# Consequences of e-Business Initiatives on Business Process Performance – A Model for Analysis

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#### Abstract:

This paper discusses the consequences of implementing ebusiness initiatives on business process performance and proposes a model for further analysis. Integrating the operations management literature, diffusion theory and reengineering theories, this model attempts to hypothesize the consequences of implementing e-business strategies by way of redesigning and/or integrating the information, systems and processes and its impact on the business process performance attributes. Using an survey methodology, this study will attempt to measure the extent of implementing e-business initiatives in Australian manufacturing industry and the consequences of those initiatives on business process performance. Developing a theoretical framework/model will help in minimizing the uncertainty associated with such transitions, and explain the dynamic interactions between organizational factors, business process performance variables and information systems. In addition, it will make contribution to the theories dealing with the interface between information systems and operations management in e-business context.

#### 1. Introduction and background:

Despite some initial failures and issues with regard to the implementation of associated changes, e-business is expanding in Australia. Understanding the specific impact of e-business initiatives as an IT innovation on processes and their relationships to other factors such as information systems, and organization are important to develop strategies for managing and improving the business processes. Considering the huge investments already made in these initiatives, and their overarching influence on business in general, it is important to understand the impact on business processes. Based on the literature from information systems and operations management fields, this paper analyses the consequences of implementing e-business initiatives on business process performance in manufacturing industry and proposes a theoretical model for analysis.

A report by National Office or Internet Economy (NOIE) in Australia [7] observed that the e-business readiness of Australia is ranked second only to USA.

According to this report, about 62% of Australian companies are now reporting cost savings of 1 to 5% achieved by online marketing and sales, and efficient online financial transactions. Though the number and value of electronic transactions between businesses, government and customers is steadily increasing, the current levels and volumes are not significant in Australia. At present, the B2C (Business-to-Consumer) and B2B (Business-to-Business) transactions are worth 0.17 per cent and 1.1% of the GDP respectively [7]. Generally, the manufacturing industry is observed to be lagging behind the finance, banking, insurance and other service sector in the introduction of e-business initiatives.

In spite of its advantages and potential benefits, implementing e-business initiatives often poses challenges to many businesses. Some of the challenges are back-end integration, transforming business processes, integrating information systems and IT applications, reliability of operational data, hierarchical and functionally oriented organisational structure, and performance measurement of e-business processes [4][10].

It is well recognized in the literature that adoption of information technology enables businesses to achieve competitive advantage. However, the consequences of adoption and their impact on the organizational performance are considered too complex to study. Generally, there are very limited studies on the consequences of technology adoption [7][6], though there are several studies that analysed the implementation and diffusion of technologies in different settings. Unlike other IT innovations, e-business initiatives are generally pushed into the organization and therefore does not involve the adoption component of the classical diffusion model by Rogers [9]. Because of the indirect and unanticipated consequences, and their complex cause and effect relationships, it is considered difficult to measure the consequences of IT innovations [9]. Even though it is difficult to measure impact in specific performance terms, many organizations, however, are able to achieve competitive advantage by using IT as an enabler, while others by deploying it as a tool in the redesign of business processes [8][11]. Software vendors and consultants who sponsor research on IT innovations generally assume that the consequences of such e-business initiatives are

positive. However, several IT innovations such as ERP systems, CRM and SCM softwares, and other applications are reported to have negative impacts and did not seem to realise the full benefits espoused by the vendors [3].

### 2. Model for analysis:

Taking some components of the Barnes et al [1] framework for the study of e-business in operations management literature, Rogers' diffusion theory and reengineering theories by Davenport from information systems literature, the following theoretical model is developed to analyse the impact of e-business initiatives on business process performance. Rather than studying them separately, this model helps to study the factors inherent in e-business initiatives, the impetus these factors give for initiating various organizational changes and their effects on business process performance variables such as cycle time, quality, flexibility and cost. In this context, based on the model proposed and presented at the end of the paper (figure 1), some hypotheses are formulated to be tested empirically in Australia.

