

# Introduction

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This book consists of a collection of essays concerning the relationship between regulation and technological innovation. The book represents an academic exchange of ideas on the realities and challenges of regulating technological innovation. It examines the regulatory issues surrounding the fostering technological innovation and its applications, and combines legal, economic and administrative science perspectives.

In particular, this book highlights the answers to important questions such as what type of regulatory framework would best fit the needs of technology and innovation developments; what competences or authorities should be given to the regulatory actors and other stakeholders to shape the future paths of technology innovation; what lessons can we distil from other regulatory fields; and how we can apply what we have learnt to further enhance the development of technology innovation?

## I.1 Scope

This book starts from the European ambition (both at the European level and 'below') to become a knowledge-based economy and to secure technological innovation. Against this backdrop, the book aims to support and elucidate regulatory relevance as regards fostering innovation, while at the same time considering the regulatory need to strike a balance between fostering innovation and protecting against technological risks. To this end, a multidisciplinary perspective is applied as the role of regulation in the challenge of innovation is a multifaceted issue that cannot be properly understood from a single disciplinary angle.

Various documents and agendas, including the Lisbon agenda, and the specific multilevel governance characteristics of Europe, comprising both a supranational regulatory system, and (trans)national and regional

## 2 Introduction

diversities (in economic, cultural, social and other aspects and dynamics), set the stage for addressing the book's aims. The book is meant primarily to be relevant to the overall European context, although some contributions will address more 'local' governance particularities.

While regulating technological risks is a well-researched issue, this book aspires to understand better how regulation can effectively foster and secure technological innovation (while enhancing and protecting prerequisites and possible outcomes; and balancing technology development against risk regulation). As such, its attention is drawn to the field of regulation for fostering innovation, an area that is scientifically much less explored and understood. Beyond calls for deregulation and reducing the regulatory (and accompanying administrative) burden, regulation has a positive role to play in innovation (and growth), and is indeed indispensable in enhancing and securing both scientific exploration and, especially, its uptake and exploitation by the market.

In accentuating the 'fostering' of technological innovation, this book adopts three approaches. The first aims to provide a general analysis and appraisal of the relationship between regulation and innovation (mostly viewed in terms of comparative advantages, legal designs and informal regulation). The second addresses specific exemplary areas and connected issues in regulating technological innovation (new telecommunication infrastructures and/or related services, competition law and regulated industries, border management, energy innovation and Public Private Partnerships (PPP)). The third, and our last, approach focuses on emerging technologies and the regulation of innovation (addressing regulatory partnerships in nanotechnology, patent quality and the use of existing patents). Within these approaches, the reader will inevitably find a mix of concepts, values, strategies and practices for regulatory governance (both public and private) as potential ways to facilitate, enhance and secure technological innovation.

The underlying premise of the book is that technological innovation is a public value, either for reasons of fostering technological advancement (broadly or connected to specific societal needs and services) or for reasons of public risk control. Thus, the regulatory standpoint regarding innovation ultimately rests on the need to ensure societal opportunities, needs and risks related to a technological innovation are met. This does not mean, however, that only public or formal regulation (and public, second or third-party regulators) is relevant to the book. Many contributions explicitly show how the interplay between public and private actors, and public and private regulation, is a key characteristic of regulatory innovation governance. Further, the much

sought after ‘smart regulation’ – presently a focal issue in EU regulatory governance – which features the idea of a combination of regulatory instruments, starts from the notion that there is no one-size-fits-all approach to combining regulation and innovation.

The science-based approach to the subject, as presented in this book, goes beyond showing that regulation matters in enhancing innovation. The book aims to highlight methods and techniques, and the accompanying pitfalls, that are relevant in defining and securing a proper balance between risks and opportunities, and between the public and private interests involved. The three approaches outlined above are intended to support this objective: they should demonstrate relevance and, moreover, present specific methodological insights into the specific issues of each approach (from general instrument choices and approaches, to addressing specific sectors or interests and, finally, how to deal with emerging technologies). Whether the results from the individual contributions can be combined to produce a ‘smart design’ for regulating innovation remains to be seen but, hopefully, this book will provide a step in that direction. In terms of scope, the contributions are geared to advancing this perspective, especially with regards to the European discourse and practice of regulating innovation.

## I.2 Literature

Regulation of markets, particularly financial ones, and of public risks has received considerable attention in the literature throughout the previous century and into the current one.<sup>1</sup> Further, regulation for innovation has attracted the attention of various scholars following developments in emerging technologies that have associated risks and high levels of uncertainty.

