OMIS-Based Collaboration with Service-Oriented Design

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INTRODUCTION

The success of today's enterprises, measured in terms of their ability to learn and to apply lessons learned, is highly dependent on the inner workings and capabilities of their information technology (IT) function. This is largely due to the emergence of the digital economy (Ghosh, 2006; Turban, Leidner, McLean, & Wetherbe, 2005), characterized by a highly competitive and turbulent business environment, inextricably driven by the intra- and inter-organizational processes and the knowledge processing activities they support. One consequence is the increase in organizations' efforts to deliberately manage knowledge (Tapscott, 1997), especially the intellectual capital (Stewart, 1997) of their employees (De Hoog, van Heijst, van der Spek, et al., 1999), which necessarily deals with the conceptualization, review, consolidation, and action phases of creating, securing, combining, coordinating, and retrieving knowledge. In fact, such efforts must be instrumental to creating an efficient organization model based on some innovative initiative, and then enable the organization to launch and learn. In a knowledge-creating organization (Nonaka & Takeuchi, 1995), employees are expected to continually improvise, and invent new methods to deal with unexpected problems and share these innovations with other employees through some effective channels of communications or knowledge transfer mechanisms. The key is collaboration, implying that organizational knowledge is created only when individuals keep modifying their knowledge through interactions with other organizational members. The challenge that organizations now face is how to devise suitable information systems (IS) support to enable such collaboration, namely, to turn the scattered, diverse knowledge of their people into well-documented knowledge assets ready for reuse to benefit the whole organization. This article presents some service-oriented perspectives of employee-based collaboration through the design of specific IS support called the Organizational Memory Information System (OMIS) in light of the peculiar open-source development initiative of Wiki technology (Leuf & Cunningham, 2001).

BACKGROUND

Lately, an organization's ability to learn is often considered a process of development to organizational memory. By organizational memory (Walsh & Ungson 1991), we are referring to various structures within an organization that hold knowledge in one form or another, such as databases and other information stores, work processes, procedures, and product or service architecture. As a result, organizational memory (OM) must be nurtured to assimilate new ideas and transform those ideas into action and knowledge, which could benefit the rest of the organization (Ulrich, Von Glinlow, & Jick 1993). Through understanding the important components of the OM (Vat, 2001), an organization can better appreciate how it is currently learning from its key experiences, to ensure that relevant knowledge becomes embedded within the future operations and practices of the organization. In practice, creating and using an OM is a cooperative activity necessarily involving many members of an organization. If those individuals are not adequately motivated in contributing to the OM initiative, and the organizational culture does not support knowledge sharing (Orlinkowski, 1992), it is not likely to turn the scattered, diverse knowledge present in various forms into well-structured knowledge assets ready for deposit and reuse in the OM.

Consequently, it is important to distinguish between the organizational memory (OM encompassing people) and the OMIS that captures in a computational form only part of the knowledge of the organization. The OM captures the knowledge of the organization. The associated OMIS makes part of this knowledge available either by providing direct access to it (e.g., codified knowledge assets such as experience reports) or indirectly by providing knowledge maps (e.g., tacit knowledge assets such as personnel with specific expertise). Managing the OM deals first of all with the question of "Which knowledge should go into the OMIS?" Answering this question requires determining what knowledge is owned by the members of the organization, what knowledge is needed now, what is going to be needed in the future, and for what purposes. This helps the organization to define not only a strategy for acquiring the needed knowledge, but also to establish validation criteria in relation to the defined goals. Besides, we also need to deal with "who needs the knowledge, when and why," as well as the policies for accessing and using the OMIS. This contextualization of the OMIS with respect to the organization's ability to learn is essential to implement the mechanisms of organizational knowledge transfer, examples of which are discussed in Vat (2006). In fact, in this modern age of information technology and swift change, learning has become an integral part of

the work of an organization run along principles intended to encourage constant reshaping and change. An OMIS-based organization can be characterized as one that continuously transforms itself by developing the skills of all its people and by achieving what Argyris (1992) has called *double-loop learning,* which helps transfer learning from individuals to a group, provide for organizational renewal, keep an open attitude to the outside world, and support a commitment to knowledge. One of the missions of the OMIS is to facilitate and bring about the fundamental shifts in thinking and interacting and the new capabilities needed in the organization.

