Using an Architecture Approach to Manage Business Processes

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INTRODUCTION

Business process management has long been a topic of great interest in operations management research. Early research on business process management focuses on workflow analysis and process optimization. These types of research evaluate and analyze a predefined set of procedures from a process perspective. That said, with a list of activities, constraints and criteria, the procedural workflow are specified and examined. Then, process analysts come up with suggestions to optimize the process and speed up the workflow. Research findings are widely applied in production and logistics; however, some works are criticized as being too rigid and only suitable for a stable business environment (Burns, 1993).

With the recent advances of information technologies (IT), research topics, including enterprise resource planning (Hong & Kim, 2002), computer integrated manufacturing (Burns, 1993) and total integrated management (Azhashemi & Ho, 1996), have become popular. Technologies are now playing a more significant role in organizations than before. They help organizations achieve higher competitive advantages, and facilitate the operations in all functional areas, such as marketing and sales, cash receipts, purchasing, cash disbursement, production and logistics and human resources (Valiris & Glykas, 2004). Transactions and financial data are gathered and stored, and technologies make data available for operational units and management to make decisions. Operations are sped up and an enduring dialogue in the intra- and inter-organizational contexts is built.

Technologies, on one hand, create substantial values to organizations. On the other hand, technologies are moving too fast, resulting in a rapidly-changing business environment. With the rapidly-changing environment, organizations face challenges. From a technological point of view, new technologies emerge and organizations conduct business in a more dynamic environment (Neiderman, Brancheau, & Wetherbe, 1991). For instance, although the Internet provides rich opportunities for organizations to exchange information, it greatly reduces the switching cost of users. This results in fierce competitions among organizations. Organizations have to reduce their costs in the hope of remaining competitive. Moreover, communities, such as W3C and IEEE, constantly propose new technology standards. Among various standards,

Web services are the most dominant. Sets of Web services standards, such as extensible markup language, were put forward in the early 2000s. An organization can use these standards to easily integrate multiple systems across platforms. The standards also allow various organizations to share data and applications (Coetzee & Eloff, 2007). Much research (e.g., Moitra & Ganesh, 2005) explores how Web services increase the flexibility of business processes. At present, many technology leaders, such as Microsoft, IBM, Google and Amazon, have already adopted Web services. With high external pressure, other organizations are likely to follow the technology trend and quickly adopt Web services to maintain their competitive advantage.

New technologies not only shape the operation and business environments, but also influence government regulations that pose new requirements and constraints on business processes. With transactions migrating to a computer platform, IT frauds become a concern for process analysts, management and auditors. Thus, the federal government proposes new regulations. For instance, Section 404 of the Sarbanes-Oxley Act (SOA) expands the significance of internal controls of processes. It explicitly states that managers and auditors are responsible for enacting and enforcing proper internal controls throughout their organizations. Technologies become a means to achieve improved quality of operational controls, and the ultimate objective of using technologies in business processes is to achieve high effectiveness, high efficiency and high security of organizations.

The article describes an architecture approach for business process management, and is organized as follows: first, we review the literature on architecture. Next, we outline a de facto standard for the architecture approach, and highlight the strength of using an architecture approach. Finally, we describe future trends, and conclude the article.

BACKGROUND

Business Processes and Their Importance

A business process is defined as a set of related, structured activities, or a chain of events, that produces a specific out-

Figure 1. General steps in business process redesign
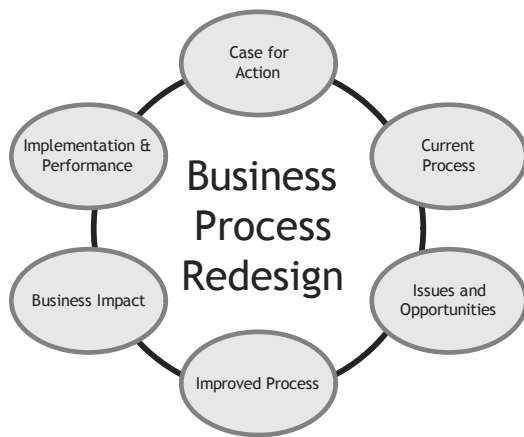
come for a particular user or users. This set of activities is in pursuit of a common goal. Typical business goals include receiving sales orders, marketing services, selling products, delivering services, distributing products, invoicing for services, accounts receivable, purchasing and accounts payable. Business processes directly support organization strategies, and hence the processes are valuable corporate assets.

To tackle the challenges by the rapid changes in technologies, presumably, organizations are required to evaluate business processes on a regular basis. As a result, organizations are paying more attention to supporting business process management and redesigning the processes to adapt to the new environments (Davenport & Stoddard, 1994). Figure 1 depicts the general steps of business process redesign.

During business process redesign, organizations have a specific case for examination. They identify the processes of interests and evaluate the opportunities and constraints. They improve the processes by integrating them into new technology platforms, and processes are redesigned in the hope of cutting costs, improving controls, speeding up the operations and achieving higher efficiency in the interactions between the internal processes and interactions of the processes with the environment (Arlbjorn, Wong, & Seerup, 2006; Hofmann & Reiner, 2006). Process redesign can help to achieve strategic advantages. Thus, it is not surprising to see the increasing amount of resources that organizations invest in redesigning their business process (Tinnilä, 1995).

Prior research shows that most organizations are not familiar with business process redesign and change management. Also, they do not have a structured methodology for process redesign. However, even if a few organizations adopt a structured methodology, some researchers criticize that their methodology is prescientific and ad hoc (Valiris & Glykas, 2004), and most approaches cannot provide a holistic view from management and operations (Avison & Wood-

Harper, 1990). In the following, we will provide a high-level architecture approach, which is influenced by organizational theories, IS development and existing work in business process redesign. Architecture views are representations of the overall system that are meaningful to all stakeholders, such as management board, chief information officer, users, designers and analysts, in the enterprise. It also provides a holistic approach to help stakeholders gather relevant and sufficient information for business process redesign.

An Architecture Approach

The word, architecture, originates from Latin. It is the art and science of building structures. In recent years, the word, architecture, has been used in application coordination (King, 1995), software management (Greefhorst, Koning, & Vliet, 2006) and enterprise management (Johnson, Lagerstrom, Narman, & Simonsson, 2007). It is the abstraction used to deal with complexity. By extension, the term "architecture" has come to denote the art and discipline of creating an actual, or inferring an implied or apparent plan of any complex object or system. Architecture is analogous to a blueprint for the object or the system. It details how the design is to be divided into individual functional components and the way in which these components are to interact to provide the overall functionality. According to IEEE Standard 1471-2000, architecture is "the fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principle guiding its design and evolution."

In the context of an organization undergoing business process redesign, architecture is a blueprint which specifies data architecture, business architecture, technical architecture and process architecture. An architecture approach is usually taken by large enterprises. As an organization grows in complexity and size, several factors hinder its abilities to solve the problems that it faces. The point is rapidly reached where the factors that come into play in structuring and conducting the business of the enterprise become too numerous and complex to manage. When dealing with such complex systems, a complicated problem is usually broken into subsets or domains, which is less complex and more manageable. This helps to make sure the orchestration of the interaction among those subsets or domains. Thereby, an architecture approach is typically adopted by large enterprises. We refer to it as *enterprise architecture*. Enterprise architecture is a specific type of architecture and can be considered to be the description and documentation of the current and desired information and technology environment, and its relationship to processes and business strategy. It coordinates various facets, including process models, diagrams or textual documents (Puschmann & Alt, 2005).

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