innovative solutions to societal challenges”, publication of NL Agency/NL Innovation

⁵⁷⁹ Often explicitly like during the “*Promoting Innovation Through Public Procurement: Best Practice & Networking*” workshop organized in Brussels by the 23-24 March 2010

⁵⁸⁰ Often explicitly like during the “*Promoting Innovation Through Public Procurement: Best Practice & Networking*” workshop organized in Brussels by the 23-24 March 2010

Figure 47: The European PCP framework

Source: European Commission (2006), "Pre-commercial Procurement New support mechanisms for pre-commercial procurements", Presentation by Lieve Bos (EC-DG INFSO) in Brussels on the 23rd of March 2010

3.2.2 The weight and resources of the European framework

Warning. Before anything else, it is to be reminded here that the European context is studied as part of the SBRI case study. The European legal and support context or the SME-instrument are absolutely not the focus of this case study, but are to be referred to as to illustrate the position of the UK with regards to inward and outward dynamics of policy learning, whether transnational or only intertemporal (for instance as the EU legislative constrains intertemporal policy learning).

As a transnationally active player, the EC plays multiple roles. It generates but also makes use of Strategic Intelligence in an instrumental way, for example as to reinforce European integration in many ways (PPPs, regional cohesion, etc.) but also as to influence Member States and regions (through Strategic Intelligence but also related policy guidelines, norms, standards...).

The EC has also by its nature some regulatory power and has room for taking policy initiatives over some policy areas which is defined according to European Added Value⁵⁸¹ and Subsidiarity⁵⁸² principles which contemporary ground is mainly to be found in the 1992 Maastricht Treaty⁵⁸³. The EC also undertakes a high number of studies, consultations, committees, conferences, monitoring initiatives, etc. that add to its presence at the national level.

European rules and legal constraints. The rules in which SBRI operates appeared to be a critical factor forcing the adaptation of SBIR (especially to the European context). The constraints of WTO and EU procurement legislations frame the possible uses of SBIR-like models in Europe. From its earliest stages, SBRI faced transferability issues due to the broader legal framework in which it should be set up. Quite some knowledge of quality has been developed on these issues (see for instance the recent work from Yanchao Li, 2015⁵⁸⁴; and of Ramona Apostol, 2014). As a matter of fact, the SBRI was introduced in a context of legal constraints framed by the so-called State Aid rules⁵⁸⁵: the emulation of the American programme was constrained by the existence of a legal framework at the European level that did not allow full funding (100% cost coverage) of projects or companies by public institutions in Europe for instance when awarding grants etc. Moreover, several interviewees explained that the State Aid rules were used as “an excuse” for officials resistant to SBRI to justify their unwillingness to cope with the requirements of the initiative. This added to the difficulty of EU (whether procurement or State aid) rules as explained by Connell (2009).

Box 91: The start of EU discussions over PCP

An interviewee explains that the PCP communication of the EC is “the vision of the EC on how PCP should happen” and resulted from a discussion triggered by the detection of the British SBRI and the Dutch SBIR programmes by the EC: “It happened after UK and NL started experimenting with SBIR models. The EC reacted: this is not really “EU-like behaviour”. We can explain how what you do is illegal. So they came up with the Communication on PCP. The EU thought ‘this is way to jump/circumvent state aid rule’ and is very much concerned with setting boundaries to national programmes” (RA).

⁵⁸¹ See

http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/fp5_monitoring_eu_added_value_of_rtd_programmes.pdf

⁵⁸² See http://europa.eu/legislation_summaries/glossary/subsidiarity_en.htm

⁵⁸³ See http://europa.eu/eu-law/decision-making/treaties/pdf/treaty_on_european_union/treaty_on_european_union_en.pdf

⁵⁸⁴ See <http://spp.oxfordjournals.org/content/early/2015/08/12/scipol.scv044.abstract>

⁵⁸⁵ See http://ec.europa.eu/competition/state_aid/legislation/horizontal.html and http://ec.europa.eu/competition/state_aid/modernisation/rdi_framework_en.pdf

The same interviewee provides further details on the Dutch experience in that respect:

“Netherlands was circumventing State Aid rules, willing to fund their national companies. They went to the US and came back home and wrote two pages on how the policy should be implemented (no legislation), very broad on 2 pages, and money was put into it. A pilot started in 2004; and in 2006 the EC was signalled that these things were happening in Netherlands so discussions were held with Netherlands who had to open to other Member States. Then started a lot of discussions with other Member States on compliance with State Aid”.

Source: RA

Given the natural (possible) link to procurement in SBRI design, the solution worked out by the SBRI lead expert facing organisational resistance from the ministries was to place SBRI under procurement legislation. By focusing the form of the awards on a contractual form and presenting SBRI as externalized public R&D, the initiative could be operated legally in the UK. However, positioning the SBRI towards procurement had an important impact on its design: “It is not actually possible under EU legislation to restrict a procurement programme to SMEs. However, neither is it necessary” (Connell, 2006). The set aside could therefore be operated but restricting the access to SBRI to SMEs was not possible anymore with the initiative falling under procurement rules. It is also to be explained that according to the EU legislation, it is not possible for any public entity to restrict the access to its procurement to local/domestic companies. Therefore, the SBRI is opened to any European company or entrepreneur willing to apply for it, while in the US only American companies can be supported.

Box 92: From US to EU - SBIR (NL) and SBRI (UK) on the EU agenda

An interviewee expert in the European PCP issue explains the role of the European framework in regard to the conditions of implementation of the American SBIR:

“Comparing legislative guidelines we see major differences. (...) The European Commission uses a legal framework to set boundaries which rule what can be done at the national level for R&D. There are also differences in the assessment criteria in the US versus the EU. Criteria are missing in the EU. In Europe, the concern is to prevent national discrimination, and we tend to forget efficient implementation in that context (of non-discrimination)”

Following the recommendations from the SBRI lead expert, the decision was taken in the UK to place SBRI under procurement rules: “They chose procurement and not State Aid because we already have a lot of State Aid and these rules do not incentivize enough, so procurement was chosen over it. In the US, companies invest a lot more. (...) so it was made under Procurement rules which incentivize more the private sector. But what they failed to do was to clarify. They failed to provide a clear distinction between procurement (and why it is good etc.) but also provide a clear dichotomy in legislation when it is procurement and when it is subsidy. (Source: RA)

Source: RA

The legal issues were eventually clarified thanks to a double-dynamic: 1) clarification of the legal SBRI position promoted by the key domestic expert on the topic, and 2) the elaboration at the EU level of the so-called “PCP framework” (see Figure 26) and related policy modalities⁵⁸⁶. It is indeed to be noticed that discussions initially triggered by the Dutch and British cases led to several policy effects: the EU framework was refined as to integrate the PCP framework, Strategic Intelligence was produced and exchanges organized on the topic in parallel with the support of EU projects dealing with PCP; and the EC took the initiative of integrating PCP into its overall policy framework, mainly through Horizon 2020⁵⁸⁷. Here the Strategic Intelligence and essentially Connell (2006) plaid the role of conceptual and practical discussion over the legal status of SBRI in the UK, and did not stop there: the position recommended in the report was adopted as a solution for SBRI to be legally implemented in the UK (see Box 93). Also the EC produced Strategic Intelligence on the topic of PCP that plaid the role of conceptual and legal framing of what PCP is and how it can be implemented under EU legislation (see the main components of the EU Strategic Intelligence repository in 0).

Box 93: EU regulation as a constraint or resource of organisational resistance to change

“For many years, the Civil Service had advised the government that introducing a US style SBIR programme could not be established in the UK without breaching EU regulations. Both State Aid and Procurement regulations have been cited as problems. However, a programme based on contracts for R&D projects that government departments require clearly cannot qualify as a “State Aid”, and the author contends that with care it should be possible to develop processes which deliver the fundamental benefits of the SBIR programme without breaching EU procurement rules. One of the objectives in drafting the Private Members’ Bill was to define such a process in detail. A first reading of the Private Members’ Bill earlier proposed by Anne Campbell was given in the House of Commons by Kitty Ussher on 7th February 2006”.

Source: Connell, 2006

Following the discussions at the EU level that were raised by the EC detection of the Dutch and British SBIR-like programmes, the *“Issues such as compliance with EU and UK Government procurement rules and the EU State Aids concerns expressed earlier by officials have all been resolved.*

⁵⁸⁶ See <http://ec.europa.eu/digital-agenda/en/pre-commercial-procurement>

⁵⁸⁷ See for instance the 2014-2015 Work Programme of Horizon 2020 available at http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annexe-inproc_en.pdf

This has been helped by the European Commission's own commitment to "Pre-Commercial Procurement" and clarification of how it can be used as a legitimate innovation policy measure⁵⁸⁸ (Connell, 2010a). As highlighted by TSB (2011), SBRI operates under the European PCP legislation.

The EC as Strategic Intelligence platform: Experts and EU-funded projects. The fashionable trend of demand-oriented innovation and the related interest for PPI and PCP initiatives appears to drive some of the debates and discussions at the national level in Europe. The Commission (through Committees, Strategic Intelligence, but also task forces and assimilated activities) identifies critical issues which are taken up by Member States stakeholders or representatives. The EU tools play the role of international knowledge platform as highlighted by an interviewee who explained that the *"Benefit of going to Brussels was hearing about the benefits of SBIR programmes in other countries"* while *"in the UK the tradition is to ask a senior or a 'celebrity' to do a review of an area (for instance Catapult review); the other one is to use the UK academic community in innovation (Georghiou, Imperial Business School, Jakob Edler, Alan Huge, etc.) to do a survey paper to see what happens in other countries"*. If the European Strategic Intelligence on PCP introduced in 2007 was critical in the UK as well, the above quote highlights the importance of experts as holders of legitimate policy knowledge: *"In the UK we faced under-development demand-side instruments, and this idea came from Georghiou, and based on his Aho Review work for EC"* (Source: interviewee from a stakeholder organisation). The role of the expert as relay of EU-generated Strategic Intelligence is indeed important. The expert explains in the above quote was indeed leading the discussion on the role of procurement in innovation at the European level in the context of the Aho report (2006) and contributed to the knowledge roll-out to the UK.

Box 94: Multiple influences of the EC

Other factors influence the UK such as the practice of the European Regional Development Fund (ERDF)⁵⁸⁹, Horizon 2020 and other EC programmes which are used to channel knowledge and frame practices but also perceptions: "In April 2009 the East of England launched a Small Business Research Initiative competition in the health sector to help industry bring new technologies to support the achievement of regional health priorities and increase the possibility of adoption in the NHS (...) The programme was funded by the NHS East of England and the East of England Development Agency (EEDA), together with the Technology Strategy Board (TSB) and the European Regional Development Fund".

