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Ravi Seethamraju

University of Sydney, [Ravi.Seethamraju@sydney.edu.au](mailto:Ravi.Seethamraju@sydney.edu.au)

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# EFFECTS OF ES-ENABLED STANDARDIZATION AND INTEGRATION ON BUSINESS PROCESS AGILITY

Dr Ravi Seethamraju  
Faculty of Economics & Business  
The University of Sydney,  
Sydney, NSW-2006,  
Australia  
Email: r.seethamraju@econ.usyd.edu.au

## Abstract

*Agility has become a key organizational capability today as businesses face an uncertain and volatile environment. Enterprise systems, a key component of IT infrastructure in a majority of organizations today, have delivered cost efficiencies, control and consistent execution. Using a case study approach, this research reports on the investigation of the influence of enterprise system-enabled environment on business process agility. According to study, integration, standardization, best practices and process orientation, the key characteristics of ES-enabled environment have mixed and varying effect on business process agility and that is dependent upon the extent and type of standardization and integration implemented in the organization and the nature of business processes. Tight coupling of systems, structures and processes resulting from ES implementation restricts a firm's ability to reconfigure and deploy business processes. The study found that the standard best practices embedded in an enterprise system do not have any direct influence on process agility. Recognizing that it is not after all necessary for all processes to be agile, study pointed out some of the challenges in identification, configuration and effective deployment of agile processes.*

*Keywords: Agility, Enterprise system, Standardization, Integration, Case study*

## **1. INTRODUCTION**

Dynamic business environment requires firms to adjust, redesign and adapt their processes swiftly, or to be 'agile'. Business process agility, a combination of speed and flexibility has increasingly become essential for survival for today's organizations. Whether it is for a simple reduction of costs or to attain and/or maintain competitiveness in marketplace, whether it is to overcome the unanticipated changes in the regulatory environment, or to increase firm's responsiveness to the external environment, speed and flexibility are critical characteristics today's firms aspire to build. Information technologies today are considered a significant digital platform and are expected to facilitate agility in their processes and systems. This paper reports on a case study research that investigated the impact of integration and standardization enabled by the enterprise systems implementation on business agility. It will first briefly review the literature on 'agility' and on the concepts of standardization and integration. It will then describe the research methodology, an exploratory case study and discusses findings.

## **2. LITERATURE REVIEW**

Business processes have become important corporate assets today. Enterprise systems as a backbone to the organizations, have been delivering cost efficiencies and consistent execution of the processes. This section reviews literature on business process agility, role of information technology and enterprise systems in agility. Considering that enterprise system is a generic term, and its capability, scope, scale, technology orientation, functionality and architecture are continuously changing, this study discusses standardization and integration, the two key benefits of implementing enterprise systems for analysing their impact on process agility.

### **2.1 Business process agility**

Bringing new products and services rapidly to market and improving customer service while simultaneously reducing cost inefficiencies have been pushing business processes to the top of business organizations' priority list (Gartner 2006, Forrester Research 2005, Davenport 2005). In the past quality, cost efficiency and speeding up the business processes were sufficient to maintain a competitive edge. Contrary to the traditional view in which performance objectives such as cost, quality, dependability, flexibility and speed were considered at times conflicting, the new concept of 'agility' inherently postulates the possibility of simultaneously excelling in all the performance objectives with the help of existing and emerging information technologies/systems. Though process performance objectives such as cost, quality and dependability are implicit in the term 'agility', the two concepts of flexibility and speed are particularly important and inherent to the definition of business process agility.

Agility as a complex concept was analyzed in a range of disciplines - economics, operations and supply chain management, strategic management and information systems disciplines. Sambamurthy et al (2003) defined business agility as the capability of firms in managing their internal operations and interactions with their eco-systems and identified three types of agility – customer agility, partnership agility and operational agility. While the first two deals with managing relationships with customers and partners, operational agility refers to the ability to rapidly sense and respond by redesigning existing processes and operations. Some authors considered agility as a broader concept with two dimensions – 'sense' and 'respond' capability (Mathiyalakan et al 2005, Conboy & Fitzgerald 2004). Adopting the definitions by Raschke & David (2005), Sambamurthy et al (2003) and Meade et al (1999), business process agility in this study, is defined as the ability to dynamically modify, reconfigure and/or deploy a business process (and its various components) to accommodate required and potential needs of the firm (Seethamraju 2006).

