Innovation Policy Development and the Emergence of New Innovation Paradigms

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> " *Innovation policy design has to be based on a double principle,* "
> *namely, the existence of real problems hindering innovativeness of*
> *an economy, and the ability of public agents to proactively solve or*
> *mitigate them.*
>
> Charles Edquist, Leif Hommen, and Maureen McKelvey
> *Innovation and Employment: Process versus Product Innovation*

The objective of the present article is to discuss innovation policy issues related to three emerging innovation paradigms: user-driven innovation, open innovation, and value co-creation. It provides a summary of insights based on innovation policy practices and challenges in Denmark. The choice of Danish innovation policy practices is not accidental. In 2008 Denmark implemented 40 different national innovation programs by allocating about 400 million euros. Since the three emerging paradigms have become globally relevant, the discussion of Danish policy development challenges and practices is expected to be insightful for innovation experts from other developed countries that are currently dealing with the adoption of these paradigms.

Introduction

Market competition is becoming increasingly driven by new products, processes, business, and organisational resources that integrate inputs received from customers, suppliers, universities, or other external partners in multiple forms, such as new market insights, new technological knowledge, or through specific customer interactions. Von Hippel (1978; http://tinyurl.com/3aoq3uv) explains this as a move from a *manufacturer-active paradigm*, where the manufacturer of goods survey customers needs using market data analysis to identify new product ideas, to the *customer-active paradigm*, where the manufacturer more actively screens customer needs and generates product ideas based on these customer inputs. This fundamental paradigmatic shift implied a new understanding of innovation management leading to the emergence of at least three new innovation paradigms: user-driven innovation, open innovation, and value co-creation.

User-Driven Innovation
There is no unique way of summarizing the different approaches to user-driven innovation (von Hippel,

2006: http://tinyurl.com/3trcqff; Buur and Matthews, 2008: http://tinyurl.com/5whluou). One example of such summary was provided by the Danish Enterprise and Construction Authority's division (FORA, 2010; http://tinyurl.com/5rt8sdh) for research and analysis focusing on the development of proposals for business and innovation policy. It defined a user-driven innovation framework consisting of four main areas: user tests, user exploration, user participation, and user innovation. User innovation takes place when companies actively involve experts or advanced users in some of the key steps of the innovation process. In many cases, users are more knowledgeable on specific areas regarding specific products or services (von Hippel, 2006; FORA, 2010). Here, users are actually able to innovate for themselves and not only provide feedback to a specialized manufacturer (von Hippel, 2006). The user innovation area includes the *lead user approach* as suggested by Eric von Hippel (2001; http://tinyurl.com/3dwqxlw). Lead users can be found based on a systematic search using well-defined criteria or within the activities of existing innovation-driven communities. They are users (but not necessarily customers) that are ahead of a trend by having spent the time and resources to develop their own solu-

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tion and at the same time would have a much greater use benefit from the commercial implantation of a given innovation. Companies gain insights from lead users and therefore have better chances to overcome the challenges with "sticky information" (von Hippel, 1994; http://tinyurl.com/3tsw3t3), which is information that is costly to acquire, transfer, and use in a new location.

The user innovation approach also includes the development of *innovation toolkits* (Jeppesen, 2005: http://tinyurl.com/6hezgg8; von Hippel, 2001; Piller & Walcher, 2006: http://tinyurl.com/6zfykzh). Companies using toolkits set up a framework where the users are empowered to create their own products with the features they need. Well-designed innovation toolkits could be of great benefit for both users and manufacturers in sectors where the user needs are rapidly changing (von Hippel, 2001) and it is therefore more difficult for the manufacturers to keep ensuring that their products meet the actual needs of their customers.

The next steps in user-driven innovation need to embrace a more holistic perspective on user heterogeneity and a more refined systematic perspective on using "technology" as an innovation enabler and not merely as a "feature" of the market offer. Technology goes beyond its integration into specific products and services and should be seen as a driver for innovation by the facilitation of real-time analytic capabilities during the collection and processing of larger amounts of data and, at the same time, as providing a platform focusing on the participatory and interactive aspects of innovation processes.

Open Innovation

Recent views on the open innovation paradigm argue for the involvement of a wider range of actors, including firms, universities, and research and technology organisations that may be either public or private. The paradigm has received significant interest from the business community as well as from researchers that have articulated a set of relevant questions but are just beginning the search for the answers. "Firms that commercialise external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market" have adopted the open innovation model (Chesbrough, 2003; http://tinyurl.com/455m3q6). Chesbrough and Crowther (2006; http://tinyurl.com/4xjse3r) deepen the understanding of openness by pointing out that open innovation involves flows in two directions; first "the inbound open innovation which is the practice of leveraging the discoveries of others",

and second outbound open innovation where firms "look for external organizations with business models that are better suited to commercialize a given technology than the firm's own business model". Simard and West (2006; http://tinyurl.com/3oftvn2) point out that "in open innovation, some firms need to identify external knowledge and incorporate it into the firm; others seek external markets for their existing innovations".