Source: Connell and Probert, 2010

⁵⁸⁸ Reference to European Commission (2007), "Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe", (SEC(2007) 166

⁵⁸⁹ See http://ec.europa.eu/regional_policy/index.cfm/en/funding/erdf/

The EU brand also plays a legitimisation role in the UK arena. The EC is indeed recognized as a leader in innovation policy conceptualisation, and national presence in on-going European policy debates and discussions is seen as a key factor of visibility and influence: “In the EU, the UK is seen as being in the lead in implementing the SBIR model, referred to by the European Commission as Pre-Commercial Procurement. This is allowing us, as part of the European PRO-INNO project, a position of influence in the discussions around EU implementation and European Commission support” (TSB in House of Lords Select Committee on Science and Technology, 2010a).

One of the main EU resources for UK to be present in the European arena is the support brought by the EC under its Framework Programme (ex-FPs now Horizon 2020)⁵⁹⁰. European projects have been identified by several officials from Innovate UK but also ministries as sources for mutual learning at the operational level. Several projects were quoted that dealt with the role of PCP, such as the FP-funded projects entitled “SILVER”, “CHARM”, “PRACE” and “OMC PCP. Officials from British authorities involved in these EU projects referred to them as channels for learning from abroad, although only Netherlands and Sweden seem to attract the attention with very limited lessons (as their experience is more recent than the one of SBRI). EU projects can even lead to second-degree spill-overs at the level of devolved governments: referring to the OMC PCP project, an interviewee from Northern Ireland explains: *“We weren’t part of the OMC project but we got in contact and contributed to a workshop in Berlin. The thing was very early stage in NI, a number of agencies we were looking at were mainly agencies looking for a way to avoid State Aid rules. And there was a lack of understanding of innovation”* (source: NORTHERN IRELAND interviewee).

Some interviewees involved in SBRI referred to FP7 projects in which UK actors have been involved (in particular from DfT), with a focus on PCP and allowing interactions with equivalent institutions in Europe. However one conclusion emanating from the interviews is that the UK and NL being on the forefront of the EU PCP wave, learning from others appeared of very limited interest, especially given the fact that the Dutch experience is not perceived as successful⁵⁹¹.

⁵⁹⁰ See <http://ec.europa.eu/digital-agenda/en/eu-funded-projects>

⁵⁹¹ One of the interviewees mentioned that the Dutch SBIR was always under-funded and based on too low amounts to make a difference.

Box 95: EC projects as a source of US inspiration for SBRI - converging features

“Another relevant policy development is the review of the Small Business Research Initiative (SBRI). The SBRI is a cross-departmental programme, which primarily intends to stimulate and increase the demand for R&D from high-tech SMEs and to give them the opportunity to gain a first customer for new technologies, supporting development and demonstration. Lord Sainsbury’s Report made recommendations for a reformed SBRI model to transform the financing of innovative SMEs. The recommendations were based on the successful US Small Business Innovation Research (SBIR) programme. (...) This aspiration was set in the context of the US model (...). The old UK initiative, however, lacked many of the key features of the US initiative; many government departments were easily able to meet the target as a result of existing work, much of it on policy studies, and it had little visible impact on innovation. In March 2008, the policy decision to reform the SBRI was announced, including a pilot programme in 2008 and a full roll-out from April 2009 (...) The new programme is being designed with the following features, many of which are akin to the US SBIR programme.

- ▶ *Substantial and visible budget.*
- ▶ *Phased projects of sufficient size to create demonstrators or products on trial, and to make a difference to an individual company.*
- ▶ *Transparent, systematic programme with impact measurement.*
- ▶ *Contracts, not grants (100% funded).*
- ▶ *Driven by a near-to-market innovation need (typically 5 years out).*
- ▶ *Intellectual property remains with the contractor (with a licence for the department)”.*

Source: OMC-PTP Project (2009), “Exploring Public Procurement as a Strategic Innovation Policy Mix Instrument”, funded within the 6th Framework Programme of the European Commission and available at <http://www.innovatiefaanbesteden.be/files/409>

3.2.3 Outward perspective (export and promotion): pivotal role of UK as a relay between the US and the EU?

Connectivity and limited outward perspective. The connectivity of the SBRI system with outside the UK can hardly be assessed in absolute terms as it takes several forms and happens at different levels or through multiple channels that can be active or inactive to various degrees (bilateral cooperation between national or sub-national agencies across Europe/the world, conferences, EU committees, etc.) depending on many factors. References to foreign experiences are not made in many instances except when about the American model, although some can be pinpointed (for instance, HM Treasury (2008) refers not only to the American model and its success, but also to the level of support observed in South Korea through a similar programme⁵⁹²).

Some willingness to further cooperate with international partners is found on the field but still in a process of maturation. The Department for Business, Innovation & Skills (BIS), the Cabinet Office and the Department for Transport submitted written evidence to the S&T Select Committee in 2010 stating that *“The UK is a member of a Pro-Inno Group which is looking at developing a model for an EU SBIR programme. Under this work the UK has engaged in a peer review process with the Dutch, who run the only other SBIR scheme in Europe, with a view to learning from each other to improve our own programmes, share learning with other EU Member States and exploring opportunities for collaboration”* (House of Lords Select Committee on Science and Technology, 2010a). Strategic Intelligence is therefore to be used as a platform for transnational policy learning.

Although international platforms exist (see Box 96), the interviewees in the UK showed limited interest in promoting the programme outside the UK, except for one exception (lead SBRI expert) and several officials involved in EU-funded projects willing to share policy knowledge and experience with their foreign counterparts bilaterally.

⁵⁹² “The SBIR establishes a goal of 2.5 per cent of federal R&D expenditure to be spent on SMEs. The Korean equivalent to this programme, the KSBIR goes further, with all public institutions (including nationalised concerns such as utilities) required to place 5 per cent of their R&D budgets with SMEs, with the Small and Medium Business Administration (SMBA) allocating approximately \$920 million under this programme in 2005” (HM Treasury, 2008)

Box 96: Connectivity to the outside system and vulgarisation through international conferencing

International conferences and expert meetings have been organized as learning and diffusion platforms, sometimes explicit as in the right-corner conference dedicated to a “transatlantic evaluation of SBIR program and stimulation of transatlantic innovation” (June 2009, Helsinki).

The EC SME-Instrument⁵⁹³. The EC instituted under the new Framework Programme for R&D Horizon 2020 and as a result of the discussions on PCP the so-called SME Instrument. With about €3 billion foreseen for the period 2014-2020, the SME instrument is a three-phased mechanism targeting SMEs only and aiming to help “*high-potential SMEs to develop ground-breaking innovative ideas for products, services or processes that are ready to face global market competition*”⁵⁹⁴. Box 97 provides more details on the design of the initiative which is currently running through targeted calls. This scheme is oriented towards overall business rather than only focused on technological aspects.

⁵⁹³ See <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/sme-instrument>

⁵⁹⁴ Source: <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/sme-instrument>

Key differences with the American model can already be noticed that were already criticized by both American and British (SBIR/SBRI) lead experts who were consulted by the EC on that specific issue (at the design stage) and confessed during their respective interviews either that the EU model could not reach the success of SBIR if based on the current design of the SME instrument⁵⁹⁵ or that the success of the instrument was uncertain.

Box 97: Emulation of SBIR at the EU level - the SME instrument of the EC

“The SME Instrument offers small and medium-sized businesses the following:

- ▶ *Business innovation grants for feasibility assessment purposes (optional phase I): EUR 50,000 (lump sum) per project (70% of total cost of the project);*
- ▶ *Business innovation grants for innovation development & demonstration purposes (possible phase II): an amount in the indicative range of EUR 500,000 and 2,5 million (70% of total cost of the project as a general rule);*
- ▶ *Free-of-charge business coaching (optional in phases I and II), in order to support and enhance the firm’s innovation capacity and help align the project to strategic business needs;*
- ▶ *Access to a wide range of innovation support services and facilitated access to risk finance (mostly in optional phase III), to facilitate the commercial exploitation of the innovation.”*

Source: <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/sme-instrument>

The scheme was literally inspired by the American but also British experiences. The SBRI lead expert explains: *“In 2009 I made proposals to the European Commission for an EU initiative under which €800m a year of the FP8 budget would be used to cofound SBIR style competitions run by individual member states. In October, the Commissioner for Research and Innovation announced a significant commitment to introducing pre-commercial procurement programmes such as SBRI, including an early pilot”* (Connell, 2010a⁵⁹⁶). Since the official launch of the SME instrument, UK authorities understand that the EC was quite influenced by SBRI as it aims to *“fill gaps in funding for early stage, high-risk research and innovation as stimulating breakthrough innovations’ (...) SBRI expert David Connell says that the UK work on SBRI has helped to encourage the EC scheme”* (NHS, 2012).

⁵⁹⁵ One of the main criticisms was about the importance of 100% support in Phase 2, which was highlighted in both US and UK cases as of main importance for SBIR-like programmes to be successful.

⁵⁹⁶ In reference to Connell (2009), “Creating an EU SBIR Programme; Lessons from the UK SBRI and Proposals for EC Action”, Presentation to EC Workshop, Brussels October 2009; ideas later “presented to Commissioner Maire Geoghegan-Quinn at a meeting arranged by Malcolm Harbour MEP” (Connell, 2010a)

Through bilateral discussions and presentations at “Pre-Commercial Procurement Workshops” organized by the European Commission in June (see Connell, 2009 - “THE UK SBIR CAMPAIGN: HISTORY, PROGRESS AND LESSONS FOR EU POLICY”) and October 2009 (see Connell, 2009a - “CREATING AN EU SBIR PROGRAMME: LESSONS FROM THE UK AND PROPOSALS FOR EC ACTION”) the leading policy learning entrepreneur came to promote the adoption of an SBIR-like programme by the European Commission, emphasizing the role of SBIR as a seed funding programme and referring to the uptake by UK of the American model since 2001. In 2010 a third presentation by the same person - “CREATING AN EU SBIR PROGRAMME: LESSONS FROM THE US AND PROPOSALS FOR EC ACTION”.

Box 98: Origins of the SME-instrument

The lead SBIR expert presented himself as “Campaigning for a UK SBIR since 2004; EU SBIR since 2009” (Connell, 2010). The policy learning entrepreneur emulated his own approach of Strategic Intelligence instrumentation (used in the context of SBIR) at the EU level, using the American and British experiences as to recommend and make proposals for a new EU instrument inspired by both schemes.

“EU too difficult. About 2009 I was invited to give a talk to couple of workshops on PCP. Lice Bos did very good work and pushed for the EU regulation on PCP. She clarified the law, made it clear that SBIR can be operationalized (even without 100% funding). I thought that EU could itself adopt such a program, and I became enthousiasc, Malcolm Harbour MEP had a strong interest and I went to see him, we had shared interest, and he said: what don’t you come over to Strasbourg and we see how many commissioners we can see in a day. Only key officials move, with only one or two advisors then the commissioners go to Strasbourg (so then they are more available). Met Tajani, Quinn, etc. They were looking for something better for SMEs in terms of SME policy for H2020. 2011, out of the blue, I got a call from the Hungarian embassy, Hungary was about to become chair of EU Council, and they wanted to make their mark in policy. Industry minister responsible for innovation at this time asked me to meet him, and it turned that he used to be a prof in Wales. EU competitiveness council met. Now EU has strong commitment, and announced upcoming PCP Program.” (Source: interviewee – DC); Additional material illustrates the position of the expert and how the notion of SME instrument came about in the PCP wave:

WHY IS IT IMPORTANT?