## 2.2 Information technologies, enterprise systems and agility

Several IT-enabled innovations in general, and enterprise systems in particular have contributed to the cost efficiencies through standardization, simplification, integration, and automation of business processes and their consistent execution (Davenport et al 2004). Like many IT innovations in the past, enterprise systems focused on increasing control and efficiency. The present day requirements of a cost-effective and responsive enterprise make it difficult for enterprises to stick to well-defined static business processes. It may be necessary for a firm to rapidly join or leave an inter-enterprise business process in a dynamic collaborative environment in order to respond to changes in markets, suppliers, customer requirements and different stakeholders. In addition, organizational realignment which includes mergers, acquisitions, divesting, spin-offs, and outsourcing and off shoring may all require continuous unbundling and re-bundling of business processes multiple times. This typically involves separating, redesigning, merging, configuring and deploying business processes and its related components such as organizational structure, business rules, roles and metrics. While enterprise systems have the capability to support such integration efforts through various pre-configured solutions for particular industries and implementation tools, they do not at present have capabilities to deal with dis-aggregation and disintegration.

In addition, continued usage of legacy systems, reluctance to change the configuration after embedding the system (Somer 2003), the inherent nature of enterprise system (ES) infrastructure that result in tight-coupling of structures, processes, business rules and roles and the associated interdependencies (Newell et al 2007), and complex nests of links between various applications supported by a silo's of technology from different vendors (van Oosterhout et al 2006) have all been posing further challenges for firms. Emerging information technologies/systems today are considered a significant business platform for building and delivering this critical business need, 'agility' (van Oosterhout et al 2007, Sambamurthy et al 2003). Responding to this critical business need, several information technology vendors such as SAP, IBM, Oracle and others have incorporated capabilities to build agility in their software and hardware solutions. For example, IBM's 'on-demand' vision, HP's adaptive enterprise strategy, SAP's enterprise oriented architecture, and Oracles 'demand' vision promises to deliver agility.

## 2.3 Integration

Enterprise systems are one of the key tools implemented by organizations to achieve 'integration' across the organization (Markus et al 2000) and integration is by far the most important characteristic of enterprise system discussed in the literature (Markus 2001). Though it is conceptualized differently by different disciplines depending upon their focus, organizational integration in business information systems literature is generally defined as the coordination of various activities and processes carried out by different individuals, work groups, departments, and business units across various functions, across various business entities, across different hierarchical levels and strategy and culture (Markus et al 2000). Though a technical perspective of integration represents the extent to which different systems are interconnected and can communicate with each other (Chiang et al 2000), integration in this study is defined as coordination of activities, processes and information across various units and functions within the enterprise.

Integration in an organizational context had three dimensions - vertical integration, horizontal integration and technical integration. Horizontal integration refers to interconnection between various departments or functions within an organization (Uwizeyemungu & Raymond 2004). This cross-functional integration represents the extent to which different functions and business processes are interconnected and tightly coupled (Orton & Weick 1990). If it is between different hierarchical levels, it is termed as vertical integration. While the horizontal integration is a critical determinant for facilitating cooperation and managing interdependencies across business functions (Davenport 2000), vertical integration facilitates enhanced visibility, accessibility, control and decision support capability (Markus et al 2000), the key benefits of enterprise systems implementation. Horizontal integration achieved across the enterprise after the configurations and settings are fully embedded,

may discourage the firm from changing the processes because of the costly change management efforts and reluctance to disturb the well-set system.

Vertical integration, however, may facilitate better understanding of the processes, information and decision making because of its ability to facilitate increased visibility and centralization of control. This may help top management to comprehend the critical need for process changes better and therefore position them well to build agility into processes. Many organizations may prefer to make further process changes during upgrades and thereby make their processes agile. Thus, the influence of vertical and horizontal integration can be hypothesised as positive on process agility.