Fundamentally, open innovation leads to: i) the reactivation of internal capabilities by complementing them with external inputs, and ii) the identification of potential new sources of returns from projects that no longer fits firms' strategies.

Pisano and Verganti (2008; http://tinyurl.com/67bcd3b) distinguish between the truly open collaboration that can include virtually anyone in the architecture (the participant decides to participate, as seen, for example, in crowd sourcing) and closed networks, where (normally) it is a company or existing consortium that decides whom to select and include in the innovative activity. The first type of network innovation, involving companies, academic researchers, and others, has increased and many central corporate laboratories have become more open to various types of cooperation of this type. Nonetheless, it is generally still the latter approach that is seen as providing the primary evidence for open innovation practices.

Value Co-Creation

Value co-creation is an emerging business, marketing and innovation paradigm describing how customers and end users could be involved as active participants in the design and development of personalized products, services, and experiences (Prahalad and Ramaswamy, 2004: http://tinyurl.com/3up3mhr; Etgar, 2007: http://tinyurl.com/3h75f4c; Payne et al., 2008: http://tinyurl.com/3by88xx). It is based on the design and development of customer participation platforms, providing firms with the technological and human resources, tools and mechanisms to benefit from the engagement experiences of individuals and communities as a new basis of value creation. The active participation of customers and end users is enabled through multiple interaction channels, very often by means of technological platforms through the Internet (Sawhney et al., 2005: http://tinyurl.com/62sm59n; Nambisan and Nambisan, 2008: http://tinyurl.com/6dwt78w; Nambisan and Baron, 2009: http://tinyurl.com/6bpnnw7). The advancement of information and communications technologies (ICT) enabled customers to be much more active,

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knowledgeable, globally aware, and willing to use interactive virtual environments to personalize the existing and shape new products and services. The multiple channel open interaction and dialogue between the firm and its customers, between the firm and its suppliers and partners, between the different customers, and between the customers and firms' suppliers and partners, constitute a fundamental part of the value co-creation philosophy. The emergence of the value co-creation paradigm creates unprecedented opportunities for firms in dealing with the impacts of the ongoing globalization processes, which include a much faster degree of technological change; the necessity to be more innovative and, therefore more competitive, by accessing and managing globally distributed resources; and the need to enhance their international competitiveness by addressing multiple markets and heterogeneous customer needs within and across different market segments (Prahalad and Krishnan, 2008; http://tinyurl.com/4yowma2). The ability of value co-creation platforms to enable the personalization of new products and services challenges the operational regime of traditional marketing by moving it to a new service-dominant logic (Vargo and Lusch, 2004; http://tinyurl.com/3enpsr7), which redefines the terms of existing market segmentation techniques (von Hippel, 2006) and enables firms to address a broader market with a higher degree of customer satisfaction.
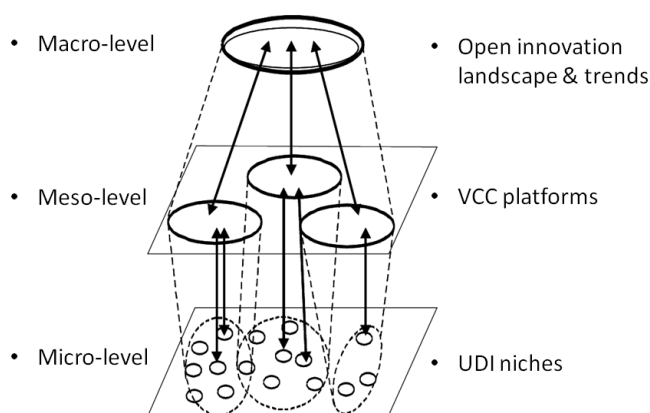
The new dominant logic of marketing entails a new vision of the topology and the dynamics of the entire value creation system (Hearn and Pace, 2006; http://tinyurl.com/4u9ldxn). Such vision promotes a new understanding of the customer centricity of traditional value networks which are now considered dynamically, as people-driven webs of potential value configurations that could be actualized on the basis of specific customer demands (Norman and Ramirez, 1993: http://tinyurl.com/3j9d6cy; Flint and Mentzer, 2006: http://tinyurl.com/3de4uvw; Gattorna, 2009; http://tinyurl.com/3w5dpju). The dynamic recognition and alignment to highly heterogeneous customers and customer groups requires the development of appropriate technological infrastructures that are able to seamlessly integrate contributions from globally distributed resources to real-time analytics information and flexible business processes (Prahalad and Krishnan, 2008). Technology, therefore, plays a double role in value co-creation: it could be part of the specific products and services, but more importantly, it becomes a key enabler of co-creation experiences inde-

pendently of the industry sector and of the nature of the particular products and services. In other words, it is becoming even more pervasive than before, although within a completely different context.