In this book, the authors build on the definition of regulation formulated by Julia Black: ‘regulation is the sustained and focused attempt to alter the behaviour of others according to standards or goals with the intention of producing a broadly identified outcome or outcomes, which may involve mechanisms of standard-setting, information-gathering and behaviour-modification’.<sup>2</sup>

Studies on the regulation and innovation relationship have enjoyed intensive debate among scholars. The main focus, however, has been on risk and responsive regulation, and the issue of regulation to foster innovation has enjoyed less attention. Indeed, concerns about fostering innovation through regulation date from at least 1995 when the European Commission issued a *Green Paper on Innovation*,<sup>3</sup> stressing that

'fostering a legal and regulatory environment friendly to innovation' was one of its core objectives. This was followed a year later by the *First Action Plan for Innovation in Europe*, and more recently with the *EU's Europe 2020 Strategy*, designed to foster an innovation culture and create a more innovation-friendly environment. However, such statements have attracted little general academic response. An exception may be found in a paper by Kuhlman et al. who, at the end of the last century, pointed to the essential role of an innovation-friendly regulatory framework in achieving economic policy goals.<sup>4</sup>

The issue of regulation and innovation has also been debated in various books. For instance, in 2008, Roger Brownsword in his book, *Rights, Regulation, and the Technological Revolution*,<sup>5</sup> presents regulatory challenges from a perspective that is wider than only risk-orientation. He claims that we are entering an era of a new technological revolution and that this will certainly challenge the existing regulatory frameworks. Therefore, it is important to select the right regulatory instruments that are able to respond to such technological dynamics and to broader societal values. The debate in his book focuses largely on how newly emerging technological applications contribute to regulatory changes, and less so on regulatory approaches to fostering innovation. Conversely, *Regulating Technologies: Legal Futures, Regulatory Frames and Technological Fixes*, edited by Brownsword and Yeung,<sup>6</sup> is closer to the perspective adopted in this book as it offers a varied and double perspective, of technology as a regulatory tool and vice versa. That book emphasises how the legal community has only recently grasped the opportunities and challenges that emerging technologies pose to their 'host communities'. It focuses its attention especially on the challenges that lie in the field of risk regulation, including the role of the precautionary principle. Opportunities provided by the new technologies are also addressed in their book, especially in terms of how technology in itself provides a regulatory tool in the sense of techno-regulation (also known as regulation through code). Our book aims to build on such existing works, so as to move the debate forward to the challenges of regulation for fostering innovation and to add a more multidisciplinary view of the subject. As such, we hope that readers will experience an opening up of new perspectives on the regulation and innovation relationship.

### 1.3 Our target audience

This book is addressed to a range of audiences: administration scientists, legal scholars, politico-economic scientists, students (masters level and

above) in these disciplines, regulators and other decision makers, plus advisors in the field of regulation and innovation. As to its academic relevance, we hope that universities and affiliated organisations will find, within their programmes in the field of regulatory affairs, that the use of this volume can support the exchange of views on balancing risks and opportunities in technological innovation – especially with regards to the discourse on enhancing, fostering and securing technological innovation in an increasingly competitive and knowledge-based world.

#### **I.4 Format**

A deliberate choice was made to present concise contributions on the regulation and innovation discourse: each contribution being of just sufficient length to offer a descriptive and analytical ‘stage setting’, as well as prescriptive elements for further debate. As the below overview will show, the contributions have been clustered into three parts to provide a coherent structure and a variety of leading perspectives for such debates.

The first part (of four chapters) provides a general analysis of the relationship between regulation and innovation. Subsequently, the second part of the book (again four chapters) brings forward issues related to technological innovation; providing evidence from specific regulatory areas. Finally, the third part (three chapters) aims at furthering the debate on technology innovation and regulation by focusing on the potential of newly emerging technologies to foster technology innovation.

It did not seem fitting to force some synthesis onto the contributions, or upon their groupings in parts, by adding a separate, concluding in-depth analytical contribution. Instead, the book ends with some general notes primarily intended as ‘food for further thought’.