- Cambridge experience indicates that:
 - many (probably most) successful new S&T based SMEs have adopted a “soft” model based on R&D contracts for private sector customers (VC funding is typically secondary or not required)
 - most are company spin outs, NOT university spin outs
 - most make little or no use of collaborative R&D grants (especially EU Framework grants, which are seen as a distraction)
- The standard venture capital model is not financially viable for investors in early stage companies in the UK or Europe, at least without complementary funding
- The US SBIR model is proven and well regarded; it is a simple, well defined (out-of-the-box) mechanism that the EC can use to build experience of PCP
- It replicates the way SMEs use PRIVATE SECTOR R&D contracts to develop and trial new products; it plays to the “natural”, customer-led innovation process and creates reference customers to support global marketing

PROPOSED EU PROGRAMME

- Establish EU Framework programme to cornerstone “Government Innovation Contracts” competitions in individual member states
- Competition, objectives and rules must be compliant with standard rules and process based on US SBIR (all innovative firms eligible, but designed mainly for SMEs)
- Projects must be related to government needs and objectives as customer (direct or indirect) or specifier
- Single company contracts with no requirement for collaboration; publication of contract winners and project results facilitates pan European commercialisation through OEM partnerships, distribution agreements and corporate venturing
- Target programme budget for FP8 : €800m per annum
- Successful bids from public sector member state organisations awarded EU contribution of 40% of programme costs
- Pilot during FP7 with annual budget of €100m from 2010 to 2013 ; experience sharing across EU

Source: Connell, 2009

The field research also highlighted the process of uptake and tailoring of the SME-instrument of the EC: while the mandate of the SME-instrument to emulate SBIR was used, it did not lead to substantial emulation of the scheme as the concerned DGs are no procurement authority like the American DoD. The procurement demand effect was therefore replaced by the EU “Grand Challenges” to provide guidance for solutions to be developed. Coalitions with diverging interests (research versus private sector-oriented organisations) came to conflict in 2012 with parliamentary support over the EC proposal for the SME-instrument, until the Parliament agreed on a final position upon recommendation from the EC, allowing the SME-instrument to be launched. Philosophical oppositions between DGs over practical implementation modalities for the instrument eventually ended up as a transformation of pre-existing EC measures.

Lobby organisations were also at work, willing to promote the growth of SMEs' position in the procurement arena: "We tried to get SBIR thinking into the EC work; OECD demand-side report; It is good to promote it in Brussels to get H2020 money and share policy thinking is also beneficial to everyone, even though there is an element of competition" (Source: stakeholder interviewee). However, the PCP debates appear not to be subject to political conflicts as SBIR has been in the US; and the most influencing factors identified by the field research were the role of the lead expert on SBIR (see Box 74) who seized the opportunity window of the "need for an idea" using the British experience as a source of inspiration for European PCP policy making.

Box 99: Pushing the EU version of SBIR - from Strategic Intelligence to influence

*In a first interview, the SBIR lead expert indicated about his EU SBIR campaign the following: "The SME instrument looks very interesting, not sure how it will work. It is inspired by the SBIR. I got invited by L**** B** to talk at a workshop. I always regarded the EC as too difficult to deal with, too bureaucratic, with too complicated collaborative programmes, etc. That stimulated me to think about a possible role of the EC. I went with a UK MEP -Malcolm Harbour- to Strasbourg where we met up among others with Máire Geoghegan-Quinn, EC vice-president for enterprise"; the interviewee added that "as a Venture Capitalist, every company coming to me participating to EU funds would be black-marked; I proposed the EU-wide SBIR programme. A billion Euros a year, co-funded by national SBIR programmes. A year ago, they invited me to speak in Budapest to the EC competitiveness meeting of the EU. Also with key people of the Council of Europe. My role was to encourage them, especially **Quinn who tasked officials to come up with something**. It was quite close to what I was expecting. Also as close as possible to the US model" (Source: DC – emphasis added)*

WHAT ARE THE LEARNING POINTS FOR EUROPE FROM THE US SBIR PROGRAMME?

- Defined budgets each year; run as a "SEED FUND", not a set of "targets" or guidelines. (We must replicate this without legislation)
- Total value of US Federal Government R&D contracts with small firms is 3-5 times the SBIR budget.
 - more important than VC for S&T firms.
 - SBIR is just the first step on the procurement ladder
 - The 2.5% rule is just part of the story
- Topics are defined by informed officials in customer agencies, with ongoing dialogue with potential users and small companies with ideas for projects
- Key role of Department of Defense and NASA in funding component level technologies with dual (military and civil) use
- Diverse range of topics, mostly tightly defined

Source: Extract from Connell's 2010 slides « Based on presentations to European Commission Pre-Commercial Procurement Workshops in June and October 2009 » available on <http://www.cc2-live.co.uk/davidconnell/docs/5%20dc-pub.pdf>

When the EC started commissioning Strategic Intelligence on PCP, other external experts as well as consultants were involved who drafted recommendations on the use of PCP under H2020 on the basis of national experiences which were not only from the UK but also the Netherlands (see Box 100). The influence of national players such as SBIR supporters went beyond the setup of an SBIR-like scheme at the EU level but already impacted the definition of PCP framework modalities upstream: *“We had success in Brussels loosening up the procurement rules; we made common calls with Netherlands in Brussels, leading to the PCP Framework. The problem is that it still did not overcome all difficulties (such as the HR issue)”* (interviewee from stakeholder organisation).

Box 100: Presenting the Dutch SBIR experience to a European audience

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Why should Europe take up this opportunity?

- Public Contracting Authorities (PCAs) and Innovation Agencies can **mobilise innovations** to tackle societal challenges
 - *By articulating demand in view of societal challenges*
 - *By purchasing innovations using public procurement procedures*
 - *By acting as catalysts for innovations on the private market*
- PCA managed an estimated public purchasing pool of **€420 bn** in 2010
 - *While this includes innovations a dedicated action to involve SMEs would be catalyst*
- PCA can **lower entry barriers for SMEs** to public procurement
 - *Reduce the administrative burdens of contract arrangements*

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Recommendations for Horizon 2020

- Mobilise the untapped pool of public procurement at Contracting Authorities: even a small percentage would make a big difference
 - *In partnership with CAs at MS, regional and local level*
 - *Will in the long run complement the limited RDTI funds*
 - *Take stock of experiences at DG ENT and DG INFSO*
- While a big EU-SBIR type scheme fits the objectives of the Innovation Union learn the lessons from EU national initiatives:
 - *Keep it lean, fast and simple for SMEs*
 - *Establish a good evaluation system and criteria for selection*
 - *Consider the IPR rules and their implications for the SMEs*
 - *Test technological and commercial feasibility*
 - *Consider the degree of ‘prescription’ in societal challenges*

Source: Boekholt, NoDate

With regards to how the EC conducted the PCP design process, one interviewee who is an expert in that matter explains that in this context and about SBIR/SBRI, the EC delegates *“assume it is working in the US; there are some studies in the US but also lots of criticisms. They are not preoccupied with analysing why it is working in the US, etc.”* (Source: RA). In her 2014 summary of her PhD research⁵⁹⁷, Apostol stated that the EC *“took steps to emulate the success of the US SBIR within the EU. It defined a procedure called PCP in compliance with the EU legislation on procurement and state aid”* and concluded that the EC *“missed the opportunity for making a convincing case for PCP, they have not clarified the rationale behind such an innovation policy instrument; they have not defined conditions for an effective and widespread implementation; they have not simplified the law in order to encourage public authorities within the EU to apply this instrument”*.

⁵⁹⁷ Available at <https://www.youtube.com/watch?v=0nfSPXKuEmw#t=65>

ANNEX 3 – Correspondence table: claims, questions and conclusions

Research Questions		Analytical conclusions	Corresponding claims
<i>RQ1: How do soft and hard features of Strategic Intelligence enable cross-temporal policy learning?</i>	<i>->1.1 – What has been the role of Strategic Intelligence among the drivers of policy change over time?</i>	<p>POLICY LEARNING through Strategic Intelligence requires external and competitive conditions co-defined by SI</p> <p>POLICY LEARNING through Strategic Intelligence requires some degree of Policy Learning Readiness to overcome resistance to change</p>	<ul style="list-style-type: none"> ▶ Detailed understanding about the determinants and conditions of policy transfers and the role of learning mechanisms in this regard is still lacking ▶ The conditions of the production and transfer of the knowledge about policy ideas and practices remains to be questioned: Transnational Policy learning happens, but is still a black box to be opened. ▶ Focused on policy adoption (...) broadening the analysis to other forms of change such as re-design. ▶ It is necessary to reconcile all dimensions of policy change, overcoming the existing dominant focus on policy adoption and broadening the analysis to other forms of change such as re-design ▶ Such statement would tend to undermine the role of competitive factors. However, some better distinction should be made here between the reasons for policy circulation (which can be competitive and linked to external factors) and the type of policy circulation, which can be policy learning. One could assume that if transfer is about circulation, policy learning relates to the type of circulation process under the scope while competition relates to both the causes (as implying the existence of a competitive risk factor) and nature of a policy learning relationship ▶ The lack of understanding of how learning processes take place and in which conditions. This implies that possible resistance to policy learning should also be better understood when observed in order to understand which factors hamper/enable policy learning