A Comparison of the Three Paradigms

Comparing the three paradigms is a challenging task since they seem to express different and, at the same time, interrelated visions about business innovation practices. They could be considered as three complementary perspectives on an emerging stronger market-driven vision about the management of innovations. The three perspectives can be visualized by means of a multi-level framework (Warnke et al., 2008; http://tinyurl.com/3w47b6w) that distinguishes three analytical levels: innovation niches, regimes, and landscape (Figure 1). The first micro-level is that of user innovation niches – specific places, or smaller technological sectors, in which novelties are created and developed, building on learning processes among producers and users of a specific product or technology. Such niches are the most appropriate places to position the user-driven innovation paradigm. The second level is the meso-level of regimes. A regime refers to the dominant practices, rules, and technologies, including the logic of appropriability pertaining to the domain, giving it stability as a platform for guiding decision-making. There could be different types of sub-regimes, such as technology regimes, production regimes, marketing regimes, user regimes, or policy regimes (Warnke et al., 2008).

Figure 1. Multi-level representation of the user-driven innovation (UDI), value co-creation (VCC), and open innovation paradigms

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The second meso-level seems to be the proper place for the positioning of the value co-creation paradigm with its dominant customer participation and marketing orientation building on linkages to the first innovation niche level. The third level is the socio-technical landscape (i.e., the wider context or environment in which the regimes are embedded). The landscape consists of the social values, policy beliefs, worldviews, political and business coalitions, and dominant IP appropriability culture, but also the physical and geographic settings, prices and costs, trade patterns, and incomes in which processes of regime change are embedded. In our view, this is the place to position the open innovation paradigm. It can be seen as the existential fabric of the first two levels that could be potentially influenced in the long-term by the transformative changes in the dominant marketing regime empowered by advancements in specific user innovation niches.

Policy Issues Relevant to the Three Paradigms

The emergence of the new innovation paradigms definitely challenges existing national innovation policies. At the same time, while the three paradigms are relatively new worldwide, some countries and organisations did already develop some initial policy responses aimed at their more systematic promotion. The insights suggested here were derived from an analysis of the recommendations discussed by policy related organizations in Denmark. The focus on Denmark was driven by the existence of multiple national innovation programs that provide a good basis for reflection on policy issues. For example, the Danish program for user-driven innovation aimed to strengthen the diffusion of methods for user-driven innovation by focusing on a broader, multiple-stakeholder innovation perspective. The program had a yearly budget of 13.4 million euros and ran for four years between 2007 and 2010. It was administered by the Danish Enterprise and Construction Authority, which is part of the Danish Ministry for Economic and Business Affairs. After looking at the existing Danish policy framework, five areas were found to be particularly relevant to the three emerging innovation paradigms. These areas are:

1. Innovation support (targeted innovation programs)

2. Innovation networks (matchmaking between companies and in some cases knowledge institutions)

3. Education and competencies (the development of new skills related to innovation)

4. Entrepreneurship (enhancing the creation and growth of new companies)

5. Intellectual property (IP) issues

The five areas are not unique to the Danish innovation environment. Therefore their discussion will be highly relevant for other developed countries dealing with the implementation of the three emerging innovation paradigms.

1. Innovation Support
National innovation policy strategies emerge within the context of the different innovation programs that are offered by various ministries. While there are usually multiple programs focusing on innovation, most often the dominant perspective is technological. Such dominance implies the need of broadening the innovation policy development perspective by, first, adopting a more holistic business innovation philosophy and, second, by promoting practices enabling the adoption of the three emerging innovation paradigms. For example, promoting mechanisms enabling and enhancing users' participation in innovation by creating relevant infrastructures and platforms has thus far not been an area of any substantial policy focus and could become a relevant innovation policy area to target in the future.

2. Innovation Networks
Policy organizations highlight the need to foster networks and partnerships among companies, as well as between companies, the public sector, and other research organisations. Typically, innovation networks are seen as part of a vision that has two main targets: i) more innovative businesses, and ii) an enhanced knowledge-sharing mechanism between public and private institutions. While most networks are sector specific, there are already multiple examples of networks created around the experimentation with new innovation methods. On average, the total funding received by innovation-related networks has increased over the last few years. However, to enhance the ongoing emergence of the three paradigms, a much more structured governance of the networks should be used (Pisano and Verganti, 2008). The focus on the need for more efficient network governance is a key issue across the developed world.

