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Innovation Journey – Navigating Unknown Waters

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Product design and creation can been regarded as an 'innovation journey', biased by unforeseen setbacks along the road. In fact, real and sustainable innovation success should rather be viewed as 'by-products along the journey' than as end result. If one takes a closer look to the contingencies during such a journey, retrospective attributions of success to certain approaches or persons will prove to be misleading; such rash "attributions reinforced top managers' belief that managing innovation is fundamentally a control problem when it should be viewed as one of orchestrating a highly complex, uncertain and probabilistic process

" (van de Ven et al. 1999, 59).

An innovation journey should be imagined as a journey into unknown waters or an *uncharted river* (van de Ven et al. 1999, 212). This metaphor helps "to develop an empirically grounded model of the innovation journey that captures the messy and complex progressions" while travelling (212/3). Consequently, according to van de Ven and colleagues, "innovation managers are to go with the flow – although we can learn to maneuver the innovation journey, we cannot control it" (213).

Still, while conceiving innovation processes as uncertain open ended processes of more or less organised social action, one can identify certain *patterns* and a number of *typical key components* characterising the journey helping the actors to navigate along uncharted rivers. Van de Ven et al. (1999, 23-25) suggest the following components (see exhibit 1): During an initiation period (1.) an innovation project is (often quite slowly) put in motion, sometimes (2.) triggered by a "shock", and (3.) project plans are developed , less as a journey map, rather to legitimate the project vis-à-vis the corporate management. In the developmental period (4.) the initial innovation idea proliferates into numerous variations; but soon (5.) setbacks and mistakes are encountered "because plans go awry or unanticipated environmental events significantly alter the ground assumptions of the innovation". Projects often end in vicious cycles, or (6.) actors decide, often after power struggles, to change the criteria of success and failure. (7.) Various innovation personnel join the project and leave it, experiencing euphoria and frustration, while (8.) investors and top management accompany the process, serving as checks and balances on one another. (9.) Interaction with other organisations have supportive or negative impact on the innovation project, while (10.) wider sectorial infrastructures are being developed with competitors, government agencies and others. During the implementation or termination period (11.) innovation adoption occurs "by linking and integrating the 'new' with the 'old' or by reinventing the innovation to fit the local situation". After implementation (12.)

investors and top management "make attributions about innovation success or failure. These attributions are often misdirected but significantly influence the fate of innovations" (van de Ven et al. 1999, 24).

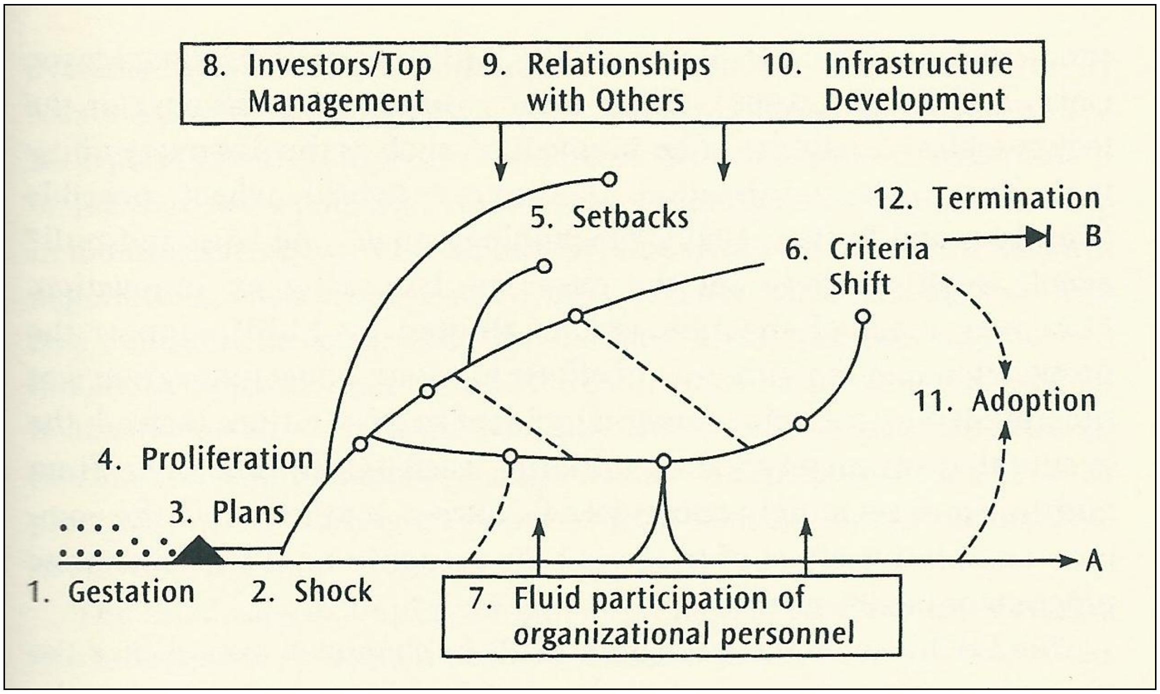

Exhibit 1: Key components of the innovation journey (Van de Ven et al., 1999, 25)

Navigating innovation journeys by learning 'to go with the flow' – after all, this advice sounds somewhat humble and unambitious. Do innovation actors (managers, users, policymakers) really have no serious chance to guide innovation projects towards desired targets? Rip (2010) suggests that actors interested in strategic interventions will be more successful if they understand the *co-evolutionary nature* of the overall process and its institutional environment. "At least, they can avoid being improductive, as would happen when using a command-and-control approach while technological innovations are following their own dynamics" (Rip 2010).