#### **I.5 Overview of the book contents**

##### **Part I**

Following this Introduction, Part I provides a general analysis of the relationship between regulation and innovation. To begin with, in Chapter 1, Antoni Brack argues that competition law has the potential to foster technology development, but that regulatory effectiveness could be better achieved through fewer regulations, thus reducing the repetitiveness and complexity of technology regulation. The next three chapters explore the main challenges facing the regulation of technology

innovation in recent decades. In particular, the main concern of the authors is how to provide a legitimate, valid and effective regulatory framework that gives voice to all stakeholders involved with the technology innovation process. Contributors draw lessons from various disciplines: Donnelly draws on knowledge from classical and institutional economics (Chapter 2); Heldeweg shows the relevance of the concept of 'smart rules and regimes' in attempting to project lines along which the legal design of such smart rules and regimes could proceed (Chapter 3); and Wessel explores the role of informal international law making in the crafting of rules for technological innovation (Chapter 4).

The following paragraphs provide more detailed explanation of the chapters in this part; but readers who feel they have enough knowledge at this point may prefer to jump to Part II.

The first part of the book starts with Brack's contribution (Chapter 1). According to Brack, innovation refers to technological improvements in trade and industry that result from improvements to products, processes and organisations. Competition law is crucial, as the main factor in the development of new or improved technologies and, more importantly, for removing possible obstacles to innovative developments. In Brack's view, innovation could be enhanced by making a distinction between horizontal and vertical cartels, determining whether the undertakings involved operate on the same level or not in the production and distribution chain. In his contribution, Brack compares two separate regulations, which both allowed undertakings to cooperate, under certain conditions, for innovative purposes, but that expired at the end of 2010. The European Commission called for public consultations on the review of the expiring regime as part of the process of preparing to renew or replace this regime. Responding to this request, Brack conducts a comparative analysis of the two 'Block Exemption Regulations', and argues that these regulations should be merged into one. A reduction in the regulatory burden is an important goal of the so-called Better Regulation Programme and a simplification of these regulations would fit with this by reducing the regulatory burden on undertakings and cutting the number of definitions.

In Chapter 2, Donnelly analyses how regulation contributes to innovation generally, drawing on knowledge from classical and institutional economics. In this chapter, technological innovation is analysed from the contribution that regulation can make to economic development. As such, various instruments that, it is claimed, will enable regulation to foster competitiveness and innovation are put forward; these most

frequently address standardisation, intellectual property and economic monopolies. In Donnelly's view, regulation affects the capacity of companies to attract, hold on to and utilise factors of production to protect intellectual property and to collaborate with others. He states that, very often, regulation, and the associated modes for fostering competition and innovation, provides an asymmetric balance among the various interests since regulatory rules often favour some forms of regulatory environment or economic activities over others. Regulatory bodies also bear a responsibility for ensuring that markets are kept open. This not only means combating private attempts to shut down markets, but also attempts at regulatory capture by private interests. As such, regulation is a building block that influences the capacity of companies to attract appropriate investments, including fixed and human capitals, for innovation. However, the greatest challenge of the twenty-first century, it is argued, will be developing regulatory forms that work well in supporting two different kinds of innovation within a single country: one that requires very flexible contracts and another that requires very stable ones.

In Chapter 3, Heldeweg argues that 'smart rules and regimes' form the main building blocks in fostering technological innovation without neglecting safeguards against technological risks. Adequate regulation is crucial for enhancing technological innovation. Supporting the arguments of the Dutch Scientific Council for Government Policy (WRR) study, Heldeweg shows that innovation is indeed a complex system, focusing not only on the creation of new knowledge and technologies but also on changes in organisation, management and labour, and on the diffusion and application of new knowledge. As such, providing an effective legal design methodology is crucial. Given this relevance, this chapter attempts to suggest lines along which the legal design of such smart rules and regimes could be envisaged. Heldeweg argues that the smartness of rules and regimes relates to balancing two variables: high innovation dynamics and strong conflicts of interest. It is thus crucial that the legal norms and regulatory frameworks align with the current state of a technology, and this could raise issues of legitimacy and legal validity. To this end, the chapter explores an approach based on institutional legal theory. This offers a significant first step but a legal design methodology for 'smart rules and regimes' requires further steps to provide a science-based perspective on which innovation regulation can be built. Heldeweg concludes his contribution by arguing that technology innovation could be fostered through 'smart rules and regimes'. These regimes would need to be legitimate (delineating between state power

and citizens' freedom), have legal validity and be effective and efficient. In this respect, hybridity among the various regulatory actors will be crucial in providing balance among the multiple interests across the various modes of coordination (hierarchy (government); competition (markets) and collaboration (social networks)).

