

## Chapter 3

# Industrial Informatics and the Ecology of Innovation: IS Innovation Processes

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### ABSTRACT

*The chapter provides an integrated view of value creation in the development of new products and services related to ICT. The authors argue that innovation ecologies are key aspects for enhanced innovation processes. Building on early experiences from a project focused on the innovation ecologies of its wide range of R&D projects the authors ask how such a focus can help organizations utilize important resources in an open innovation system and guide universities – as driving engines in R&D activity systems – to become key players in open innovation systems and simultaneously radically improve milieus for research and education. Exploring the outcome from the project and how customers are integrated into value creation processes during the course of design and use, we argue that innovation systems management and customer integration are important assets not only to increased efficiency and quality, but also for enhanced innovation. The authors coin the term ‘ecology of innovation’ to sum up the potentials related to innovation and value creation.*

### INTRODUCTION: INFORMATICS AT ‘THE AGE OF INNOVATION’

Agile manufacturing, customer relationship management and mass customization are strategies that have enjoyed increasing attention in the literature during the last decade (e.g. Sahin 2000, Piller 2003). Despite different foci, these new concepts related

to value creation share in common the ambition to provide ways of enabling companies to increase cost efficiency along the value chain while simultaneously increasing the company’s ability to react to changing customer needs. They are approaches to innovation designed to improve and strengthen the value creation process related to the customer.

Open Innovation can be seen as a response to the necessity of constant innovation and the decline of the so-called closed innovation model (for a

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discussion, see Chesbrough, 2003, 2006). Several factors have led to the erosion of the closed innovation model during the past few years. Critical sources of knowledge exist outside the research laboratories of large companies; this is a fact that has to be acknowledged and addressed by large companies as well as by small firms collaborating with large companies. In addition, as employees change job positions they also effectively take their knowledge with them, resulting in knowledge flows between competing firms. We can also see how possibilities to further develop ideas and technologies outside the firm (in the form of spin-offs or through licensing agreements) are growing rapidly. And, arguably most importantly, other actors in the value chain, for instance customers and suppliers, play increasingly important roles in today's innovation processes. Closed innovation – innovation within the firm's boundaries – is just not working anymore.

Growing attention has been devoted to the concept of Open Innovation, both in academia as well as in practice. Chesbrough (2003) describes how many companies have shifted from closed innovation models towards a more open way of innovating during the past few years. Open Innovation is focused on how to combine internal and external ideas as well as internal and external paths to market to advance the development of new technologies.

Living Labs can be seen as new arenas for innovation, responding to the opportunities identified through open innovation models but also proposing a way to move university research out in the wild. Originating from Professor William Mitchell at MIT Media Lab and School of Architecture and city planning, Boston, the concept of Living Lab has been described as “a user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts” (Eriksson et al, 2005, p. 4). In this paper the Living Lab approach is considered as an approach to support and implement processes of open innovation in the

context of academy-society collaboration projects, and, as a part of this endeavor, suggest roads to new environments for academic research and education. Further, Living Labs are considered to be interesting frameworks of innovation systems focusing on communities of people.

In this chapter we have adopted the view that universities have a great potential to develop significant roles in innovation processes by establishing partnerships with firms and individuals that are seeking ideas and knowledge originating outside their normal scopes. During the last decade universities both in Europe and in the US have struggled to be competitive in terms of research and education quality. The role of the university in contemporary society has radically changed during the past few decades and the ‘ivory tower’ type of university does not exist anymore. The change has been described by Gibbons as a change towards a role more sensitive towards societal needs where university research and education cater for external societal needs (Gibbons et al., 1994). While universities are reported to struggle in making this transition, some good examples exist where innovation systems – involving research units, educational programs, and external commercial parties – co-exist in a way that makes each innovation system component better off (Saxenian, 2006). In this paper Industrial Informatics is considered a vehicle to improved research and education, as part of universities developing as innovation systems partners.

We argue that an approach focusing on the design and use in value creation constellations – using and developing further the open innovation model – is the only way to go for individual firms and at the same time offers a unique opportunity to universities to improve. However, we need to move the discussion related to *why* we need to innovate, or *what* the innovation goals should be, to practical questions related to *how* we should go about this innovation process. The research questions for this paper is: How can an approach, focused on innovation ecologies, help organiza-

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