The technical integration facilitated by enterprise systems, may result in tighter coupling with other practices and structures in the enterprise, and may create interdependencies. This may make it very difficult and costly for any organization to make any process changes (Newell et al 2007, Wensley & Stijn 2007). The more an organization is integrated adopting integrated technologies embedded in the enterprise system software, the less flexible and more difficult and uneconomical to 'disconnect' (Wensley & Stijn 2007). If counterbalancing technologies such as middleware, point-to-point interfaces are not introduced, enterprise systems may actually reduce the agility (Newell et al 2007).

By mapping the organizational structure and other elements into the system by way of configuration, the system is fit to the organizational needs. Once this configuration is completed, the system is tightly linked with organizational structures, processes, technology and people (Davenport 2000) and changing them is considered difficult and uneconomical. This together with the insufficient levels of standardization and integration achieved because of the continuing usage of legacy systems, phased implementation of various application modules in an enterprise system and inadequate decision support capability of the system makes it harder to derive other benefits of integration.

Therefore, technical integration and the resulting tight coupling of systems, structures and processes may restrict a firm's ability to change and reconfigure business processes. Thus, while the level of horizontal integration achieved may have a negative influence on organizational ability to build agile processes, vertical integration may positively contribute to business process agility.

Though the original vision of enterprise systems was to create an environment of seamlessly integrated data, processes, technology and people, the reality is different. Many organizations still leave some legacy systems for a company specific application that needs integration with their enterprise system, choose a 'best of breed' approach in the selection and implementation of various application modules, use data warehousing technology to complement enterprise system's in decision support capability, and need to integrate their enterprise systems with external processes and data (Markus 2001). Moreover, implementing the enterprise systems in phases (one module after another), upgrading them and then integrating with the changing hardware, networks and database software is a continuous process and thus may not help realize a truly "seamless" and "integrated" environment.

## 2.4 Standardization

Standardization is an agreed way of doing things. In the context of enterprise systems, standardization is the process of producing an agreement on technical and business specifications to be used consistently across the enterprise to ensure that processes, information, format and systems are interconnected and interoperable (Markus et al 2000). The very purpose of standardization of business processes is to rein-in the variability and variety of processes, terminology and definitions, information/data formats, and technology platforms/systems, spread across the organizational business units and achieve the efficiencies and consistency in execution through automation and other means (Davenport et al 2004). Standardization of processes can facilitate efficient handoffs across process boundaries and better communications about how business operates (Davenport 2005).

Standardization of processes, information, technology platforms are typically carried out before implementing enterprise systems software. Inadequate levels of standardization may limit firm's ability to access information and use it for decision making even if data is available somewhere in the system. In the absence of right and timely information, organizations may not be able to identify the appropriate process components and reconfigure the processes to deal with dynamic changes.

Therefore, higher the level of standardization achieved, higher the ability of the firm to build agility in their processes. The full benefits of standardization will, however be felt more if the organization is global and if the processes are repetitive, transaction-based processes such as 'procure-to-pay' and 'order-to-cash'. If the processes are unique and specific to a particular location and are offering a competitive advantage, then enforcing an enterprise level standardised process, may actually limit the firm's process agility. Of course, this may be challenging if the firm is trying to reconfigure inter-enterprise processes in a supply chain context.

On technology side also standardization is an important benefit. If the organization is a large global organization, consolidating the technology platforms (such as databases, networks, interfaces etc.) into standardised form, may allow easier integration among various process components, reduce maintenance costs, and allow the firm's processes to be flexible. As it will reduce the need to develop interfaces between different applications and systems, a standardised technology platform may actually improve the potential process agility in a limited way. On the other hand, technology may also restrict business process agility, as it can create tight-coupling of the infrastructure with processes, information systems, structures, work roles/people and technology becoming interdependent and tightly integrated with each other. Tight-coupling enabled by ES may make it difficult and/or prohibitively costly to change the processes quickly. Therefore, higher the standardization of the technology platforms, lower the potential for process agility.