The contribution by Wessel in Chapter 4 advances the idea of regulating technological innovation through informal international law. Wessel indicates that the role of international organisations in regulating technological innovation has been crucial in several sectors, including telecommunications, health and safety, and intellectual property. Such organisations are generally involved in normative processes that, de jure and de facto impact on states and even on businesses and individuals. As such, in *Wessel's* view, the international regulation of technology seems to have been taken over by non-traditional international bodies. In fact, he argues that it would even be fair to say that global governance in the area of technology is no longer directly in the hands of the traditional international actors, the nation states. A variety of governmental, non-governmental and hybrid organisations are today involved in the crafting of rules and standards for worldwide application. This chapter puts forward the view that 'informal international law making' has indeed become a tool to regulate technological innovation. On the one hand, this has brought a new mechanism to the regulation of technology innovation but, on the other, there are many disputes concerning the legitimacy and accountability of such rules. By looking at a number of 'informal' bodies involved in the regulation of the Internet, an attempt is made to answer the question as to the extent to which the activities of international non-governmental actors can nevertheless be seen as an expression of international public authority.

## Part II

The second part of the book brings forward issues related to technological innovation, providing evidence from specific regulatory areas. The first two contributions (Chapters 5 and 6) focus on the telecommunications sector. Here, the roles/potentials of the emerging networks (Broos, Chapter 5) and competition law (Holterman, Chapter 6) in fostering innovation in this regulatory field are discussed. Both of these contributions advance the idea that ensuring certainty and incentives is crucial if the telecommunications sector is to innovate. Sanders and Luisa Marin then focus on other regulatory fields. In Chapter 7 is Marin's work on the use of technology innovation in policing the external EU borders. This part concludes with Chapter 8, where Sanders argues for



safeguarding public interests in the innovation process, and ensuring legitimacy and effectiveness by drawing lessons from the energy sector.

As before, for those who want a little more information on the content of these Part II chapters, we provide a more detailed description of each contribution below. Other readers may be satisfied with the above brief synopsis and wish to move on to Part III.

The contents of the chapters in this part are organised as follows. In Chapter 5, Broos advances from the limited scientific insights that currently exist into the relationship between regulation and innovation, by providing a new perspective on the possibilities, or otherwise, for pacing innovation through regulation. In particular, he focuses on the meso-level (industry) discussions about stimulating the deployment of so-called Next Generation Networks (NGNs) for telecommunications. Broos argues that the structured application of innovation timing theory, combined with the concept of network effects in the telecommunications industry, and related to new entrance strategies provides a better understanding of the influences of several regulatory measures because it exposes the network effects that enhance some first-mover advantages. In an emerging telecommunications market, a first mover is likely to become a provider with sustainable market power. If a leapfrog-enabling technology gateway becomes available, investing in an NGN appears to be a more attractive strategy for new entrants in an unregulated telecommunications market than investing in a 'Same Generation Network' or attempting a service-based competition. By confronting several common regulatory practices in telecommunications with innovation timing advantages and network effects, Broos analyses the institutional influence of these practices on the attractiveness of the strategic options open to new entrants. The analysis shows that cost-based mandated access leads to a declining attractiveness of investing in NGNs, whereas relaxing mandated access obligations appears to influence the development of NGNs positively. Furthermore, this analysis leads to a better explanation of why interconnectivity and portability obligations, as well as the guaranteeing of greater regulatory certainty, have positive effects on all new entrance strategies.

In Chapter 6, Holterman again analyses the telecommunication industry, this time providing a positive and normative discussion on the role of competition law and competition authorities in fostering, or hampering, innovation in this regulatory field. Holterman develops his argument, as to whether it would be appropriate for competition authorities to interfere in the DSL industry (concerning particular forms of digital data communication, such as ASDL and VDSL), by discussing

the Deutsche Telekom and Pacific Bell cases as examples of competition law 'intruding' into a regulated industry. He combines an analysis of these recent EU and American case law examples with a simple economic model of multi-agency regulation and its effects on innovation. Most importantly, Holterman's contribution sheds light on the 2002 EU telecommunications package, as well as the choices made by the various actors in the Deutsche Telekom situation to determine what role the EU legislators actually intended for the competition authorities. While the decisions of lawmakers should ideally reflect their careful consideration of the consequences of their decisions on innovation, Holterman concludes that the 2002 EU telecommunications package appears to be highly problematic in that it seems to give competition law an enhanced role in discouraging future innovation. According to Holterman, this development has created many doubts because regulators are normally in a much better position to understand the market, since competition authorities are only able to intervene *ex post*, and this has created great uncertainty among market actors, reducing their willingness to invest in innovation.