3. Education and Competencies
Most of the developed countries need to enhance their educational systems by gearing them towards the creation of new skills and competencies that could enable

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or enhance user and employee involvement in innovation processes. The problem is that educational systems usually fall outside of the ministries that formulate innovation policy. In addition, any potential changes in the educational system would only underline the need to formulate broader national innovation strategies cutting across and integrating the efforts of the various ministries. While there has been a stress on the need to add entrepreneurship to the teaching agenda in schools and universities, little attention has been paid to preparing graduates for the newly emerging types of workplaces and innovation tasks. Fortunately, there is a visible trend in the development of program components to teach students how to work in multidisciplinary teams and obtain new skills that will enable them to be innovative employees and leaders.

4. Entrepreneurship

During the last decade, entrepreneurship has become a hot topic for policymakers worldwide. Many developed countries perform relatively well in terms of the amount of new companies that have been formed. In addition, there is a growing trend related to the development and implementation of innovative business-creation programs. However, there is a common weakness when it comes to both sustaining the businesses and enabling growth among startup companies. There does not seem to be a clear understanding of the type of policies that are necessary to create innovative companies by enabling them to become globally successful and ensuring efficient job creation and stability.

5. IP Issues

Creating a new system for IP and copyright rules, as well as the adoption of a more open entrepreneurial orientation by both new and existing firms, were also mentioned as relevant policy areas that could enhance the adoption of open innovation practices. While reforming the IP system is vital to enhancing the adoption of new innovation paradigms, it is not an issue to be dealt with on a purely national level. The entire discussion of intellectual property rights must remain high on the political agenda. Why is this the case? To answer this question, one could point out that a patent owner is granted the right to exclude others from commercially using, selling, offering, and keeping in stock an invention as specified in the claim section of the patent (Junghans and Levy, 2006; http://tinyurl.com/3wme7hx). In return for these exclusive rights, the patent owner is obliged to make the patent available to the broader audi-

ence, which is secured by the patent authorities publishing the patent documents a period after the application date. The fundamental rationale for granting intellectual property rights to innovators is to increase private investment in innovation. However, it is also known that there is a social welfare loss caused by the owners restricting the use of their legally protected information in order to increase private profits. In other words, intellectual property rights are thought to be good for innovation and bad for competition (von Hippel, 2006).

Furthermore, it is important to understand that the company can protect one particular technology from being exploited by other companies through the patent application. However, it is more often becoming the case that the inventor of the technology attempts to "disguise" a real invention by "patenting around" the original invention. Already in the early 1980s, when researchers really started to use patents to assess firm technology strategies, the situation of defensive patents surrounding the core patent was highlighted by Campbell (1983; http://tinyurl.com/3auj6z9) as a key issue. Campbell also described how competitors may position offensive patents close to the defensive ones. This practice has two implications. First, the company can hide the invention and thereby gain a competitive advantage based on time before the competitors discover the patent, which ultimately may provide the company with additional profits. Second, the cost of inventing around the patent carries large costs for the patent granting authorities, but also for general knowledge generation in the society.

These practices underline the particular challenge of developing an effective patenting system, and it is therefore our argument that a well-functioning international patent system is needed both in order to lower the cost of applying for protection, but also to ensure an effective protection of the invention. However, as mentioned earlier this is not a task for a single country, but should be a coordinated international effort. It is quite vital that, while opening up the innovation process, companies are encouraged to reveal proprietary knowledge to collaborators. The current trend towards a changing weight of the innovation ingredients (from technologies towards other types of innovation sources) as well as towards more open and collaborative paradigms raises the question about the proper IP protection systems.

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Conclusions

This article addresses the question of how national innovation policies may reflect the emergence of three new innovation paradigms: user-driven innovation, open innovation, and value co-creation. Five areas were found to be particularly relevant to the three emerging innovation paradigms: innovation support, innovation networks, education and competencies, entrepreneurship, and intellectual property issues. The discussion of these five areas leads to the conclusions that, even though many national innovation policy organizations have taken significant steps towards promoting a modern innovative business environment, the new innovation paradigms can only to a certain extent spread and flourish under the current innovation policies. Hence, there are still areas that need to be addressed with new and improved policies. Another important conclusion is that new innovation policies will prove relevant and highly impactful only if they are developed within the context of integrated national innovation frameworks.

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