CINet Research Papers

# Enabling Knowledge Processes in Innovative Environments

ICT as a Trigger for Changes in Knowledge Management

Sara Pavesi


Serial number: 2005-3

# ENABLING KNOWLEDGE PROCESSES IN INNOVATIVE ENVIRONMENTS

## ICT AS A TRIGGER FOR CHANGES IN KNOWLEDGE MANAGEMENT

Problem definition and purpose of the study

Published by:
Continuous Innovation Network
www.continuous-innovation.net



ISBN 90-77360-03-4

## The Continuous Innovation Network

The Continuous Innovation Network (CINet) is a global network that brings together researchers and industrialists working in the field of Continuous Innovation. CINet is a continuation of the European Continuous Improvement Network, started in 1993. In 2000, the mission of EuroCINet was reformulated and its name changed to CINet, a research network on Continuous Innovation. These changes facilitate the dissemination, not just within but beyond Europe, of a new way of thinking about the integrated management and organisation of day-to-day operations, improvement and learning, and innovation and change.

## The CINet PhD Network

CINet has developed a PhD network, which promotes research collaboration among PhD students and their institutions on topics of interest to CINet. In detail, the network objectives are as follows:

- To promote the development of research on continuous innovation and its applications to enhance companies' effectiveness and better use of human resources for more sustainable organisation of work.
- To facilitate research integration and mobility on a global level.
- To enhance research quality and, in particular, to promote synergy and collaboration on empirical research.
- To promote a better quality of PhD training and supervision.
- To promoting joint research programmes involving companies and academia offering the prospect of rigorous training and exposure of PhD students.

The CINet is unique for its focus on innovation management as well as for the specific vision that is shared by partner institutions concerning the role and potential contribution to innovation and improvement of human resources at all levels.
Characteristic for the CINet PhD network, relative to other PhD networks, is its strong emphasis on implementation and collaboration with industrial users. Students work in close collaboration with companies to analyse and solve management problems. Research designs involving in-depth empirical studies and action or clinical research are therefore encouraged. The PhD students involved in the CINet receive an intensive training to cope with concrete management issues. All the students who were so far rewarded a CINet-based PhD degree easily found their way to highly valued positions in industrial companies, in research insitutes or as consultants.

**Previously published in this series**:

- GIESKES, J.F.B., *Closing the research cycle, verifying the underlying assumptions of the CIMA model on stimulating learning in product innovation processes,* 2003. (nr. 2003-1)
- RONCHI, S., *The effects of the internet adoption in customer-supplier relationships. The markets - vertical alliances divergence and the emergence of collaborative markets*, 2003. (nr. 2003-2)

# ENABLING KNOWLEDGE PROCESSES IN INNOVATIVE ENVIRONMENTS

## ICT AS A TRIGGER FOR CHANGES IN KNOWLEDGE MANAGEMENT

**Sara Pavesi**

MIP Politecnico di Milano
via Garofalo 39
20133 Milan
Italy
pavesi@mip.polimi.it

# Table of contents

Table of contents ..... vii
1. Problem definition and purpose of the study ..... 9
1.1 Introduction ..... 9
1.2 Goals of the study and research questions ..... 11
2. The background of the research ..... 15
2.1 Theoretical background ..... 15
2.2. The contribution of preliminary research works ..... 26
3. The research design ..... 29
3.1 The overall structure of the research work ..... 29
3.2 The methodology in the research ..... 34
4. The identification of the knowledge management configurations ..... 37
4.1 Introduction ..... 37
4.2 A process perspective for knowledge management ..... 38
4.3 The research setting ..... 40
4.4 The investigation framework ..... 41
4.5 The operationalisation of the framework ..... 41
4.6 the identification of knowledge management configurations of consultancy companies ..... 44
4.7 The interpretation of results ..... 47
5. The role of innovation strategies for knowledge management ..... 51
5.1 Introduction ..... 51
5.2 The dimensions of innovation strategies ..... 51
5.3 The innovation strategies of the consultancy companies ..... 52
5.4 A contingent approach for knowledge management configurations ..... 55
5.5 Summary of results ..... 57
6. Refining the results through the longitudinal case studies ..... 59
6.1 Introduction ..... 59
6.2 The research methodology and the research setting ..... 59
6.3 The adoption of km configurations in other professional environments ..... 60
6.4 The analysis of the alignment between innovation strategy and configurations ..... 63
6.5 The longitudinal cases research ..... 64

6.7 Summary and conclusions....67
7. The analysis of configurational change....69
7.1 Introduction....69
7.2 The action research methodology....69
7.3 The development of the case of company K....70
7.4 The phases of the development of the knowledge management system....73
7.5 Discussion of the action case and results....76
7.6 Summary and conclusions....83
8. Implications of findings for theory and practice....87
8.1 introduction....87
8.2 Reflection on the methodology....87
8.3 Contributions of the research....90
8.4 Notes for further research....94
8.5 A final comment....96
Appendix 1: Propositions....99
Appendix 2: References....107