The analysis by Marin in Chapter 7 focuses on a different regulatory field in which innovation and technology are also crucial. She provides interesting evidence on the use of technology innovation in the policing of the external borders of the European Union, focusing primarily on two technology initiatives: the European Borders Agency (FRONTEX) and the European Border Surveillance System (EUROSUR). Starting with the origins, tasks and responsibilities of the EU agency FRONTEX, as well as the FRONTEX-led operations carried out on the southern maritime border, Marin argues that the policing of external borders emphasises elements of multilevel governance that involve various stakeholders and interests. In the second part of her contribution, Marin analyses the various technologies and systems that are in place for border control, and examines in particular the EUROSUR, which offers a good example of how technology can be exploited in the context of managing external maritime borders. This chapter concludes by discussing the political and legal implications of these technology initiatives, and makes recommendations for their future improvement.

In Chapter 8, Sanders analyses how one can safeguard the public interests in the energy sector. His empirical analysis starts with the Dutch government's plans to increase energy supply from renewable energy sources by negotiating climate agreements on national and international levels. Realising that the energy sector's sustainability ambition is dependent on technological innovation, the government has launched

several projects in collaboration with private parties. An example of such an initiative is the Salland Green Gas Project. Based on an analysis of this project, Sanders illustrates that the social interests, which the government designates as public, are in fact variable and that this dynamic spills over into the governance structures in which public interests are embedded. Following this, he analyses how the government can ensure the functioning of the Salland Green Gas Project while balancing the legal and public administration values of effectiveness and legitimacy.

### Part III

The third part of the book has three chapters. In this part, the contributors further the debate on technology innovation and regulation by focusing on the potential of newly emerging technologies to foster technology innovation. In the first chapter (Chapter 9), Chowdhury discusses the field of nanotechnology, a newly emerging technology, through a comparative analysis of the various sub-political actors that engage in regulating nanotechnology without any *de jure* legal mandate so to do. In the last two chapters (Chapters 10 and 11), Kica and Rodriguez respectively focus on the role of patents in spurring innovation and economic growth, and discuss the current challenges facing the European patent system in coping with the pace of technology development and new innovation requirements.

Again, for those readers who desire more knowledge on the content of the chapters in this third part at this stage, the following paragraphs offer brief summaries.

Following the debate on emerging technologies, Chowdhury (Chapter 9) sheds light on the participation of various actors in the development of regulatory norms within the field of nanotechnology. In her chapter, she revisits the arguments provided by theorists for and against national versus international regulation of nanotechnology. As a newly emerging technology, nanotechnology faces many challenges since there is a lack of information as to what regulatory actions this field could be based upon, as well as on the toxicity, and health and safety aspects of nanomaterials. Chowdhury emphasises the reality that several international actors have become active in setting up expert groups and other administrative structures in order to develop regulatory norms in the context of nanotechnology. Interestingly, some of these actors have had international exposure and experience in developing regulations in other new and emerging technology areas. For others, this is an opportune area for extending their regulatory competencies. However, such

actors share a common characteristic: they are essentially sub-political in nature. This concept of sub-politics has been developed by the sociologist Ulrich Beck to characterise international actors that engage in regulatory norm setting without having any *de jure* legal mandate to do so. This chapter explores in detail three such actors within the domain of nanotechnology regulation: the IFCS (Intergovernmental Forum on Chemical Safety), the OECD (Organisation for Economic Cooperation and Development) and the IRGC (International Risk Governance Council). Linkages between these three actors and EU institutions exist at numerous levels through membership, common normative foundations and functional linkages that lead to converging interests. Further, given the growing acceptance of international forums/institutions as efficient and effective sites for regime creation, there is a high probability that the norms emanating from such sub-political actors will seep into the EU legal regime through the pathways identified above. In the final part of her contribution, Chowdhury analyses the regulatory partnerships between EU institutions and such sub-political actors in terms of delegation and exchange of competences with reference to norm creation for EU nanotechnology regulation. She concludes that there have been several structural innovations which have been adopted by EU policymakers, including dividing, delegating and sharing specific competences within highly technical domain areas such as nanotechnology, but that there remain questions on the transparency and legitimacy of this policy formulation process.