In order to better understand the options and limitations for interventions in an innovation journey it is useful to apply a heuristic offered by the school of evolutionary-economic analyses of technology dynamics.[1] This heuristic is built on the findings of "innovation studies", in particular on the seminal work of Nelson and Winter (1977; 1982): In „search of a useful theory of innovation" and convinced of the stochastic, evolutionary, and organisationally complex and diverse character of innovation, the authors observed different technological "regimes" characterised by longstanding

[1] See for a more detailed discussion chapter "Technology Assessment as Constructive Design and Governance" in this book.

specific “search strategies” of engineers, determining to some extent the development trajectory of a given regime. Rip and Kemp (1998) added to the „grammar“ of a regime explicitly the public and private strategies and policies of relevant actors: Technological innovation is socially constructed, including the governance of a regime.

Scholars combined these conceptual elements into the heuristic of a „multi-level-perspective“ on socio-technical transitions (e.g. Geels and Schot 2007), characterised by niche innovations on a micro-level (developing in emerging or created and protected incubation spaces), socio-technical regimes on the meso-level, and wider socio-technical landscapes on the macro-level (macro-economic, cultural and macro-political developments). Studied with the help of this heuristic one can see regime transitions, sometimes incremental sometime radical, sometimes driven by basic changes in the overarching landscape, or stimulated through niche innovations undermining dominant regimes (see exhibit 1 in chapter on CTA in this book). Such transition processes are spurred by promises and expectations about technological options and innovation (van Lente 1993). Actors anticipate and assess their options vis-à-vis changing regimes and create de facto new patterns governance triggering “irreversibilities” (Callon 1991). In short, socio-technical regimes are determining the leeway of actors to steer innovation processes, in other words the “governance”: This concept is a heuristic, borrowed from political science, denoting the dynamic interrelation of involved (mostly organized) actors, their resources, interests and power, fora for debate and arenas for negotiation between actors, rules of the game, and policy instruments applied (e.g. Kuhlmann 2001; Benz 2007).

In a stylized description of the innovation journey (see exhibit 2), *three types* or clusters of governance activities can be distinguished where the innovation journey enters into a new phase because a trajectory with its own dynamics is started up: build-up of a *protected space*, stepping out into the *wider world*, and *sector-level changes* (vertical dimension in exhibit 2), each cutting across activities in scientific *research*, *technological* development and *markets*, regulation and societal context (horizontal dimension in exhibit 2). “Each phase has its own dynamics and the trajectory is not easy to modify. But just before ‘gelling’, it is still possible to exert influence, while there is some assurance that a real difference will result because the intended shift becomes part of the trajectory” (Rip 2010).

An *example* of a successful innovation journey (actually several journeys) is provided by *Xsens*[2]. Today Xsens is a leading developer and global supplier of 3D motion tracking products based upon miniature inertial sensor technology. The company was founded in 2000 by two graduates of the University of Twente, The Netherlands. Inspired by the possibilities of tiny motion sensors for measurement of the performance of athletes, they specialized in sensor technologies and sensor fusion algorithms. In 2000 Xsens launched its first measurement unit which was used for human motion measurement and industrial applications. After more than ten years of experience and several trips

[2] The text of this paragraph draws on http://www.xsens.com/ and http://en.wikipedia.org/wiki/Xsens (09 January 2012).

and setbacks along 'uncharted rivers', Xsens today is recognized for its motion tracking and motion capture products with best-in-class performance, outstanding quality and high ease-of-use. Clients of Xsens include Electronic Arts, NBC Universal, INAIL Prosthesis Centre, Daimler, Saab, Kongsberg Defence Systems and many other companies and institutes throughout the world. Xsens is working with many industry partners, including Autodesk, Sagem and Siemens.