	<p>->1.2 – <i>What type of learning occurred that was enabled/facilitated by Strategic Intelligence?</i></p>	<p>Strategic Intelligence greatly contributes to policy conceptualisation and problematisation</p>	<ul style="list-style-type: none"> ▶ Unavoidable building block of policy learning is “learning from the past”, a dimension of policy learning to which this thesis will refer to as “cross-temporal policy learning” ▶ The mechanistic nature of the approaches adopted by the authors willing to design taxonomies led to under-consider the role of knowledge and other cognitive factors in policy circulation processes, leaving a central role to competitive approaches to policy making ▶ Cognitive factors, knowledge and especially intelligence-based knowledge such as explained above seem to play a role that is not much explored in the literature. ▶ It is interesting to highlight from the above the existence of more abstract forms of Strategic Intelligence (embodied in conceptual and discursive types of Strategic Intelligence), which can suggest in a POLICY LEARNING context that some more abstract learning could be triggered by Strategic Intelligence, for instance as a filter to understand reality or policy rationale.
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	<p>->2.3 – <i>Do specific features of Strategic Intelligence lead to particular types of policy learning in functional terms (structuration; policy repository; channelling)?</i></p>	<p>Technical features of Strategic Intelligence foster Policy Learning</p> <p>POLICY LEARNING happens through the political instrumentation of SI</p>	<ul style="list-style-type: none"> ▶ Policy transfer is then viewed as an independent variable, while it could be considered it as the dependent variable to be further analysed as a process in order to understand how innovation policy learning takes place. ▶ The instrumental approach to policy and especially the model developed by Lascousmes and Le Galès (2004) present a great opportunity in this regard ▶ This thesis will consider policy learning as a non-linear process potentially touching upon any stage of the policy making cycle. Such process is expected to be non-linear, dynamic and be influenced by policy learning entrepreneurship and readiness factors. ▶ Reference is also made in this thesis to their concept of instrumentation, which partly justifies the consideration for utilisation concepts (see 3.2.3) in line with the expected interactive nature of the relationship between policy and Strategic Intelligence that can take place beyond the sole adoption stage of the policy cycle. This echoes the possible importance of policy entrepreneurship and in particular policy learning entrepreneurship (expected to take form through to Strategic Intelligence). ▶ One can thus establish a direct connection with the concepts of “technical” and “social” components of an instrument according to Lascousmes and Le Galès’ definition, and the assumption that particular technical features of Strategic Intelligence (methods and techniques) might impact policy learning
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			<ul style="list-style-type: none"> ▶ A parallel could indeed be easily made between main dimensions, which summary is proposed in the following dimensions according of the effects observed (in terms of change): Instrumental and technical/operational (related to techniques and operational changes, very often associated as take-up of knowledge production outputs); Process-oriented and interactive (effects of process and actors mobilisation on the social relationships setting and mediation); Organisational (change in organisational behaviour); Argumentative (political, tactical and advocacy: in the context of confrontation, which can also be symbolic when coming to legitimizing a decision); Conceptual (change in theories and concepts, including related ideologies); Paradigmatic (change in terms of the vision of the world)
<i>RQ2: How does Strategic Intelligence trigger or supports Transnational Policy learning?</i>	<i>->2.1 – What are the policy changes that are due to foreign experience vehicled by Strategic Intelligence?</i>	Strategic Intelligence owns a variable position in different national systems and leads to policy adaptation	<ul style="list-style-type: none"> ▶ Both concepts of “transnational policy learning” (Malik and Cunningham, 2006) and cross-temporal policy learning will be used ▶ This is the position this thesis should support in this dissertation, combining both transnational and cross-temporal policy learning. ▶ These mechanistic approaches also paid little attention to the processes underlying convergence. Although the direction of convergence remains interesting, the differences in policy systems most likely imply that it is limited by factors that limit convergence to policy outputs tailored to (sub-) national contexts. ▶ It seems of utmost importance to further analyse how policy circulation takes place. This implies some further integration of two dimensions of policy change that are rather artificially separated in the literature: “change as a result from the circulation of policy” and “change as a result from the past”.

			<ul style="list-style-type: none"> ▶ This thesis therefore adopts an instrumental perspective in order to understand how Strategic Intelligence considered as soft procedural instrument enables/fosters/facilitates/hinders cross-temporal and/or transnational policy learning. It is assumed here that both cross-temporal Transnational Policy learning can vary in nature depending on the Strategic Intelligence features mobilized during the policy process. ▶ This dissertation argues that Strategic Intelligence enables and facilitates policy learning. Strategic Intelligence can be considered as a governance instrument, with different forms of application. This instrument is part of broader strategic interplays and holds its own repositories, paradigms, beliefs, values, visions, concepts, theories, techniques and tools. This instrument produces interactions between individuals, groups, institutions, and produces effects through the circulation of models.
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	<p>->2.2 – <i>What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (eg instrumentation/utilisation and policy – learning– entrepreneurship)?</i></p>	<p>While passive TRANSNATIONAL POLICY LEARNING was also observed, active TRANSNATIONAL POLICY LEARNING dynamics are embodied by Policy Learning Entrepreneurs active transnationally</p>	<ul style="list-style-type: none"> ▶ The policy learning and governance instrument approaches should be combined to contribute to the research on policy change, especially from the perspective of cross-temporal and Transnational Policy learning (which in the case of transnational takes the form of diffusion). ▶ The crucial role of policy entrepreneurs in policy innovation and diffusion was clearly acknowledged by the literature. But most approaches to (expert) policy entrepreneurship remain limited as they: Are grounded into the idea that retribution is the main driver of their entrepreneurship, without leaving any space to what will be called “Policy Learning Entrepreneurship”; Tend to make individuals the central actor of policy change while disregarding the empowering role of social structures. Mostly adopt a conflictual approach to policymaking based on conflicting coalitions and/or interests as the main source of policy change. It is argued that change can also take place by the overcoming of learning barriers, or what will be analysed as “Policy Learning Readiness” which characteristics should be analysed in this study. Such concepts should contribute to the understanding of passive and active dynamics to be assumed to underline the “push” and “pull” approaches introduced by Randma-Liiv (2007). The research claim of this dissertation is that Strategic Intelligence can play both a resource and structural role as an empowerment factor of expert policy entrepreneurs with no reward focus.
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	->2.3 – <i>To what extent does Strategic Intelligence allows the circulation of policy?</i>	Complex sets of relationships result in diffused Policy Learning spill-overs enabled by SI	<ul style="list-style-type: none"> ▶ No reference is made to Strategic Intelligence such as evaluation, foresight, etc. as a vector of lesson-drawing ▶ Benchmarking and evaluation but also other forms of Strategic Intelligence seem to be placed at the core of policy-influencing variables and a great (potential) source for policy learning.
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ANNEX 4 – Other annexes

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2/ List of interviewees

Name of the interviewee	Country	Organisation	Date of interview
Roland Tibbetts	USA	Former NSF, Founding father of SBIR	16/11/2013
Nicholas Vonortas	USA	GWU	Multiple interviews along my stay in the US
Manny Oliver	USA	DoE	10/09/2013 and 18/11/2013
Kei Koizumi	USA	White House	11/09/2013
Donal Siegel	USA	University of Albany	13/09/2013
Mary Clague	USA	NIST	12/09/2013
Vanessa Tesoriero	USA	DoEd	20/09/2013
Susan Nichols	USA	DARPA	26/09/2013
Robert Vinson	USA	NIH	26/09/2013
Edward Metz	USA	DoEd	30/09/2013
Franklin Rusco	USA	GAO	01/10/2013
Rich Leshner	USA	NASA	23/10/2013
Mary Schoonmaker	USA	GWU	04/10/2013
John T. Scott	USA	Dartmouth University	08/10/2013 and 22/10/2013
Irwin Feller	USA	Institute for Policy Research and Evaluation	09/10/2013
Charles Wessner	USA	NAS	16/10/2013, 17/12/2013 and 02/02/2015

Name of the interviewee	Country	Organisation	Date of interview
Rachael Sack and Melissa Wong	USA	DoT	24/10/2013
Erik Stam	NL	University of Utrecht	31/10/2013 and 06/11/2013
Neville Reeve	European Union	European Commission – DG RTD	31/01/2013
Bernd Reichert	European Union	European Commission – DG RTD	01/02/2013
Sven Schade	European Union	European Commission – DG ENTR	22/02/2013 and 27/04/2015
Dariusz Ila	USA	University of North Carolina	07/11/2013
Rick Shindell	USA	SBIR Insider	07/11/2013
Corinne Vinopol	USA	IDRT	11/11/2013
Edsel Brown	USA	SBA	12/11/2013
Philip Eskeland	USA	KEI – Ex Congress Staff	12/11/2013
Jerome Wujek	USA	NIH/NEI	13/11/2013
Diana Haikalas	USA	NIH/NIDA	13/11/2013
Jere Glover	USA	SBTC	14/11/2013
Kimball Marshall	USA	Alcorn State University	14/11/2013
Kevin Wheeler	USA	Senate – Democrat Staff	15/11/2013
John Ujvarri	USA	NIH/SBTDC	15/11/2013
Natalie Seiling	USA	DoD/DLA	10/12/2013
Barry Pineles and Joe Hartz	USA	House – Republican Staff	19/11/2013

Name of the interviewee	Country	Organisation	Date of interview
Cheryl Vickroy	USA	TechOpp Consulting, Inc.	20/11/2013
Todd Mc Cracken	USA	NSBA	20/11/2013
Jonathan G. Scora Pearl	USA	Perceptrol	21/11/2013
John Waszczak	USA	Ex-Raytheon and Tibbetts Award	22/11/2013
Donald Manzullo	USA	KEI – Ex Congressman	10/12/2013
Matt Portnoy ⁵⁹⁸	USA	NIH	25/11/2013
Charles F. Cleland	USA	USDA	25/11/2013
Stephanie Fertig	USA	NIH/NINDS	25/11/2013
Emily Baker and Kelly Slone	USA	NVCA	09/12/2013
April Richards	USA	EPA	26/11/2013
Ronald Cooper	USA	SBA	27/11/2013
Jack Biddle	USA	NovakBiddle	02/12/2013
Arun Seraphin	USA	White House - OSTP	03/12/2013
Celinda Marsh	USA	White House - OMB	17/12/2013
Nancy Moore	USA	RAND Corp.	09/12/2013
Adam Minehardt	USA	House – Democrat Staff	11/12/2013
Chris O’Gwin	USA	DoE	12/12/2013
James C. Greenwood and Cartier Esham	USA	BIO	16/12/2013

⁵⁹⁸ No report could be produced out of this specific interview due to technical reasons

Name of the interviewee	Country	Organisation	Date of interview
Jane Campbell	USA	Senate – Democratic Staff	16/12/2013
Bob Berdahl	USA	AAU	17/12/2013
Toby Smith	USA	AAU	20/12/2013
David Connell	UK	CBR	08/08/2013 and 29/10/2014
John Rigby	UK	MioiR	12/09/2014, 26/09/2014, 02/10/2014 and 28/10/2014
Patrick Le Galès	US/UK	Sciences Po Paris	
Karen Livingstone	UK	NHS	06/02/2015
Anne Blackwood	UK	NHS	25/11/2014
David Evans	UK	IET	26/11/2014
Ian Barham and Nicola Lloyd	UK	DEFRA	27/11/2014
Neville Hargreaves	UK	Oxford Catalysts/Velocys, Ex- TSB	27/11/2014
Stian Westlake	UK	NESTA	01/12/2014
Alistair Nolan	US/UK	OECD	09/12/2014
Andrew Nicholson	UK	MoD, CDE (Center for Defense Enterprise)	21/01/2015
Bruce Hellman	UK	uMotif	20/11/2014
Christopher Green	UK	Home Office, Centre for Applied Science and Technology (CAST)	13/11/2014
Eoin McFaden	UK	DETI, NI	26/11/2014

Name of the interviewee	Country	Organisation	Date of interview
Fergus Harradence	UK	HMT	06/11/2014
Gareth Browning	UK	EST – Innovaiton, Welsh Government	20/11/2014
Joanne Coyle	UK	INVEST NI	19/11/2014
Julie-Ann Augusto	UK	HSCNI SBRI	24/11/2014
Kitty Ussher	UK	Tooley Street Research, Ex-MP	18/11/2014
Lee Smith	UK	CFT	02/12/2014
Michael Keenan	US/UK	OECD	09/12/2014
Pat Doyle	UK	Invest NI	29/10/2014
Paul Tuffs	UK	InnovateUK	10/11/2014
Ramona Apostol	UK	Corvers	17/11/2014
Richard Kirk	UK	PolyPhotonix	17/11/2014
Stephen browning	UK	InnovateUK	19/11/2014
Stuart Barthroop	UK	BIS	14/11/2014
Jakob Edler	UK	MioiR	29/10/2014
Dimitri Gagliardi	UK	MioiR	13/10/2014
Kieron Flanagan	UK	MioiR	25/09/2014
Khaleel Malik	UK	MioiR	09/10/2014
Philip Shapira	US/UK	MioiR	18/09/2014
Yanchao Li	UK	MioiR	15/09/2014
Effie Amanatidou	UK	MioiR	03/09/2014

3/ Organisation categories associated to the interviewees

The following classification was operated to better distinguish between different groups of interviewees. It illustrates the nature of the organisation the interviewee(s) was/were interviewed for.