### **3. RESEARCH MODEL AND METHODOLOGY**

#### **3.1. Research objectives & methods**

The objective of this research study is to analyze the influence of integration and standardization, the key espoused benefits of implementing enterprise systems on organizational ability to build and operate agile business processes. Using these two characteristics (standardization and integration) as a framework, this exploratory study focuses on the influence of each of the key characteristics on the ability of the firm to build agility in their processes. As shown in the following research model, the construct business process agility therefore comprises of three major abilities – i) ability to identify the changes required to the existing business processes and its components, ii) ability to reconfigure and/or redesign and assemble those components, and iii) the ability to effectively deploy them taking into consideration the changes required in the related components such as structure, policies, practices, business rules, roles and metrics for consistent execution and control. The ES-enabled capability comprises of two constructs – standardization and integration, the key benefits of implementing enterprise systems.

The research was undertaken in order to develop understandings of the impact by a case study method. As Gummeson (1991) points out, the aim of case studies is not to establish a superficial cause-effect relationships and/or correlations, but to reach a fundamental understanding of structure and process. Case study methodology can facilitate the development of understandings of the multiple interpretations of organisational life and can capture contextual richness and complexity (Yin 2003).

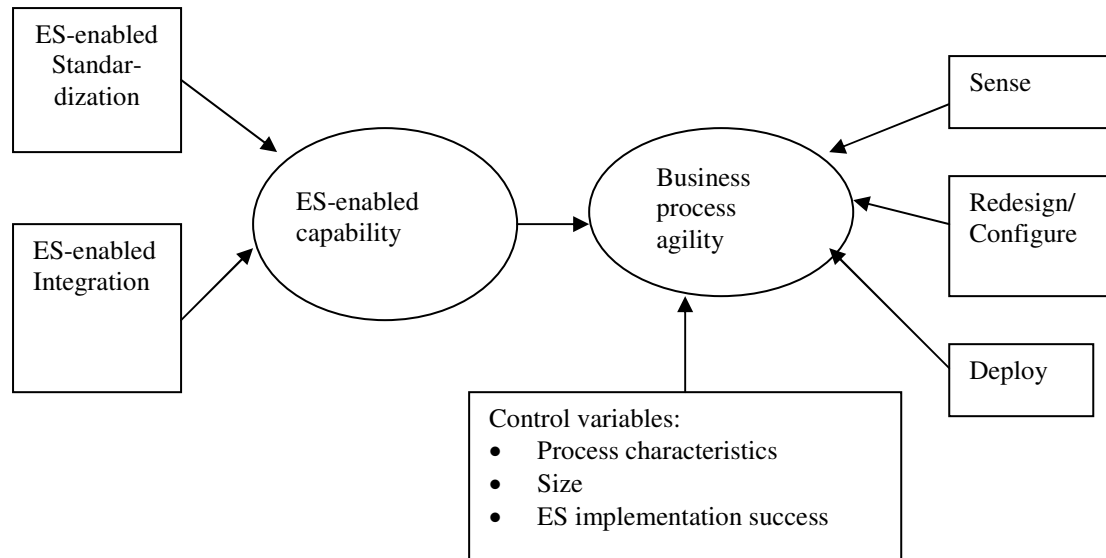


Figure 1. Research model – Influence of ES-enabled capabilities on business process agility

Case study research thus offers deep insight into the impact of information systems on various organizational dimensions and attempts to understand the phenomena. Using semi-structured in-depth interviews of the key respondents that are actively involved in the implementation of the enterprise systems and post-implementation management of the company's operations, primary data was collected. Given the nature of questions, in-depth interviews based on the perceptions, views and experience of the key individuals in the organization were considered more insightful. These interviews were recorded with prior permission and transcribed for further analysis. The data thus collected was analyzed with reference to the characteristics and propositions discussed earlier in the literature review section.

Some of the generic limitations such as lack of generalisability and subjective bias injected by the researcher as well as by the respondents applicable to any case study research can be attributed to this study. As expected in such studies, the extent of cooperation from different respondents in the organization was not uniform and the respondents might have either overrated or underrated the issues. These limitations, however, were unlikely to have significantly affected the validity and reliability of the outcomes because the objective of the study was not to generalize, but to provide anecdotal evidence and basis for further empirical research. The following section gives a brief background to the case study organization studied.