In Chapter 10, Kica starts by emphasising the role of patents within the innovation process and technology development. Following this, she focuses on the challenges that the emerging new technologies and the increase in the number of patent applications have brought to the IP regulatory framework and the ability of patent examiners to issue high-quality patents. The quality of the granted patents is considered to be the main endogenous factor challenging the ability of the patent system to encourage innovation and the diffusion of technology. Patent quality in this chapter is viewed as the extent to which patents meet patentability standards, an aspect which is often assessed by patent examiners. As such, Kica argues, the quality of patents depends on the competence of the examiners as well as on the time and search materials available to them. However, within the current European patent system, there are too few patent examiners which, coupled with the shortage of time available to search and examine patent applications and the rapid developments in emerging fields of science, has increased uncertainty in the interpretation of patentability criteria and

in granting patents to potentially valuable inventions. This chapter acknowledges the complexity of the patent system and examines the potential of administrative mechanisms that have been put forward to improve patent quality. It starts by examining the scholarly debate on the mechanisms that support patent quality enhancement through improving the examination process. Next, it lays out the landscape of the administrative mechanisms and addresses the quality of search and examination procedures, and of the quality of products and processes at the European Patent Office (EPO). It distinguishes between the strategies that address the quality of search and examination procedures, and the EPO's use of work from other patent offices and sources. Finally, in her contribution, Kica brings the scholarly debate and the functioning of the administrative mechanisms together, and provides policy recommendations aimed at enhancing the value of patents for newly emerging technologies. She concludes that patent quality is a shared responsibility of both patent examiners and applicants, and that these need to work together to enhance the functioning of the patent system, and so foster innovation activities and technology development.

In Chapter 11, Rodriguez takes a similar line, arguing that patents have a role in fostering technological innovation in the European Union. According to Rodriguez, patent protection is crucial and various actors in many sectors invariably opt to protect their inventions while building monopoly positions or establishing a financial strength in the market or a vital position during the standardisation process. However, the current patent system in Europe is considered to provide little added value to innovation. Rodriguez argues that the current European regime allows member states to retain their institutional arrangements and prevents any moves to delegate responsibility beyond the national sphere. Such a regime can be characterised as a fragmented European patent system of national translation, validation and enforcement. Fragmentation is regarded as a failure of the system since it leads to higher costs, uncertainty and to low quality. At this point, Rodriguez argues that the most appropriate way to overcome the failures of the current EU system is through a unitary title and a centralised patent court that could enhance technological innovation at various levels (micro-, meso- and macro-). However, there is still significant conflict and debate among member states as to how to establish such a unitary patent system. Given this situation, Rodriguez posits that enhanced cooperation could be an alternative strategy, and that several countries could work together without the unanimous participation of all EU member states.

## I.6 Collaborative efforts and contributors

Focused work on the chapters of this book started in September 2010 and contributions were completed in July 2011.

The contributors are all active in the fields of ‘European regulation’ and ‘regulation in Europe’, some following a more general, theoretical perspective and others focusing on a more specific material object of regulatory study, but all relating to technological dynamics or innovation. All contributors have previously written for and published their findings and opinions in international books and journals. Some authors are already leading experts in their fields (Wessel in European law, Rodriguez in patent policy, Heldeweg in environmental legal governance, *Donnelly* in global governance and the politics of economic policy, Marin in European constitutional law and Brack in competition law and technology regulation), others are involved in PhD projects in the field of regulating innovation.

The book evolved as a collective journey. The editors and contributors have collaborated in the course of meetings on Innovation and Governance Studies at the University of Twente, and the editors took it upon themselves to arrange several meetings in which the initial ideas on the focus of a book and, later, abstracts and draft contributions were discussed. Although the book covers a variety of related foci, angles and perspectives, the contributors see the book as an outcome of their collaborative efforts.

### Notes

1. See Black, J., M. Lodge and M. Thatcher (eds), *Regulatory Innovation* (Cheltenham: Edward Elgar, 2005).
2. Black, J. ‘Critical reflections on regulation’, *Australian Journal of Legal Philosophy*, vol. 27 (2002), pp. 1–35.
3. European Commission. *Green Paper on Innovation* (Luxembourg: European Commission, 1995).
4. Kuhlman, S, C. Bättig, K. Cuhls and P. Viola, *Regulation und künftige Technikenentwicklung: Pilotstudien zu einer Regulationsvorausschau* (Heidelberg: Physica, 1998).
5. Brownsword, R. *Rights, Regulation, and the Technological Revolution* (Oxford: Oxford University Press, 2008).
6. Brownsword, R. and K. Yeung (eds), *Regulating Technologies: Legal Futures, Regulatory Frames and Technological Fixes* (Oxford and Portland: Hart Publishing, 2008).