Organisation	Category
European Commission – DG RTD	Policy maker
European Commission – DG ENTR	Policy maker
University of Utrecht	Expert
uMotif	Company
CFT	Company
PolyPhotonix	Company
CBR	Expert
MioiR	Expert
NESTA	Expert
Corvers	Expert
NHS	Policy maker
NHS	Policy maker
DEFRA	Policy maker
Oxford Catalysts/Velocys, Ex-TSB	Policy maker
MoD, CDE (Center for Defense Enterprise)	Policy maker
Home Office, Centre for Applied Science and Technology (CAST)	Policy maker
DETI, NI	Policy maker
HMT	Policy maker
EST – Innovaiton, Welsh Government	Policy maker
INVEST NI	Policy maker
HSCNI SBRI	Policy maker
Tooley Street Research, Ex-MP	Policy maker
Invest NI	Policy maker
InnovateUK	Policy maker
BIS	Policy maker
IET	Stakeholder
Sciences Po Paris	Expert
OECD	Policy maker
IDRT	Company
TechOpp Consulting, Inc.	Company
Perceptual	Company
Ex-Raytheon and Tibbetts Award	Company

NovakBiddle	Company
GWU	Expert
University of Albany	Expert
GAO	Expert
Dartmouth University	Expert
Institute for Policy Research and Evaluation	Expert
NAS	Expert
University of North Carolina	Expert
Alcorn State University	Expert
RAND Corp.	Expert
Former NSF, Founding father of SBIR	Policy maker
DoE	Policy maker
White House	Policy maker
NIST	Policy maker
DoEd	Policy maker
DARPA	Policy maker
NIH	Policy maker
DoEd	Policy maker
NASA	Policy maker
DoT	Policy maker
SBA	Policy maker
KEI – Ex Congress Staff	Policy maker
NIH/NEI	Policy maker
NIH/NIDA	Policy maker
Senate – Democrat Staff	Policy maker
NIH/SBTDC	Policy maker
DoD/DLA	Policy maker
House – Republican Staff	Policy maker
KEI – Ex Congressman	Policy maker
NIH	Policy maker
USDA	Policy maker
NIH/NINDS	Policy maker
EPA	Policy maker
SBA	Policy maker
White House - OSTP	Policy maker
White House - OMB	Policy maker
House – Democrat Staff	Policy maker
DoE	Policy maker
Senate – Democratic Staff	Policy maker
AAU	Policy maker

SBIR Insider	Stakeholder
SBTC	Stakeholder
NSBA	Stakeholder
NVCA	Stakeholder
BIO	Stakeholder

4/ Indicative topics of discussion for the interviews

The following section presents the interview topics that will be used in the context of the SBRI case study. These topics are only for the interviewer to be kept in mind during the open interviews. Therefore they are included into this document as an indication of the information expected from the interviews. The topics take the form of questions which are derived from the main research questions. These questions can be used to the extent necessary in order to stimulate the discussion with the interviewee(s) on specific elements and when relevant.

4.1 Policy makers - politics

Purpose: Get insights on the role of Strategic Intelligence in policy learning from a decision making point of view

Strategic Intelligence and policy change in a learning context

RQ1: How do soft and hard features of Strategic Intelligence enable transnational policy learning?

→ 1.1 – What has been the role of Strategic Intelligence among the drivers of policy change over time?

1. What are the reasons for launching an SBRI in UK?
2. What have been the changes in SBRI (design, practice, etc.) that were influenced by reports, evaluations, etc. since its beginning?
3. To what extent did Strategic Intelligence influenced your positions/the decisions taken about SBRI?
4. How did you make use of Strategic Intelligence in your work (negotiations, networking, learning, etc.)

→ 1.2 – What type of learning from abroad occurs?

1. Do you know about other programmes in other countries, and to what extent?
2. What is your perception of other SBIR-type of initiatives in other countries?
3. What have been the changes in SBRI that were inspired from abroad (for instance the American model, but also others)?
4. Why were differences with the American model, and why getting closer to it?
5. What has been the trend in terms of foreign influence on SBRI evolution (tendency to copy/getting inspiration, the other way round...) and why?

→ 1.3 – What are the policy changes that are due to foreign experience brought by Strategic Intelligence?

1. Were the changes (from learning) organisational (processes, organisations, etc.), social (discourses, values, beliefs, etc.), instrumental (policy characteristics, rationale, instrumentalisation)? -> Explain the scope to the interviewee.
2. What were the more important/prominent changes due to foreign experiences?
3. How did they occur and what were the impacts in terms of perception of the programme?

Meta-instrumental features and policy learning

RQ2: To what extent specific features lead to specific types of learning?

→ 2.1 – To what extent does Strategic Intelligence contribute to the dynamics observed in a functional way (structuration; policy repository; channelling)?

1. What are the sources –precise reports, events, advocates or opponents, etc.- for learning from abroad? What about your implication in these processes?
2. Are (some of) these sources issued from abroad?
3. What has been the role of hard features (process, governance, etc.) of Strategic Intelligence in learning from abroad? (Mobilizing, structuring, connecting, ruling, etc.)
4. What has been the role of soft factors (content, etc.) of Strategic Intelligence in learning from abroad?

→ 2.2 – What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (eg utilisation)?

1. Who were the advocates and opponents to learning from abroad and what were their arguments/stakes? What about your position?
2. What was the relations of those advocates/opponents to foreign models and the references made to these models? What about you?
3. Do you (or anyone else) promote the UK model abroad? Why and how?
4. What is the role of international organisations such as the European Commission and the OECD in this?
5. What are the conditions or arguments explaining the dynamics behind the process of import/export of the model, whether they are pushed or pulled?

→ 2.3 – Do specific features of Strategic Intelligence lead to particular types of policy learning?

1. Would you consider that specific features of Strategic Intelligence influenced SBRI in a way more than another? Why?
2. What type of Strategic Intelligence influenced the SBRI evolution the most (in terms of inspiration from abroad)? (Evaluation? Benchmarking?) Why?
3. What are the changes that can be attributed to specific features of Strategic Intelligence (mention/quote changes due to Strategic Intelligence and check what cause is related to what change)?

4.2 Policy makers - officials

Purpose: Get insights on the role of Strategic Intelligence in policy learning from a policy making and implementation perspective

Strategic Intelligence and policy change in a learning context

RQ1: How do soft and hard features of Strategic Intelligence enable transnational policy learning?

→ 1.1 – What has been the role of Strategic Intelligence among the drivers of policy change over time?

1. How was Strategic Intelligence used in the (re-)design/implementation of SBRI?
2. What have been the changes in SBRI (design, practice, etc.) that were influenced by reports, evaluations, etc. since its beginning?
3. To what extent did Strategic Intelligence influenced the design, redesign and implementation of the SBRI?
4. Why did you make use of Strategic Intelligence in your work?

→ 1.2 – What type of learning from abroad occurs?

1. Do you know about other programmes in other countries, and to what extent?
2. What is your perception of other SBIR-type of initiatives in other countries?
3. What have been the changes in SBRI that were inspired from abroad (for instance the American model, but also others)?
4. Why were differences with the American model, and why getting closer to it?
5. What has been the trend in terms of foreign influence on SBRI evolution (tendency to copy/getting inspiration, the other way round...) and why?

→ 1.3 – What are the policy changes that are due to foreign experience brought by Strategic Intelligence?

1. Were the changes (from learning) organisational (processes, organisations, etc.), social (discourses, values, beliefs, etc.), instrumental (policy characteristics, rationale, instrumentalisation)? -> Explain the scope to the interviewee.
2. What were the more important/prominent changes due to foreign experiences?
3. How did they occur and what were the impacts in terms of perception of the programme?

Meta-instrumental features and policy learning

RQ2: To what extent specific features lead to specific types of learning?

→ 2.1 – To what extent does Strategic Intelligence contribute to the dynamics observed in a functional way (structuration; policy repository; channelling)?

1. What are the sources –precise reports, events, advocates or opponents, etc.- for learning from abroad? What about your implication in these processes?
2. Are (some of) these sources issued from abroad?
3. What has been the role of hard features (process, governance, etc.) of Strategic Intelligence in learning from abroad? (mobilizing, structuring, connecting, ruling, etc.)
4. What has been the role of soft factors (content, etc.) of Strategic Intelligence in learning from abroad?

→ 2.2 – What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (e.g. utilisation)?

1. Who were the advocates and opponents to learning from abroad and what were their arguments/stakes? What about your position?
2. What was the relations of those advocates/opponents to foreign models and the references made to these models? What about you?
3. Do you (or anyone else) promote the UK model abroad? Why and how?
4. What is the role of international organisations such as the European Commission and the OECD in this?
5. What are the conditions or arguments explaining the dynamics behind the process of import/export of the model, whether they are pushed or pulled?

→ 2.3 – Do specific features of Strategic Intelligence lead to particular types of policy learning?

1. Would you consider that specific features of Strategic Intelligence influenced SBRI in a way more than another? Why?
2. What type of Strategic Intelligence influenced the SBRI evolution the most (in terms of inspiration from abroad)? (Evaluation? Benchmarking?) Why?
3. What are the changes that can be attributed to specific features of Strategic Intelligence (mention/quote changes due to Strategic Intelligence and check what cause is related to what change)?

4.3 Experts and consultants

Purpose: Dive into the drivers of Strategic Intelligence and the role of those who hold it

Strategic Intelligence and policy change in a learning context

RQ1: How do soft and hard features of Strategic Intelligence enable transnational policy learning?

→ 1.1 – What has been the role of Strategic Intelligence among the drivers of policy change over time?