### 3.2 Case study organization

The case study organization is a continuous process manufacturing company that makes chemical products. This is a typical make to stock company that also fulfils some specific orders of major customers. Started about a decade ago, it currently employs about 400 persons. This organisation has been using SAP for the past ten years starting from the earlier versions (3.1 versions) and is now running on ECC 5.0 version. It has Sales and distribution (SD), materials management (MM), Financials (FI/CO), Plant Maintenance (PM), Asset management (AM) and Production planning (PP) modules. The company had carried about 20 modifications (customisation) to the software at the time of initial implementation in 1997. With every new upgrade in the past ten years, however, the company was able to gradually do away with those software customizations and now is close to a 'vanilla' implementation.

In addition to SAP, Lotus Notes, Novel networks systems in business environment; it has a specialised manufacturing process control system and a laboratory information system as legacy systems. Interfaces with SAP were built for these applications. As mentioned in the literature review section, the scope of implementation would influence the effect of several ES characteristics such as integration and standardization and therefore their influence on the process agility. By implementing most of the application modules, the system is qualified as a good candidate for this investigation and therefore is selected for this study. This company therefore has the potential to offer a rich organizational context for this research. The following section describes the research framework and presents analysis and findings.

## 4. ANALYSIS AND FINDINGS

### 4.1 Standardization and agility

Standardization and integration of the processes, information, business rules and technology platforms across the enterprise is expected to result in consistent execution of the processes and improved efficiencies. The benefits of such standardization and integration, however, depend on the scope and depth achieved in a typical enterprise system implementation. By implementing almost all the application modules with the least amount of customization, this organization has standardized and integrated all the major processes and information across the major enterprise functions. As suggested by one respondent, simplification and standardization of repetitive processes such as procurement have helped this case study organization in delivering consistency and control and process agility in this particular end-to-end process is neither a requirement nor relevant. In fact, as pointed out by another respondent, *“we don’t want these repetitive processes to be agile at all. Who wants to change procure to pay process, what potential benefits can come out of this, why should we change these processes and for whom?”* (Respondent 2).

Process agility, therefore is not a requirement for every process and organizations may prefer certain processes to be stable and want them to deliver consistent execution. The organization believes that the *‘procure to pay process is a standard process in any organization and we don’t expect to derive any competitive advantage or benefit by making it agile and flexible’* (Respondent 2 & 5). As noted by another respondent, *“if we can standardize a simple and logical process, then it will with agility; when you try and standardize something very specific, may be illogical, then you are in trouble”* (Respondent 2). Standardization of the processes and information has helped this organization to achieve ‘single truth’ of information and ‘consistent and accurate’ execution of processes across the enterprise. As observed by one respondent, this factor has *‘helped us to understand the process and speak one process language....use one metric of process performance... and confidence to deal with and implement required changes to processes across the organization’* (Respondent 3).

In case of other non-standard processes, however, the firm has implemented its old processes that have grown out of the organization that does not exist now. As pointed out by one respondent, *“if we can standardize a simple and logical process, then it will help with agility and when you try and standardize something that is very specific, may be illogical, then we are stuck,.... but many years when SAP was implemented, it was really implemented into an organization that had an old-fashioned mentality,.. Which does not exist anymore”* (Respondent 2). In certain accounting processes and information, the organization has simply converted their old paper-based (inefficient) processes into an electronic system in ES environment. *“They took the old paper-system almost and just turned them into an electronic system”* (Respondent 3). As pointed out by one respondent, *“the problem with SAP is that it locks in business processes, and if you’ve got a poor business process, SAP will enforce it”* (Respondent 4). Assuming those old processes as standard has placed the organization into a tight corner with no discernable performance gains. This together with the organisational culture that has overemphasised on control in the past had made the processes so complex that it is too hard to contemplate any changes.

Standardization of technologies though is considered a major benefit of implementing enterprise system; it has not been completely achieved in this organization. As it is a specialized manufacturing



organization, it has several other applications that deal with laboratory quality control, manufacturing process control, contract management, project management and pay roll system. At present, these legacy systems have point-to-point interfaces with SAP. As pointed out by one respondent, *‘SAP cannot offer everything, even with its industry solutions, therefore we are happy to maintain these separate legacy systems for these critical applications and link them up with SAP. Of course, we will review them every time there is an upgrade and hope to minimise them one day... that is if SAP can come up with a workable solution to our requirements...’* (Respondent 1).