# 1. Problem definition and purpose of the study

## 1.1 Introduction

*"In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge" (Nonaka, 1991, p.96).*

*"To be a leader in global manufacturing in the 1990s, a company must excel in two seemingly contradictory ways. First it must constantly build and refresh its individual areas of expertise so it has the critical capabilities needed to stay ahead of the pack. And second, it must get its mix of disciplines to work in the ever changing way needed to prevail in the ever changing competitive advantage" (Leonard-Barton et al., 1994, p.121).*

The concept of organisational knowledge, as a valuable strategic asset, has become quite popular recently. Organisations are being advised by management theorists that, in order to remain competitive, they must efficiently and effectively create, capture, harvest, share and apply organisational knowledge and expertise. (Nonaka, 1991, p.96).

Several issues make the concepts of knowledge and knowledge management extremely challenging and difficult to analyse. First of all, knowledge always begins with an individual (Kim, 1993) and it is not a corporate resource. However, personal knowledge can be transformed into organisational knowledge valuable to the company as a whole (Nonaka, 1991). The purpose of knowledge management is to enhance a firm's performance by designing, implementing, maintaining and improving a system that supports the organisation's knowledge processes (Davenport et al. 1998). Making personal knowledge available at the company level is the real challenge of knowledge-creating companies that have to deal with the issue of tacit knowledge (Polany, 1966). This exists in mental models, beliefs and perspectives; so ingrained that they are taken for granted and cannot be easily articulated (Nonaka and Takeuchi, 1995).
Moreover, knowledge and learning go hand in hand. Defending and enhancing a given knowledge position is most effectively accomplished by continuous organisational learning. The ability of an organisation to learn, accumulate knowledge from its experiences, and reapply that knowledge is, in itself, a skill that can provide competitive

advantage (Zack, 1999b). The question that arises concerns the relationship between learning and accumulated knowledge and innovation. Companies have, today, to confront themselves with a number of "intertwined changes in their environments" (Boer, 1991) which require the ability to innovate their processes and products but, at the same time, achieve results in terms of efficiency, quality and flexibility. How can accumulated knowledge therefore contribute to manage these changes efficiently and effectively? The question becomes much more critical when seeing the traditional issue of learning as the repetition of tasks (Boston Consulting Group, 1968; Abernathy and Wayne, 1974): if repetition of tasks (and therefore learning) improves company performances, how can learning take place and be exploited in innovative environments where there is much less repetition of tasks?

Finally, in the past, knowledge has been treated somewhat like air: it is ubiquitous, invisible, taken for granted and never explicitly valued or managed. However, in today's business, firms must explicitly address a range of decisions regarding the creation, development, and maintenance of their knowledge resources and capabilities. The problem is that very little theory has addressed the issue, and moreover there is yet little solid guidance for the practicing manager. The relevance of knowledge is widely recognised (Wernerfelt, 1984; Leonard-Barton et al., 1994; Collis and Montgomery, 1995; Wijnhoven, 1999); but how it can be managed remains an unexplored issue. Recently, however, a growing number of contributions have addressed the processes and infrastructures for sharing and codifying knowledge, especially using new forms of "Information and Communication Technologies" (ICT). These efforts are extremely challenging, but at the same time they have merely addressed the technical applications of ICT (Conklin J. (a), 1996; Bradshaw et al., 1997; Croasdell, 1997), ignoring their impact on the overall organisation.
The thesis considers *how knowledge processes can be supported in innovative and knowledge intensive environments, with particular emphasis on the role of ICT*. The research especially focuses on managerial activities and decisions that help companies in stimulating knowledge processes; on how those decisions are related, with specific focus on ICT; and how they relate with the innovation strategy of the companies.
The research arrives at a set of propositions on sets of managerial activities and decisions: how these decisions are related to each other, what are the expected results according to the innovation strategies of the company, how they contribute to developing new innovation strategies. Two remarks have to be made right at the start: choices concerning ICT in this research are not considered to be the only decisions; they have to be related to all the other managerial decisions for stimulating knowledge processes. ICT will result in a trigger, but is not the only enabler. Secondly the relationship among decisions will be investigated by exploring change: triggered by ICT, the changes in the other decisions, performances and innovation strategies will be investigated and explained.
The thesis stems from a collaboration between the University of Twente and Politecnico di Milano, which have been involved (and still are) in joint EU-funded research projects about topics of common research interest such as organisational learning, knowledge management, and product innovation management. In particular, my collaboration with the team at University of Twente started with the experience of the CIMA project, which is also a very important input for this thesis.