1. What were the main characteristics of the Strategic Intelligence method you conducted/contributed to?
2. How did you ensure/do you plan dissemination and utilisation modalities of the intelligence you're involved in (the evaluation, study, etc. You're conducting or contributing to)?
3. What have been the changes in SBRI (design, practice, etc.) that were influenced by reports, evaluations, etc. since its beginning?
4. To what extent did Strategic Intelligence influenced the positions/the decisions taken about SBRI?
5. How did you make use of Strategic Intelligence yourself in your work?

→ 1.2 – What type of learning from abroad occurs?

1. Do you know about other programmes in other countries, and to what extent?
2. What is your perception of other SBIR-type of initiatives in other countries? What about SBRI in UK?
3. What have been the changes in SBRI that were inspired from abroad (for instance the American model, but also others)?
4. Why were differences with the American model, and why getting closer to it?

5. What has been the trend in terms of foreign influence on SBRI evolution (tendency to copy/getting inspiration, the other way round...)

→ 1.3 – What are the policy changes that are due to foreign experience vehicled by Strategic Intelligence?

1. Were the changes (from learning) organisational (processes, organisations, etc.), social (discourses, values, beliefs, etc.), instrumental (policy characteristics, rationale, instrumentalisation)? -> Explain the scope to the interviewee.
2. What were the more important/prominent changes due to foreign experiences?
3. How did they occur and what were the impacts in terms of perception of the programme?

Meta-instrumental features and policy learning

RQ2: To what extent specific features lead to specific types of learning?

→ 2.1 – To what extent does Strategic Intelligence contribute to the dynamics observed in a functional way (structuration; policy repository; channelling)?

1. What are the sources –precise reports, events, advocates or opponents, etc.- for learning from abroad? What about your implication in these processes?
2. Are (some of) these sources issued from abroad?
3. How and why did you design the Strategic Intelligence method (evaluation, etc.) the way you did and what have been/are the issues and challenges?
4. Did you make reference to SBIR-specific knowledge from abroad, how (comparison techniques? Literature review? Case study? Benchmarking?) and why?
5. Did the process, structure, governance, etc. of the method you implemented connect UK with foreign actors, how and why?
6. How has this been perceived? (Well, not well, was it a specific demand, etc.)
7. What has been the role of hard features (process, governance, etc.) of Strategic Intelligence in learning from abroad? (mobilizing, structuring, connecting, ruling, etc.)
8. What has been the role of soft factors (content, etc.) of Strategic Intelligence in learning from abroad?

→ 2.2 – What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (eg utilisation)?

1. Who were the advocates and opponents to learning from abroad and what were their arguments/stakes? What about your position?
2. What was the relations of those advocates/opponents to foreign models and the references made to these models? What about you?

3. Do you (or anyone else) promote the UK model abroad? Why and how?
4. Do you make use of SBRI experience or other SBIR experience in other contexts?
5. What is the role of international organisations such as the European Commission and the OECD in this?
6. What are the conditions or arguments explaining the dynamics behind the process of import/export of the model, whether they are pushed or pulled?

→ 2.3 – Do specific features of Strategic Intelligence lead to particular types of policy learning?

1. Would you consider that specific features of Strategic Intelligence influenced SBRI in a way more than another? Why?
2. What type of Strategic Intelligence influenced the SBRI evolution the most (in terms of inspiration from abroad)? (evaluation? Benchmarking?) Why?
3. What are the changes that can be attributed to specific features of Strategic Intelligence (mention/quote changes due to Strategic Intelligence and check what cause is related to what change)?

4.4 Stakeholders (incl. target groups and beneficiaries)

Purpose: understand how Strategic Intelligence was used (or not) by innovation actors and/or impacted (or not) policy making through stakeholders, target groups and beneficiaries access to Strategic Intelligence

Strategic Intelligence and policy change in a learning context

RQ1: How do soft and hard features of Strategic Intelligence enable transnational policy learning?

→ 1.1 – What has been the role of Strategic Intelligence among the drivers of policy change over time?

1. What are the reasons for launching an SBRI in UK? What was your position on this (pro/con, associated/excluded, consulted...)?
2. Did you make use of Strategic Intelligence in order to influence policy making? How?
3. To what extent did you have access to Strategic Intelligence (evaluations, etc.; explain)?
4. To what extent did Strategic Intelligence influenced your positions?
5. How did you make use of Strategic Intelligence in your work (negotiations, networking, learning, etc.)

→ 1.2 – What type of learning from abroad occurs?

1. Do you know about other programmes in other countries, and to what extent?
2. What is your perception of other SBIR-type of initiatives in other countries?
3. What have been the changes in SBRI that were inspired from abroad (for instance the American model, but also others)?
4. Why were differences with the American model, and why getting closer to it?
5. What has been the trend in terms of foreign influence on SBRI evolution (tendency to copy/getting inspiration, the other way round...) and what is your position on this?

→ 1.3 – What are the policy changes that are due to foreign experience vehicled by Strategic Intelligence?

1. Were the changes (from learning) organisational (processes, organisations, etc.), social (discourses, values, beliefs, etc.), instrumental (policy characteristics, rationale, instrumentalisation)? -> Explain the scope to the interviewee.
2. What were the more important/prominent changes due to foreign experiences and what is your position in that regard?
3. How did they occur and what were the impacts in terms of your perception of the programme?

Meta-instrumental features and policy learning

RQ2: To what extent specific features lead to specific types of learning?

→ 2.1 – To what extent does Strategic Intelligence contribute to the dynamics observed in a functional way (structuration; policy repository; channelling)?

1. What are the sources –precise reports, events, advocates or opponents, etc.- for learning from abroad? What about your implication in these processes?
2. Did you promote/confront some of these sources and the arguments they defended?
3. Do you make use of Strategic Intelligence issued from abroad and if yes, how?
4. What has been the role of hard features (process, governance, etc.) of Strategic Intelligence in learning from abroad? (Mobilizing, structuring, connecting, ruling, etc.)
5. What has been the role of soft factors (content, etc.) of Strategic Intelligence in learning from abroad?

→ 2.2 – What are the ‘pull and push’, ‘active and passive’ dynamics observed in practice (e.g. utilisation)?

1. Do you actively promote or confront the SBRI programme? How?
2. Who were the advocates and opponents to learning from abroad and what were their arguments/stakes? What about your position?
3. What was the relations of those advocates/opponents to foreign models and the references made to these models? What about you?
4. Do you (or anyone else) promote/confront the UK model abroad? Why and how?
5. What is the role of international organisations such as the European Commission and the OECD in this?
6. What are the conditions or arguments explaining the dynamics behind the process of import/export of the model, whether they are pushed or pulled?

→ 2.3 – Do specific features of Strategic Intelligence lead to particular types of policy learning?

1. Would you consider that specific features of Strategic Intelligence influenced SBRI in a way more than another? Why?
2. What type of Strategic Intelligence influenced the SBRI evolution the most (in terms of inspiration from abroad)? (Evaluation? Benchmarking?) Why?
3. What are the changes that can be attributed to specific features of Strategic Intelligence (mention/quote changes due to Strategic Intelligence and check what cause is related to what change)?

Appendix X: National Academy of Sciences Study

(a) The purpose of the study is to:

(1) Continue the most recent study relating to the following issues:

(i) A review of the value to the Federal research agencies of the research projects being conducted under the SBIR Program, and of the quality of research being conducted by small businesses participating under the program, including a comparison of the value of projects conducted under the SBIR Program to those funded by other Federal research and development expenditures;

(ii) To the extent practicable, an evaluation of the economic benefits achieved by the SBIR Program, including the economic rate of return, and a comparison of the economic benefits, including the economic rate of return, achieved by the SBIR Program with the economic benefits, including the economic rate of return, of other Federal research and development expenditures;

(iii) An evaluation of the noneconomic benefits achieved by the SBIR Program over the life of the program;

(iv) An analysis of whether Federal agencies, in fulfilling their procurement needs, are making sufficient effort to use small businesses that have completed a second phase award under the SBIR Program; and

(2) Conduct a comprehensive study of how the STTR program has stimulated technological innovation and technology transfer, including—

(i) A review of the collaborations created between small businesses and research institutions, including an evaluation of the effectiveness of the program in stimulating new collaborations and any obstacles that may prevent or inhibit the creation of such collaborations;

(ii) An evaluation of the effectiveness of the program at transferring technology and capabilities developed through Federal funding;

(iii) To the extent practicable, an evaluation of the economic benefits achieved by the STTR program, including the economic rate of return;

- (iv) An analysis of how Federal agencies are using small businesses that have completed Phase II under the STTR program to fulfill their procurement needs;
- (v) An analysis of whether additional funds could be employed effectively by the STTR program; and
- (vi) An assessment of the systems and minimum performance standards relating to commercialization success established under section 9(qq) of the Small Business Act;

(3) Make recommendations with respect to—

- (i) Measures of outcomes for strategic plans submitted under [5 U.S.C. 306](#) and performance plans submitted under [31 U.S.C. 1115](#), of each Federal agency participating in the SBIR Program;
 - (ii) How to increase the use by the Federal Government in its programs and procurements of technology-oriented small businesses;
 - (iii) Improvements to the SBIR Program, if any are considered appropriate; and
 - (iv) How the STTR program can further stimulate technological innovation and technology transfer.
- (4) Estimate the number of jobs created by the SBIR or STTR program of the agency, to the extent practicable.