As the technologies are increasingly standardized and interoperable by the software vendors these days, this organization does not view technology standardization as a restricting factor for building agility. In fact, as noted by one respondent, *“it is SAP’s responsibility to make their system talk to others... it is in its own interest to do that if it wants to improve its market share for upgrades and revisions”* (Respondent 2). The management is confident that SAP and other major software vendors will remove these restrictions in their future versions and make them increasingly more open and interoperable by incorporating open standard-based non-proprietary technologies.

Therefore, standardization of repetitive processes that were efficient before ES implementation may have contributed to agility, but for other processes, standardising them and linking with technology in ES environment made those processes very rigid and inflexible. The company therefore, is now hoping to slowly change their processes by adopting the processes embedded in the ES version in every upgrade and thereby achieve efficiencies and agility. Standardization is good and lead to simplified processes in this organization in some repetitive processes where the existing processes were discarded. But, where ES was implemented without improving the process first and configured around the existing process, it has simply locked the inefficient business processes and restricted their agility.

On an economic front also, this firm views this as a cost effective and efficient option. In any case, as observed by another senior manager, the core of the main business processes such as ‘procure-to-pay’, or ‘order-to-cash’ don’t often change in any enterprise system software. It is expected the software vendors will take into consideration the changes in technologies, education and skill levels of typical workforce as users learn about the software, and contribute to the evolving nature of business processes. Therefore, in this organization, there is a strong belief that the best practices are truly best practices and there is no need for them to be changed regularly.

Any improvement in the processes consequent to the evolution of technologies, skills and practices are generally incorporated in the upgrades and newer versions. In any case, taking the business processes outside the enterprise system’s environment, and changing them to deal with external demand is a very rare in this organization, especially in case of standard transaction based processes supported by enterprise systems. Changing the business processes involves significant changes to the information technology systems, their interfaces, and organizational structures, and is generally discouraged in this organization because of the significant costs, change management efforts and particularly because it may encourage proliferation of non-standard processes, practices, technologies and systems in the enterprise. It is expected that the software vendor will update the standardized processes embedded in the software with improvements necessary and best practices from time to time and that will be enough to deal with dynamic business requirements (both internal and external).

Thus, standardization has a mixed affect on business process agility and the effect depends on the nature of business process (repetitive or special or exception handling), the extent of standardization implemented across the organization and/or the whether the standardization carried out included simplification and improvement of the processes at the time of ES implementation. Increasing shift by ES software vendors towards inter-operability and general adoption of non-proprietary technologies in their current and later versions consistent with the market demands is no threat to agility. Therefore, the standardization of technologies enabled by enterprise system implementation has a strong positive effect and will actually make it easy for organizations to build agile processes.

## 4.2. Integration & agility

Given the size of the investment and its commercial off-the shelf nature, it is necessary for an enterprise system to be adaptable to organizational conditions and structures. Once the system is configured and embedded integrating the information and processes across the enterprise horizontally, the flexibility it offers may be limited and may depend upon the scope of ES implementation. With the implementation of most of the application modules, this organization has achieved full integration of its processes and information both horizontally and vertically.

As pointed out by one respondent, *“integration has enhanced their speed of execution and consistency of execution. In fact, the company’s slowest processes are the ones that don’t use integration of features of the enterprise system”* (Respondent 1). From flexibility point of view, however, integration of processes has made them less flexible. Thus, while the speed has improved, the flexibility is compromised as a result of horizontal integration of processes in this firm.

Integration of information and processes vertically, however, has contributed to improved decision making in this firm. Improved managerial decision making, facilitated by the standardization and integration of the information as well as processes, have contributed to agility in this organization. As noted by one respondent, *“if all the processes and all of the data definitions are different, it is very difficult to make sense out of the reports produced by the system. In areas such as plant maintenance where there are lot of manual non-standardized processes and data, there is no potential for agility”* (Respondent 4).

On the other hand, in procurement process where the information and processes are fully standardized and integrated, the process is very agile, especially because of the enhanced understanding and visibility of information and process both horizontally and vertically. The richness of the information that is available and accessible has not been affected and is not considered to be a limiting factor to agility. This study suggests that the benefits of integration are likely to vary depending upon the type and nature of integration and thus confirms the previous research by Barki & Pinsonneault (2005). While horizontal integration has a mixed influence on the agility, vertical integration appears to have contributed to agility in this case study. While increasing the speed of process, the full horizontal integration facilitated by the enterprise systems has actually reduced the process flexibility.

