Enhancing the Effectiveness of Knowledge Management Systems: Using Grounded Models of Knowledge-Intensive Work Processes

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INTRODUCTION

This paper aims to present the author's research interest and plans in relations to his doctoral studies. His research work focuses on the modelling of knowledge-intensive work processes for guiding the design and development of knowledge management systems (KMS) that fit an organization's particular knowledge flow pattern. Research will be undertaken as a multiple case study using knowledge-intensive organizations as an empirical setting.

THE CONTEXT

The changing business environment and the globalization of exchanges have greatly contributed in modifying the economical landscape. Consequently, the way in which organizations operate is becoming an ever-changing process resulting in the emergence of new business models.

Presently, because capital intensive and labour-intensive firms are moving to emerging countries like China, India, and Brazil, western countries are increasingly relying on knowledge-intensive organizations (KIOs) in order to maintain their competitive edge.

In knowledge-intensive organizations (KIO), as opposed to capital intensive and labour-intensive firms, knowledge is more important than other inputs, and exceptional and valuable expertise dominates commonplace knowledge (Starbuck, 1992). KIOs are more likely to be service firms or production firms with a strong service orientation (Roberts, 1999).

Ranging from global consulting firms to technology companies, KIOs are mainly composed of highly qualified experts. The work done by these experts consists primarily in gathering information, know-how, and feedback from three sources: from interpersonal exchanges; from reading, analyzing and applying this knowledge; and in delivering written and oral conclusions to their colleagues and clients (Haas, 2006).

Given the complexity of the projects that they undertake, these experts need to integrate knowledge that comes from either their colleagues or from external sources. To facilitate this integration, KIOs have invested substantial resources in knowledge management initiatives, typically in the development of information systems intended to capture, store and share knowledge about specialized topics (Haas, 2006). The systems that are designed specifically to facilitate the sharing and integration of knowledge are referred to as knowledge management systems (KMS) (Alavi and Leidner, 1999). They usually include the three following components: storage and retrieval, collaboration, and communication technologies.

THE PROBLEM

Despite the massive investments in KMSs, these systems do not always result in project teams performance improvements (Haas, 2006). Because KMSs are just beginning to appear in organizations, little research exists to guide the development and implementation of such systems or to set expectations of the potential benefits of such systems (Alavi and Leidner, 1999).

In fact, KMSs are conceptualized along the traditional information-processing model that promotes knowledge management that emphasizes convergence and compliance in order to achieve pre-specified goals (Malhotra, 2000). However, this model's underlying objective of obtaining greater efficiencies through optimization and routinization of pre-specified goals is increasingly not suitable for organizations that experience discontinuous environmental change, ambiguity, overload and politics (Haas, 2006; Nadler et al., 1995). Thus, KMSs modeled on the information-processing paradigm could be inappropriate for capturing the specificities of knowledge-intensive organizations such as: non-routine work processes, lateral coordination prevalence in work teams, constellations structure of value-creation processes, blurred boundaries determined not by formal structure but by interaction patterns, self-organization, etc.

In addition, systems in the information-processing view are mostly designed around organization information flows. But where teams of knowledge specialists from different disciplines are required to perform non-routine work, the flow and processing of knowledge becomes at least as important as the flow and processing of information (Nissen et Levitt, 2002; Allen et al., 1990). Given that KMSs are systems dedicated specifically to facilitate the sharing and integration of knowledge, it would be better to design them around knowledge flow rather than data flow. Indeed, there are a large number of knowledge management models found in the literature. Each one of them uses its own terms (sharing, transferring, disseminating, etc.) to label knowledge processes. But beyond the diversity of terms used to describe them, these processes all express the idea of knowledge flowing from one entity to another. Consequently, knowledge flow seems to be a pivotal concept to harness different knowledge activities. In other words, in order to design a robust KMS that fits the needs and specificities of knowledge-intensive organizations, we must have a profound understanding of how to represent and simulate knowledge flow processes in modern enterprises (Nissen et Levitt, 2002). The fast emerging knowledge economy provides strong impetus for such an undertaking since knowledge-intensive work now represents the principal means of attaining a competitive advantage across most industries and economic sectors (Drucker, 1995).

However, little is presently known about the phenomenology of knowledge flow. Though many scholars have been interested in studying knowledge-intensive organizations, mainly computational organization theorists, such as the Virtual Design Team (VDT) research group, address the phenomenon of knowledge flow. The VDT research project was launched in the late 1980s with the objective of developing language, theory and tools capable of formalizing work-process modeling. Initially the VDT chose to focus on organizations engaged in routine project oriented task. Research by and Cheng and Levitt (2001) extended the modeling and simulation techniques to address less routine project oriented tasks. Even this extension of VDT has had difficulty in simulating the kind of knowledge-intensive work that is becoming increasingly important in the modern enterprise (Nissen et Levitt, 2002). These last authors, in a collaborative research, built upon the VDT research stream to incorporate emerging work on the phenomenology of knowledge flow using agent-based simulation. Despite the wealth of contribution of these research streams, they do not succeed in capturing the social interactions underlying and shaping knowledge flow patterns. As yet, there is no grounded model of knowledge-intensive work processes that organizations with non-routine work processes can use as a basis to design and implement their KMS. Thus,

we need field research to increase our understanding of how to model the flow and processing of knowledge related to knowledge-intensive work. This new understanding needs to be grounded in data. This is mandatory not only to better design KIOs, but also and particularly to develop and implement robust KMSs that can deliver the tangible benefits expected from them.