Source: 2012 SBIR Directive

6/ SBIR and SBRI material

6.1 Comparing DoD SBIR technology areas over time

Table 20: Technology areas - A time comparison

SBA classification of the technological areas targeted by the SBIR solicitations over the first 2 years of the Program	DoD 'Key Technological areas'
<i>Source: Comptroller General – GAO, 1985</i>	<i>Source: DoD, reference to the Defense Technology Area Plan from 2005</i>
<ol style="list-style-type: none"> 1. Computer, Information Processing, Analysis 2. Electronics 3. Life Sciences 4. Materials 5. Mechanical Performance of Vehicles, Weapons, Facilities 6. Energy Conversion and Use 7. Environment and Natural Resources 	<ol style="list-style-type: none"> 1. Air Platforms 2. Chemical / Biological Defense 3. Information Systems Technology 4. Ground and Sea Vehicles 5. Materials / Processes 6. Biomedical 7. Sensors, Electronics and Electronic Warfare 8. Space Platforms 9. Human Systems 10. Weapons 11. Nuclear Technology 12. Battlespace Environments
List of NAVY SBIR Topics for 2014 (source: Topic index available at http://www.dodsbir.net/solicitation/sbir142/navy142.htm)	
<ol style="list-style-type: none"> 1. Development of an HSI Module and Material-Design Software to Support Concurrent Design Concept Exploration 2. In-Situ, Non-Destructive Permethrin Test Device for Military Fabrics and Uniforms 3. Protective Helmet Suspension and Retention System 4. Ad-Hoc Ground Based Counter-Fire System 5. Expeditionary Portable Oxygen Generation System 6. Insulating Barriers for Softwall Shelters 7. Foldable High G-Force Resistant Patient Litter 8. Crew Role-player Enabled by Automated Technology Enhancements (CREATE) 9. High Power Battery for Long-Range Air-to-Surface Missile 10. High-Power Mid-Infrared Quantum Cascade Laser Array with Continuous-Wave Output Power Exceeding 100W 11. Adaptive Radar Modes for Signature Exploitation 12. Air Vehicle Communication in a Denied Environment 13. Low Cost Information Assured Passive and Active Embedded Processing 14. Innovative Tactical Bulk Fuel Delivery System Restraint System 15. Universal Decoder for Airborne Generated Data 16. Tactical Airplane Noise Reduction via Advanced Automated Computational Airframe Aft-End Integration Technologies 17. Ruggedized, Ultra-Compact, High Dynamic Range, Dual-Output Wideband Electro-Optic Modulator 18. Atmospheric Ice Detection and Avoidance System for Fixed and Rotary Wing Aircraft 19. Micro Identification Friend or Foe (IFF) 20. Innovative CH-53K Cargo Floor System 21. Effective Measures of Training Display System Performance 22. Intelligent Multi-Computing-Platform for Complex Tactical Manned and Unmanned Engagement Planning and Data Distribution 	<ol style="list-style-type: none"> 23. Mitigation of Military Communication and Radar System Interference from Current and Future Fixed and Mobile Wireless Broadband Systems 24. Advanced Arresting Gear Cable for Lighter Weight and Longer Service Life 25. Electronic Thermally Initiated Venting System (ETIVS) Trigger and Thermal Sensor 26. Micro Towed Magnetic Anomaly Detection (MAD) System for Rotary Wing and Vertical Take-Off Unmanned Aerial Vehicles (VTUAVs) 27. High Power, Long Endurance Battery 28. Wide-Angle Acoustic Beam Steering with Arrays of PiezoCrystal Tonpilz Transducers 29. Single-Transceiver Dynamic Spectrum Access (ST-DSA) 30. Expeditionary Cyber Network (X Net) 31. Spectrum Monitoring Payload for ScanEagle Unmanned Aerial Vehicle 32. High-Performance Deformable Mirror Technology Test and Evaluation Platform 33. Affordable, Scalable, Ocean Energy Harvesting System 34. Components for a Deep Drifting Sonobuoy 35. Co-Site Interference Mitigation for Wideband Receivers 36. Ultra Sharp Fiber Architectures for Ceramic Composites 37. High Fidelity Prediction of Electromagnetic Wave Propagation 38. Extended Range Forecasting and Advanced Climate Applications Decision Support System 39. Opportunistic Real-Time Multimodal Sensor Content Exploitation 40. High Speed and High Voltage Capacitors for Naval HPRF Directed Energy Applications 41. Next-Generation of Maintenance Skills Training System 42. Affordable Manufacturing of Refractory Metal Components

Source: compilation by the author, 2014

- 6.2 Example of one of the SBIR certification for SBCs majority-owned by multiple venture capital operating companies, hedge funds, or private equity firms(Source: 2012 SBIR Directive, SBA)

BILLING CODE 8025-01-P

Certification for Applicants that are Majority-Owned by Multiple Venture Capital Operating Companies, Hedge Fund or Private Equity Firms

Any small businesses that is majority-owned by multiple venture operating companies (VCOCs), hedge funds or private equity firms and are submitting an application for and SBIR funding agreement must complete this certification prior to submitting an application. This includes checking all of the boxes and having an authorized officer of the applicant sign and date the certification each time it is requested.

Please read carefully the following certification statements. The Federal government relies on the information to determine whether the business is eligible for a Small Business Innovation Research (SBIR) Program award and meets the specific program requirements during the life of the funding agreement. The definitions for the terms used in this certification are set forth in the Small Business Act, SBA regulations (13 C.F.R. Part 121), the SBIR Policy Directive and also any statutory and regulatory provisions referenced in those authorities.

If the funding agreement officer believes that the business may not meet certain eligibility requirements at the time of award, they are required to file a size protest with the U.S. Small Business Administration (SBA), who will determine eligibility. At that time, SBA will request further clarification and supporting documentation in order to assist in the verification of any of the information provided as part of a protest. If the funding agreement officer believes, after award, that the business is not meeting certain funding agreement requirements, the agency may request further clarification and supporting documentation in order to assist in the verification of any of the information provided.

Even if correct information has been included in other materials submitted to the Federal government, any action taken with respect to this certification does not affect the Government's right to pursue criminal, civil or administrative remedies for incorrect or incomplete information given in the certification. Each person signing this certification may be prosecuted if they have provided false information.

The undersigned has reviewed, verified and certifies that (all boxes must be checked):

- (1) The applicant is NOT more than 50% owned by a single VCOC, hedge fund or private equity firm.
☐Yes ☐No
- (2) The applicant is more than 50% owned by multiple domestic business concerns that are VCOCs, hedge funds, or private equity firms.
☐Yes ☐No

7/ SBRI: Value of Departmental SBRI Contracts and Treasury Commitments

Source: Connell (2014)

8/ Agencies and Department's codes (USA)

Agency Codes	
DHS	Department of Homeland Security
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
ED	Department of Education
EPA	Environmental Protection Agency
HHS	Department of Health and Human Services
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
USDA	US Department of Agriculture
Branch Codes	
<i>DHS</i>	
ST	Science and Technology Directorate
DNDO	Domestic Nuclear Detection Office
<i>DOC</i>	
NOAA	National Oceanic and Atmospheric Administration
NIST	National Institute of Standards and Technology
<i>DoD</i>	
USAF	Department of the Air Force
ARMY	Department of the Army
CBD	Chemical and Biological Defense Program
DARPA	Defense Advanced Research Projects Agency
DHP	Defense Health Program
DLA	Defense Logistics Agency
DMEA	Defense Microelectronics Activity
DTRA	Defense Threat Reduction Agency
MDA	Missile Defense Agency
NAVY	Department of the Navy
NGA	National Geospatial-Intelligence Agency
OSD	Office of the Secretary of Defense
SOCOM	Special Operations Command
<i>DOE</i>	
ARPA	Advanced Research Projects Agency - Energy
DOE HQ	Department of Energy Headquarters
<i>HHS</i>	
ACF	Administration for Marriage and Families
CDC	Center for Disease Control
FDA	Food and Drug Administration
NIH	National Institute of Health

Source: 2014 Directive

9/ Strategic Intelligence ITEMS (USA)

Structure of the list			
Type of item	Date_	_Author_	_Title
P31	1985	Comptroller General	Report to the Congress of the United States - Implementing the Small Business Innovation Development Act - The First 2 Years.pdf
P32	1999	GAO	Assessment of Small Business Innovation Research Programs.pdf
P33	1999	NAS	The Small Business Innovation Research Program - Challenges and Opportunities.pdf
P34	2000	NAS	The Small Business Innovation Research Program - An Assessment of the Department of Defense Fast Track Initiative.pdf
P35	2003	NIH	National Survey to Evaluate the NIH SBIR Program.pdf
P36	2004	NAS	An assessment of the small business innovation research program project methodology.pdf
P37	2004	NAS	SBIR Program Diversity and Assessment Challenges - Report of a Symposium.pdf
P38	2005	HHS	Report from the National Institutes of Health on the Implementation of Executive Order 13329 - Encouraging Innovation in Manufacturing.pdf
P40	2005	NAS	Partnering Against Terrorism - Summary of a Workshop.pdf
P41	2006	GAO	Small Business Innovation Research - Agencies Need to Strengthen Efforts to Improve the Completeness, Consistency, and Accuracy of Awards Data.pdf
P42	2006	GAO	SMALL BUSINESS INNOVATION RESEARCH - Information on Awards made by NIH and DoD in Fiscal Years 2001 through 2004.pdf
P43	2007	DoD	Annual Report Submission on Executive Order 13329 - Encouraging Innovation in Manufacturing.pdf
P44	2007	House	Small Business Innovation Research Reauthorization on the 25th Program Anniversary - Hearing.pdf
P45	2007	NAS	An Assessment of the SBIR Program at the National Science Foundation.pdf
P46	2007	NAS	SBIR and the Phase III Challenge of Commercialization - Report of a Symposium.pdf
P47	2007	NIH	Report on the 2007 Outcome Measures Update - NIH SBIR Performance Outcomes Data System (PODS).pdf
P48	2007	OECD	OECD Framework for evaluating SME support.pdf
P49	2008	CRS	The Small Business Innovation Research Program - Reauthorization Efforts - Wikileaks release.pdf
P50	2008	House	Hearing of Mr Bean on SBIR - America's National Technology Development Incubator.mp3
P51	2008	House	Hearing Q&A by Ms. Velasquez.mp3
P52	2008	NAS	An Assessment of Small Business Innovation Research Program at the Department of Energy.pdf
P53	2008	NAS	An Assessment of the SBIR Program.pdf
P54	2008	NAVY	A Report on the NAVY SBIR Program - Best Practices, Roadblocks and Recommendations for Technology Transition.pdf
P55	2009	DoD	Report on Department of Defense Small Business Innovation Research Program Commercialization Pilot Program.pdf
P56	2009	House	The Role of The SBIR and STTR Programs in Stimulating Innovation at Small High-Tech Businesses.pdf
P57	2009	NAS	An Assessment of the Small Business Innovation Research Program at the Department of Defense.pdf
P58	2009	NAS	An Assessment of the Small Business Innovation Research Program at the National Aeronautics and Space Administration.pdf
P59	2009	NAS	An Assessment of the Small Business Innovation Research Program at the National Institutes of Health.pdf
P60	2009	NAS	Revisiting the Department of Defense SBIR Fast Track Initiative.pdf
P61	2009	NAS	Venture Funding and the NIH SBIR Program.pdf
P62	2009	NIH	National Survey to Evaluate the NIH SBIR Program.pdf
P63	2009	UN Commission for Europe	Policy Options and Instruments for Financing Innovation - A Practical Guide to Early-Stage Financing.pdf
P64	2010	GAO	Space Acquisitions - Challenges in Commercializing Technologies Developed under the Small Business Innovation Research Program.pdf
P65	2010	OECD	Public Procurement programmes for small firms - SBIR-type programmes.pdf
P66	2010	OECD	United States.pdf
P67	2011	CRS	Small Business Innovation Research (SBIR) Program.pdf
P68	2011	GAO	Small Business Innovation Research - SBA Should Work with Agencies to Improve the Data Available for Program Evaluation.pdf
P69	2011	GlobalForumForHealthResearch	New investment strategy - innovative developping country research awards.pdf
P70	2011	NASA	Review of NASA's Management of Its Small Business Innovation Research Program.pdf
P71	2011	OECD	Business Innovat Policies.pdf
P72	2011	OECD	Demand-side policies to support innovation.pdf
P73	2011	OECD	Demand Side Innovation Policies and Instruments.pdf
P74	2011	OECD	Demand Side Innovation Policies.pdf
P75	2011	OECD	Evaluating demand-side innovation policies.pdf
P76	2011	Senate	Haring of Dr Mattgew Silver Cambrian Innovation on SBIR Reauthorization - introduction.mp3
P77	2011	Senate	Hearing of Dr Charles Wessner NAS on SBIR Reauthorization - piece on proposal mills.mp3
P78	2011	Senate	Hearing of Dr Charles Wessner NAS on SBIR Reauthorization - piece on university objections.mp3
P79	2011	Senate	Hearing of Dr Charles Wessner NAS on SBIR Reauthorization.mp3
P80	2012	CRS	Small Business Innovation Research (SBIR) Program.pdf
P81	2012	OECD	Strengthening innovation in USA.pdf
P82	2013	Senate	Hearing- SBIR-STTR Measuring the Effectiveness of the Reauthorization Act and Maximizing Research Dollars to America's Small Businesses .mov
P203	2006	RAND	Evaluation and Recommendations for Improvement of the Department of Defense Small Business Innovation Research Program.pdf
P204	2009	Wessner and Gaster	The Myth of the "Mills" - SBIR and multiple award winners.pdf