The technical integration in this organization is not complete, with a few legacy systems still supporting certain specific applications such as laboratory information system and plant maintenance operations. The organisation is planning implementation of SAP quality management module in future. Thus, the limited technical integration achieved by the enterprise system, though not restricting the agility, at present appear to have no effect on the firm’s ability to build agility in their processes.

The integrated nature, higher visibility of information enabled by the enterprise system and the dependence on the internal tangible sources of information (ignoring the managerial judgment and external sources of information), however, could potentially reduce the richness of information available to managerial decision making, restricting the organization’s ability to respond with agility. As pointed out by one respondent, *“there is always a danger, we managers depend too much on the system forgetting to use our own experience and knowledge; it is garbage and garbage out”* (Respondent 3).

Even though, implementing an enterprise system has facilitated using a common language and cooperation among all users across the organization through standardization, there is no discernable improvement in customer focus and/or holistic view. As pointed out by one manager, *“process view is like a motherhood statement and everybody is happy to talk about it. But when it comes to do something or change their ways, or demonstrating it in practice and action, it is always challenging”* (Respondent 4) While there is an evidence of some process-oriented way in the organization, especially at the higher management levels, it is very much influenced by the organizational culture and management policies and practices and individual capabilities and attitude. With standardization and integration, there is a better appreciation of the inter-dependencies by managers across the enterprise and better understanding of the processes by the senior management. This, of course, has

made it relatively easy to change the process components and reconfigure them to deal with demands if necessary.

## 5. CONCLUSIONS

Agility of business processes is now considered important. While enterprise systems in the past have contributed to standardization and integration their influence on the firm's ability to build agility is ambiguous and vary depending upon the type of integration and the extent of that integration achieved by the organization. While the technical tight-coupling of the enterprise system infrastructure may limit the firm's ability to build agile processes, both vertical and horizontal integration, and standardization of the processes and information appears to be contributing positively. In the case study organization, horizontal integration of processes and information has contributed to the improvement in process speed while compromising the flexibility. Vertical integration in the case study organization, however, has resulted in improved visibility, centralization and improved decision making, which indirectly contributes to process agility. Standardization of repetitive processes that were efficient before ES implementation may have contributed to agility in this organization. But in case of other processes, standardizing them and linking with technology in an ES-enabled environment made those processes very rigid and inflexible. The standardized processes embedded in the software were considered truly the best practice in this organisation. With regular updates ensuring the incorporation of latest developments in practices and technologies, it is generally believed that the requisite agility is also part of the best practices.

It is, however, important to note that it may not be necessary for some of the major standard processes supported by enterprise systems to be agile. For example, processes such as 'procure to pay', 'order to cash', 'hire to retire' etc. are not likely to change for some time and building agility into those standard processes may not be necessary. The focus of management in such transaction-centric and volume-based processes is to achieve consistency, control and thereby cost efficiencies and not agility.

While demanding their IT infrastructures to be tightly integrated for control and visibility purposes with the help of enterprise systems, firms are seeking to deliver agility with loosely coupled systems and technologies simultaneously. Though it is considered difficult to achieve both agility and control simultaneously in the past, today introduction of web services and service oriented architecture are expected to deliver both. Recognizing the weaknesses of enterprise systems, ES software vendors and business organizations are expending a significant proportion of their IT investment in Web services and business process management technologies.

The leading enterprise systems software vendors such as SAP and Oracle are now incorporating Web services standards into their next generation software solutions. For example, SAP has so far delivered 1000 Web service components and recently released the first Web services enabled ES suite. These emergent technologies are centered on the goal of providing the requisite process agility to enterprises by offering a competent business process platform from which to dynamically compose processes (Mooney & Ganley 2007) Building agility into business processes and implementing them is not easy and is dependent not just on the IT infrastructure including enterprise systems, but also on other factors such as business process management maturity levels and process characteristics specific to a particular organization. Further research to identify the enablers and constraints in building and implementing agile processes and in dynamic business environments is necessary.

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