In the theoretical framework developed (Figure 1), various e-business initiatives described in the literature are taken as the basis. These initiatives are expected to have an impact on the information systems, business processes and organisational factors. Moreover, the organisational changes as mentioned above can be analysed in conjunction with the attitude of the enterprise towards various e-business initiatives. The sequence of intra-organizational changes can be hypothesized to vary depending upon the sequence of events, whether the organisation took a pro-active approach or re-active approach [8]. In the pro-active approach to the adoption of these initiatives, it is expected that organization would change organizational structure and strategy, staff selection and training, and redesign/automation of business processes and information systems in that sequence. Similarly in the re-active mode, organizations are expected to change the business processes and information systems first and then follow with changes to staff skills, organizational structure and e-business strategy in that order. All these changes and effects are to be analyzed within the context of organizational variables such as structure, size and business model.

The type and motives of a particular e-business initiative(s) are influenced by the nature of customer, the path to the adoption, and the extent of changes to the business processes and information systems. Consequently, the performance of the business processes in generic sense are expected to be dependent upon the extent of this redesign and integration of business processes and information systems in the given organizational context (Barnes et al 2002). Thus, the understanding of these aspects is important in developing new theories that include e-business initiatives and accompanying organizational changes as relevant variables, rather than studying them separately.

The term business process is very generic and encompasses a wide range of activities in the firm at both strategic and operational level. There are three levels of processes – manage processes, operate processes and support processes [2]. According to Childe et al [2], 'operate processes' are directly involved in producing value for the customer, 'manage processes' are those related with the strategy and business model, while 'support processes' generally support the other two types of processes' in the manufacturing organizations that involves processes such as 'develop product, get order, fulfill order, and support product/customer'.

It is also expected that the social and technological issues that involve organisational culture, organisation size, skill levels of staff may become barriers to the implementation of e-business initiatives. For example, conservative nature of the organisation and/or industry, and the general resistance to technology, may pose problems for the transformation of organisational processes. In addition, inability to invest in technology, influence of major partners in the supply chain, lack of sound organisational strategies, and motives of organisations to select and adopt e-business strategies may influence the scope and outcomes of e-business initiatives. In addition, lack of industry standards and open systems, complexity and limitations of legacy systems are some of the technical barriers. While some companies want to lead the industry by adopting technological innovations, other companies are simply following their competitors with the hope of neutralising the competitive advantage of the leader. On the other hand, some organisations have clear objective of exploiting the full potential of e-business strategies and thereby achieve reduced costs, improved service and target specific niche markets.

# 3. Methodology:

Several studies in the past have tried to explain the ebusiness phenomenon, its potential advantages, the changes required in management and organization of the companies, and the possible business models. Most of these studies were exploratory in nature and mainly employed case study approaches [5]. Empirical studies that try not only to measure the nature and extent of implementing e-business initiatives, but also identify the way these measures impacted on various organizational changes, and their consequent effect on business process performance are necessary. As this research is measuring the extent and consequences, a survey methodology is considered appropriate to collect data [12]. The questionnaires will be posted to the top 1000 companies in Australia in November 2003. This paper reports on the first stage of the research project that has helped develop a model for further analysis and empirical testing.

# 5. Conclusions:

Manufacturing organizations which are traditionally behind the other organizations in services sector, in introducing IT related innovations, are not able to evolve beyond the most basic Internet-enabled applications such as e-mail. Some large manufacturing companies, however, have attempted to implement or have recently implemented ERP systems partially or fully with mixed results in Australia. Reports by NOIE also suggest that there is a need for manufacturing organizations to speed up the adoption of e-business initiatives and to understand the reasons behind this lagging [7]. Some of the reasons suggested include lack of framework within which the analysis of changes required to the processes and systems could be carried out, and difficulty of integration between 'bricks' and 'clicks' processes. Developing such framework will help in minimizing the uncertainty associated with such transitions, and explain the dynamic interactions between organizational factors, business process performance variables and information systems. In addition, it will make contribution to the theories dealing with the interface between information systems and operations management in e-business context.

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Note: The full paper is available from the CD of conference proceedings

Figure 1 – Model for the consequences of e-business initiatives