10/ Strategic Intelligence ITEMS (UK)

Structure of the list			
Type of item	Date_	_Author_	_Title
	2003	DTI	Innovation Report - Competing in the global economy - the innovation challenge
	2004	Connell	Exploiting the UK's Science and Technology Base - How to Fill the Gaping Hole in UK Government Policy
	2004	Cordis	NoTitle
	2006	Connell	'Secrets' of the World's largest seed capital fund
	2006	IFM Cambridge	Investigating the technology-based innovation gap for the United Kingdom
	2007	DTI	Finding and Procuring Innovative Solutions - Evidence-based practical approaches
	2007	Lord Sainsbury of Turville	The Race to the Top - A Review of Government's Science and Innovation Policies
	2007	NESTA	Driving innovation through public procurement
	2007	NESTA	Innovation policy in the modern world - Five big challenges
	2008	FreshMinds	Evaluating SME experiences of Government procurement
	2008	HM Treasury	Accelerating the SME economic engine - through transparent, simple and strategic procurement
	2008	MATRIX	Public procurement of innovative science and technology solutions
	2008	Richard	Small Business and Government - The Richard Report
	2009	ACCA on behalf of House of Commons all-party parliamentary small business group	Report on SME Access to Public Procurement
	2009	OGC	Driving innovation through public procurement
	2010	Bound and Puttick	NESTA Buysins Power - Is the Small Business Research Initiative for procuring R&D driving innovation in the UK
	2010	Connell and Probert	Exploding the Myths of UK Innovation Policy
	2010	Connell on behalf of NESTA	Scientists are customers too - How the SBRI can help Research Councils drive economic growth
	2010	Connell	Submission to House of Lords Select Committee on Science and Technology Inquiry into Procurement as a Tool to Stimulate Innovation
	2010	House of Lords Science and Technology Select Committee	Call for Evidence - Public procurement as a tool to stimulate innovation
	2010	House of Lords Science and Technology Select Committee	Public procurement as a tool to stimulate innovation - Oral and written evidence
	2010	House of Lords Science and Technology Select Committee	Public procurement as a tool to stimulate innovation - Written evidence
	2010	House of Lords Science and Technology Select Committee	Setting priorities for publicly funded research - Vol I - Report
	2011	BIS	Forward Commitment Procurement - Practical Pathways to Buying Innovative Solutions
	2011	Ecorys	Study on pre-commercial procurement in the field of Security
	2011	Engineering The Future	Response to the House of Lords Science and Technology Select Committee's call for evidence on 'public procurement as a tool to stimulate innovation'
	2011	European Commission	Compilation of results of the EC Survey on the status of implementation of Pre-Commercial Procurement across Europe
	2011	Government	Government Response to the House of Lords Science and Technology Committee Inquiry into Public Procurement as a Tool to Stimulate Innovation
	2011	House of Lords Science and Technology Committee	Public procurement as a tool to stimulate innovation - Report
	2011	House of Lords Science and Technology Committee	Revised transcript of evidence taken before the Select Committee on Science and Technology Inquiry on Public Procurement - Q&A
	2011	House of Lords Science and Technology Committee	Revised transcript of evidence taken before the Select Committee on Science and Technology Inquiry on Public Procurement
	2011	P3ITS	Pre-commercial Public Procurement for ITS innovation and deployment
	2011	Technopolis	How Public Procurement can stimulate Innovative Services - Report to Nordic Innovation Centre (NICe)
	2012	Cabinet Office	Making Government business more accessible to SMEs - One Year On - Progress report on enabling more SMEs to tender for government procurement
	2012	NESTA	Plan I - The case for innovation-led growth
	2012	NHS SBRI East	Research Report
	2012	Northern Ireland Assembly Committee for Enterprise Trade and Investment	Inquiry into Developing the Northern Ireland Economy through Innovation Research and Development DETI Response
	2012	Northern Ireland Assembly	Research and Information Service Briefing Note - The Small Business Research Initiative
	2013	BIS	Technology Strategy Board - Triennial Review
	2013	Defence Scientific Advisory Council	MOD Science and Technology Spending Level Report - Phase 2 - A DSAC Perspective
	2013	House of Commons Science and Technology Committee	Bridging the valley of death - improving the commercialisation of research
	2013	NHS England and SBRI Healthcare	Invitation to Tender for Evaluation of SBRI Healthcare Programme
	2013	The Royal Society	Response to the House of Commons Science and Technology Select Committee inquiry on 'bridging the valley of death'-improving the commercialisation of research'
	2014	Adonis	Contracts not hand-outs - The case for a UK Small Business Administration to drive growth and innovation
	2014	BIS	Innovation Report 2014 - Innovation Research And Growth - March 2014
	2014	Cabinet Office	Making Government business more accessible to SMEs - Two Years On
	2014	Connell	Creating markets for things that don't exist
	2014	SBRI Healthcare	Annual Review 2013-2014
	NoDate	Department of Enterprise, Trade and Investment	Supporting Evidence-Research Paper for the Draft Innovation Strategy for Northern Ireland 2013-2015

11/ US as a Global Technology Competitor

*Extract from the 2007 House “Small Business Innovation Research
Reauthorization on the 25th Program Anniversary”*

Hearing and related proceedings

I. THE U.S. AS A GLOBAL TECHNOLOGY COMPETITOR

This subcommittee, as well as the Full Science and Technology Committee, have had longstanding concerns about our nation's standing as a global leader in technology. While the U.S. currently remains the acknowledged front-runner in technological innovation, there are a number of indications that our global leadership is in jeopardy. Consider the status of U.S. technology products in international trade.\1\

\1\ This table is taken from *Measuring the Moment: Innovation, National Security and Economic competitiveness*, a report of the Task Force on the Future of American Innovation, November 2006, p. 14. The Task Force members included: Agilent Technologies, Alliance for Science & Technology Research in America, American Chemical Society, American Chemical Society, American Electronics Association, American Institute of Physics, American Mathematical Society, American Physical Society, American Society for Engineering Education, Association for Computing Machinery, Association of American Universities, Battelle, Business Roundtable, computing Research Association, Computing Technology Industry Association, Council on Competitiveness, electronic Industries Alliance, Google, Inc., Intel Corp., Luna Innovations, Inc., Microsoft Corp., National association of Manufacturers, National Association of State Universities and Land-Grant Colleges, Northrop Grumman Corp., the Science Coalition, Semiconductor Industry Association, South-eastern Universities Research Association, Technology CEO Council, Telecommunications Industry Association, Texas Instruments Incorporated. <http://futureofinnovation.org/PDF/BII-FINAL-HighRes-11-14-06-nocover.pdf>. While the overall pie has gotten bigger, the U.S. share has been cut in half. A parallel development has been the shift of the United States from a technology-exporting nation to an importing one. Ten years ago, the U.S. had about a \$30 billion trade surplus in high technology exports. By 2005, as the chart below shows, that had fallen precipitously to a \$45 billion trade deficit.\2\

\2\ Ibid., p. 13. These trends are in part due to the success of some of our global competitors in copying U.S. innovation-promotion programs like SBIR, the Advanced Technology Program (ATP) and the Manufacturing Extension Program (MEP). SBIR variants are now in use in at least twenty countries. SBA reports that delegations from other countries appear regularly to inquire about how SBIR is organized and administered.

Overall, many countries are more active than our own in targeting and promoting innovation as a national economic strategy. So in addition to improving and expanding the SBIR program, Congress should consider strengthening ATP and MEP. Science and engineering studies at our high schools and universities should be enhanced, as well. The declining shares of technology exports--and rising technology imports--by the U.S. also represent a threat to economic growth at the regional and local level, where wealth creation is increasingly linked to the ownership of knowledge. For a striking illustration of this relationship, we can turn to a recent economic study by Paul Bauer, Mark Schweitzer and Scott Shane.³ The authors measured eight determinants of personal income growth per capita, in the 48 contiguous states of U.S., from 1939 to 2004. (Each determinant had been highlighted in previous studies.) Among these were: the size of private financial markets, tax burdens, public infrastructure, business failure rates, industry structure, climate, bank deposits, and knowledge stocks.

³ See Federal Reserve Bank of Cleveland, "Altered States: A Perspective on 75 Years of State Income Growth," Annual Report 2005. For more detail, see Paul Bauer, Mark Schweitzer, Scott Shane, State Growth Empirics: The Long-Term Determinants of State Income Growth, Working Paper 06-06, Federal Reserve Bank of Cleveland, May 2006, www.clevelandfed.org/research/Workpaper/2006/wp0606.pdf

By far the most important growth determinant for the 1939-2004 period proved to be knowledge stocks. For this, the authors used three indices: high school and college attainment rates, and patents per capita. Upon closer examination, the overwhelmingly dominant indicator of income growth proved to be patents per capita. The chart⁴ below shows the power of this indicator in each of the 48 states studied:

⁴ Ibid., p. 46 Broadly speaking, the above chart can be read from left to right. States with lagging growth are on the left; those with higher growth, on the right. The remarkable aspect of the patent indicator is that it correlates strongly with both the poorer states and the wealthier ones--and does so more than any other indicator. A lack of patents per capita is a leading indicator of relative poverty; a profusion is strongly associated with relative affluence. Patents are more closely associated with economic growth than education, industry structure, or any of the other variables tested. The importance of patents is also well understood globally.

⁵ Measuring the Moment, op. cit., p. 15.

II. CONSIDERATIONS FOR POLICY-MAKERS

All of this leads to an obvious question: what can policy-makers do to encourage a climate conducive to patenting? The surprising answer is that Congress has already taken two of the most important steps possible in promoting the growth of patents: First, by means of the Bayh-Dole Act,⁶ Congress assured innovators that they could maintain control of the intellectual property that they developed while working in conjunction with the Federal Government.