RESEARCH GOALS AND QUESTIONS

The general purpose of the research is to describe the knowledge flow patterns associated to the emergent knowledge processes that take place in knowledge-intensive organizations. From this broad purpose are derived the following more specific purposes:

- Understanding the mechanisms underlying the emergence of the observed knowledge flow patterns.
- Modelling different knowledge flow patterns that are typical of complex adaptive processes.
- Developing a KMS design theory, including the formal model, the management philosophy, and the model of organizational relations that define any managerial technique.

In short, the research aims at both describing and understanding the factors that influence the structures of knowledge flow patterns associated with complex adaptive work processes like those that take place in knowledge-intensive organizations.

More precisely, this research plans to address the following questions:

What are the characteristics of the different knowledge flow patterns observed?

What are the environmental, structural, cognitive, political and other factors that shape the knowledge flow pattern observed?

How do these factors interrelate in structuring the flow patterns?

RESEARCH APPROACH AND STRATEGY

Two broad research approaches are generally cited in the litterature: quantitative and qualitative. These approaches include mixed methodologies (Creswell, 1994) and may be conducted under three epistemological assumptions generally named paradigms: positivist, intepretive and critical. Since the goal of this work is to acquire a deep understanding of the phenomenon of knowledge flow in organizations, a qualitative approach will be used. This implies constructing reality through language, cultural location and actions of the people involved. In other words, this work will use a qualitative interpretive approach. Then, the understanding of the phenomenon will be induced from data which are grounded in its context.

RESEARCH DESIGN

In the literature, case study is referred to as a research methodology (Creswell, 1998) or as a research strategy (Yin, 1984; Robson, 1998). A multiple case study in the former sense will be used in this work.

The research design will be twofold.

First, within the multiple case study a grounded theory methodology will be used to identify knowledge flow patterns in at least eight different KIOs, including healthcare organizations, hi-tec organizations, global consulting firms and engineering firms. This will then be followed by an attempt to build a susbtantive theory of knowledge flow in organizations by using multiple stages of data collection through an interactive process of refinement and interrelation of concepts. Doing so, this research will propose grounded models of knowledge flow process, as opposed to those derived from numerical simulation. These grounded models are anticipated to capture the essence of the social interactions governing the knowledge flow patterns. By identifying the contextual factors used to explain the observed knowledge flow patterns, the theory is expected to show sufficient predictive capacity to guide knowlege management systems design and development.

Secondly, considering that the goal of this research is ultimately to guide the design and development of KMSs and that a pure descriptive study would not be sufficient to do so, we will also need to understand how interrelate the different factors that structure the knowledge flow patterns. This implies adopting a systems approach. Moreover, it is worthy to note that KIOs are hybrid systems since they have both bureaucratic and human components. The main characteristic of such hybrid systems is the plurality of viewpoints held by different human components concerning the system's objectives, and even in what the system itself consists of (Lidell and Powell, 2003). Consequently, the systems approach needs to provide not only a practical means of capturing dynamic processes of knowledge flow from data collected in the multiple case study but also needs to inform on the degree to which the actions of the people involved affect the dynamics of the knowledge processes. Thus, to complement the descriptive analysis of the grounded theory, this research plans to use a non-numerical approach of system dynamics known as Qualitative Politicised Influenced Diagrams (QPID) (Powell and Bradford, 1998) .

Systems dynamics use cause-and-effect loops, and influence diagrams to represent processes within a system. By the means of these diagrams, one could visualize the way in which factors or variables affect one another in a dynamic system. These variables need not to be numerical (Powell and Bradford, 1998). Causality is expressed in the form of arrows connecting these factors. Being a non-numerical approach, qualitative system dynamics (QSD) reveals itself to be practical in capturing dynamic processes from responses given in a group environment. *«It avoids the necessity for numerical representation while retaining the causal information contained in influence diagram»* (Liddell and Powell, 2003).

QPID is a recent extension of QSD that works by ascribing agents and actors to the arrows of an influence diagram, allowing the examination of both the roles and motivations in a managed system (ibid). This could be useful not only to understand and predict the dynamic underlying specific knowledge flow patterns but also to put forward effective managerial actions that could enhance the adoption of KMS in the organisations.

SIGNIFICANCE OF THE PROPOSED STUDY

My research will make significant contributions to both theory and practice. First, I expect it will provide the knowledge-based view of organization with models that can help to understand the underlying logic of the dynamic of knowledge-intensive work processes. Second, it will serve as a framework not only for IS designers but also for executive managers to ensure that knowledge management systems they are building suit the needs and the work process nature of their organizations.

Note: The following references are those cited in the text above. For the purpose of this research, we mention that there exists a more comprehensive set of references that covers the different themes that our research touches upon.

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