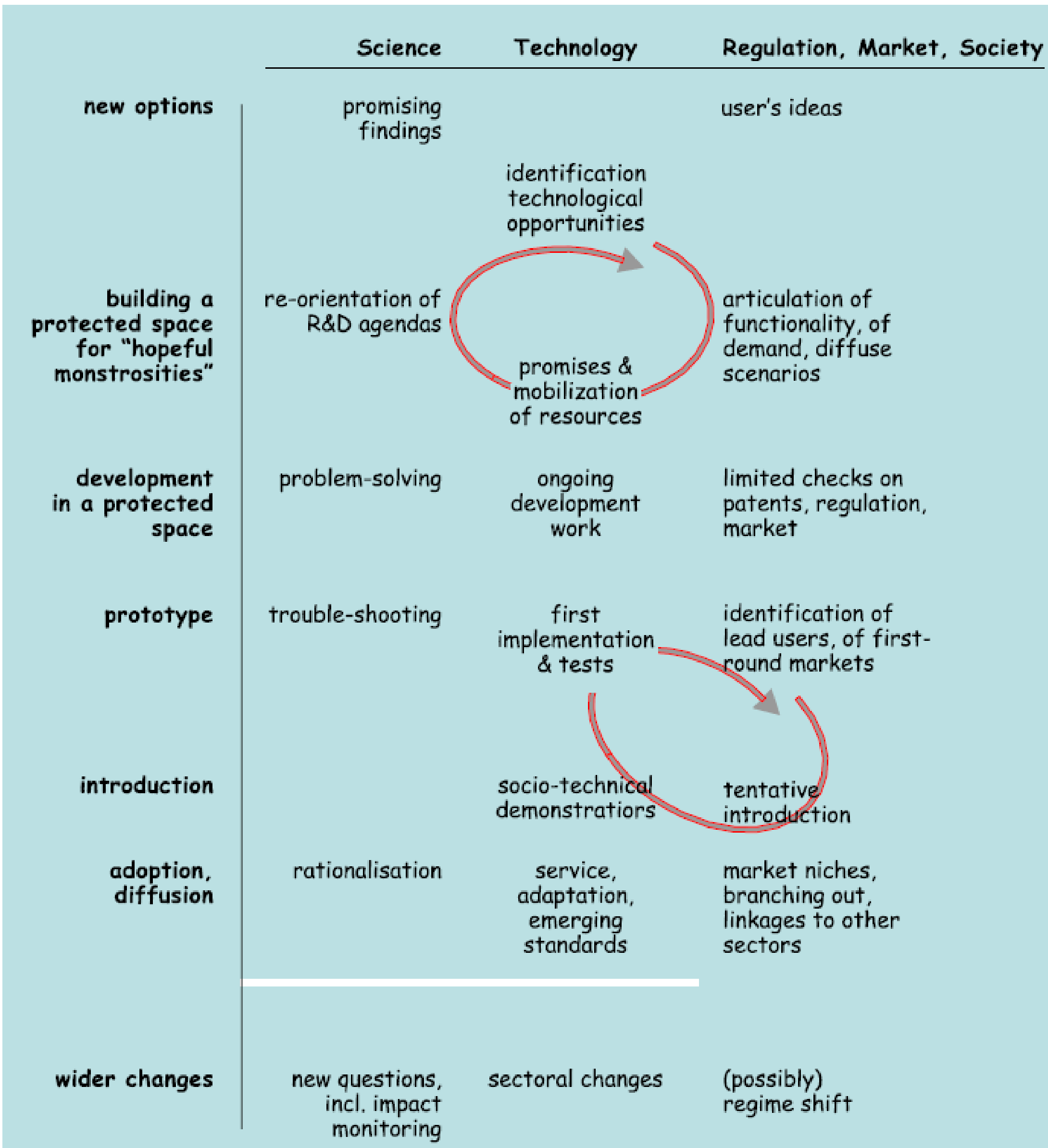

Exhibit 2: Mapping the Innovation Journey in Context (Rip & Schot 2002)

As an innovation actor, Xsens navigated through all three stylized phases of a journey: building-up of a protected space; stepping out into the wider world; and sector-level changes: (1.) The company started with a promising technological option (inertial tracking) with a potential to be developed in numerous directions. In 2000 the founders depended on other partners and explored various market niches – in this case there was almost no 'protected space', facilitated by a parent organisation, e.g. a large company, or by public innovation policy (in other cases, say the windmill energy technology in Denmark and Germany, facilitated by electricity feed-in law; see Hendry and Harborne 2011). But through exploration and learning Xsens experienced quite some cumulative development. Initially the company tried to launch the human motion measurement devices as speedometer for joggers, assuming that joggers are always ready to spend money for trendy gadgets; this failed. Shortly afterwards the innovators explored the application of the tracking sensors with handicapped people. (2.) This helped to make steps towards the integration of several 'motion trackers', which facilitated applications with ergonomic research in industry, creating again new application potential – the scope of achieved and accepted innovations made it possible 'to step out into the wider world'. (3.) One of the most successful products – developed after several setbacks and learning loops – the MVN Inertial Motion Capture suit[3], a cost efficient system for full-body human motion capture. Moven is based on unique, state-of-the-art miniature inertial sensors, biomechanical models and sensor fusion algorithms. Meanwhile the MVN has found applications in film and commercials, game development, training and simulation, live entertainment, biomechanics research, sports science, rehabilitation and ergonomics – some of the applications even helped to induce sector-level changes.

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[3] See http://www.xsens.com/en/general/mvn (09 January 2012).