

Web services and flexible business processes: towards the adaptive enterprise

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Abstract

The full potential of the expected role of Information Technology (IT) in facilitating organizational adaptation has not yet been realized because most of the existing systems do not lend themselves to the levels of flexibility required to support changes in business processes. This problem is accentuated with increase of inter-organizational linkages involving disparate IT systems. Web services have emerged as a disruptive technology, with a real potential of enabling flexible business processes. This paper examines the influence of Web services on business process flexibility and analyses its impact on organizational adaptation.

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1. Introduction

Modern organizations form part of a complex network of inter-related businesses operating in a collaborative manner. Information Technology (IT) plays a crucial role in enabling their inter-organizational linkages. The challenge for IT has been to allow the organizations to respond to change in a timely,

economical, and reliable manner without compromising organizational flexibility. This brings into focus the role of flexible business processes in enabling organizational adaptation. Organizations operating in dynamic environments need to transform continuously in order to create and sustain competitive advantage. The challenge is therefore to address the problems associated with the flexibility of business processes while taking into account the existing legacy IT systems that have been built over time. Often, considerable investment has been expended in building them but they play only a limited role in achieving the desired levels of flexibility. Business processes are activities structured and organized

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according to a predefined flow that allow an organization to carry out its business. Many of the business processes require process interdependencies and system dependencies that are established through integration of the business processes.

Studies of firms that adapt, survive, and create sustainable competitive advantage in dynamic environments show that they respond to the changing environment with appropriate strategic moves. Such firms exhibit a “sense and respond” capability, and succeed by acquiring new resources and capabilities and modifying existing resources, and capabilities. Flexible business processes are a key capability of such organizations, and therefore identification and selection of appropriate business processes assumes importance. IT has been proved to be one of the key resources aiding an organization to achieve competitive advantage [7,21,28]. Byrd and Turner [4] establish the relationship between flexible IT infrastructure and competitive advantage. Defining and implementing flexible business processes supported by flexible IT systems is of significance to organizations because this would allow them to collaborate with partners in new ways resulting in inimitability of the processes, and this in turn allows them to adapt to the changing environment. *Flexible IT systems* are those that are malleable enough to deal with uncertainties in an unstable environment. They can rapidly respond to internal and external stimuli. *Loosely coupled systems* are those that can be assembled and disassembled easily. They have less dependency on other systems, making them malleable.

The development of promising techniques for encapsulating legacy IT systems and mapping business process change onto them resulted in IT architectures for direct system support of business processes, and hence to more economical evolutionary change [18]. Technologies such as Web services, which allow applications interaction across firm boundaries economically and incrementally, have transformed the nature of inter-organizational commerce. Web services make available open and standardized interfaces, allowing for the encapsulation and componentization of software and applications, thereby enabling relatively easy configuration and re-configuration of software applications. Existing applications can be bundled and offered as services. Web services differ from other technologies as they

facilitate machine-to-machine interactions. It is widely accepted that organizations operating in highly dynamic environments need to function flexibly. IS within organizations need to aid in organizational adaptation. This paper attempts to establish the role of Web Services in facilitating an adaptive enterprise. The key issue is organizational adaptation. Specifically, we aim to answer the questions:

- What is the influence of Web services on business process flexibility?
- How will Web services facilitate the adaptive enterprise?

2. The adaptive enterprise

The complexity of technology and markets, rising customer expectations, volatility in the business environment, and the growing need for flexibility has required that firms acquire a sense-and-respond capability. This involves adjusting in almost real time to implement the changes. The organization adaptation perspective on change proposes that organizations are flexible and have the ability to change or adapt, to their environments by altering routines or practices [10,26]. These changes are usually initiated to avoid the risk of decline or failure. There is a link between the deliberate action of organizations and adaptation. More specifically, adaptation can be viewed as a source of intentional variation, because adaptation involves the implementation of change in an effort to survive. However, the degrees of adaptation that occur, and the outcomes of it, are likely to vary considerably as a function of factors such as states and the process of adaptation, adaptive ability, adaptive specialization, and adaptive generalization [6].

Numerous theoretical perspectives support the concept of adaptive behavior in organizations. *Transaction cost theory* suggests that firms take adaptive actions to achieve efficiencies in the costs associated with internal and external transactions [41]. *Resource dependency theory* suggests that organizational adaptation occurs as coalitions form to control resources that the organization needs for survival [31]. *Contingency theory* suggests that environmental conditions dictate the adjustments that management must make to the strategy and structure of a company [19,14,34]. These contrasting perspectives are found

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