SERVICE-ORIENTED DESIGN FOR OMIS

When designing an OMIS to nurture an organization's ability to learn (Vat, 2001, 2002), we consider the following modes of learning behavior: (1) individual, (2) group, and (3) repository. Individual learning is characterized by knowledge being developed, and possibly the result of combining an insight with know-how from other sources in the organization, but it is often not distributed and is not secured for reuse. Group learning is centered around the concept of communication in two possible modes: supply-driven or demand-driven. The former is characterized by an individual who has found a way to improve the work process and communicates this to one's coworkers. The latter refers to a worker who has recognized a problem in the current process and asks fellow workers whether they have a solution for this problem. In each case, knowledge is developed, distributed, and possibly combined with knowledge from other parts of the organization, but it is seldom secured. In repository learning, the communication element is replaced by collection, storage, and retrieval of knowledge items. Namely, it is typified by storing lessons learned in some information repository so that they can be retrieved and used when needed. Overall, in repository learning, knowledge is developed, secured, distributed, and is possibly the result of knowledge combination. It is convinced that the requirements of an OMIS design should be formulated in terms of some typical usage scenarios. Namely, an OMIS should facilitate individual workers to access the knowledge required by combination, to submit a lesson learned, and to decide which of the coworkers would be interested in a lesson learned. Also, there should be criteria to determine if something is a lesson learned, how it should be formulated and where it should be stored, and how to distribute some newly asserted knowledge piece to the workers in need. The perceived technical issues, nevertheless, could include the following: How are we to organize and index the OM to enhance its diffusion? How does an organization retrieve relevant elements of the OM to answer a user request or proactively push relevant elements towards users? How does an organization adapt the answer to users, in particular to their tasks, according to the knowledge contexts? These problems are largely related to the OM framework for knowledge distribution, whose goal is to improve organizational learning, with the aid of the previously mentioned OMIS support whose discussion through the idea of service-orientation is our major concern in the following section.

The Context of Service-Orientation

The term "service" has existed for some time (Chesbrough & Spohrer, 2006), and its attendant "service-oriented" connotation has also been used in different contexts and for different purposes (Rust & Miu, 2006). According to Erl (2005), one constant characteristic of this term currently identified among the research community is that it represents a distinct approach for separating concerns. Simply stated, the effort or logic required to solve any problem can be better constructed, executed, and managed if it is decomposed into a collection of smaller, related pieces. Each of these pieces addresses a concern or a specific part of the problem. Indeed, this thinking is not new and it does transcend technology and automation solutions, especially in the IT field, but what distinguishes the service-oriented approach to separating concerns is the manner in which it achieves separation. Consider our city that is full of service-oriented businesses, each of which provides a distinct service that can be used by multiple consumers. Collectively, these businesses comprise a community, decomposable into specialized, individual outlets, providing all possible business services. More importantly, individual outlets are encouraged to interact and leverage one another's services. Nonetheless, we want to avoid a model in which outlets form tight connections that result in constrictive inter-dependencies. Preferably, businesses are empowered to self-govern their individual services so as to evolve and grow relatively independent of each other. Meanwhile, it is also important to ensure that service providers must adhere to certain baseline conventions that standardize key aspects of each business for the benefit of the consumers without significantly imposing on the individual provider's ability to exercise self-governance.

The Promise of Service-Oriented Computing

With the rapid increase of software applications for the daily running of modern businesses, service-oriented computing (SoC) (Dijkman & Dumas, 2004) is emerging as a promising paradigm for enabling the flexible interconnection of autonomously developed applications operating within and across organizational boundaries (Alonso, Casati, Kuno, & Machiraju, 2003). Under the SoC paradigm, the functionality of existing applications can be expressed as services or a network of services called service compositions (Casati & Shan,