# The Effect of the Combination of Business Characteristic with ERP Implementation Strategies on Firm Performance

Yong Jin Kim, State University of New York at Binghamton, Binghamton, NY 13902, USA; E-mail: ykim@binghamton.edu
Jinyoul Lee, State University of New York at Binghamton, Binghamton, NY 13902, USA; E-mail: jylee@binghamton.edu
Pairin Katerattanakul, Western Michigan University, Kalamazoo, MI 49008, USA; E-mail: pairin@wmich.edu

## INTRODUCTION

This study focuses on the effect of the combination of business characteristic with ERP implementation strategies on firm performance. Implementing ERP is not simply purchasing software. Each ERP system represents the best practice for business processes selected from the vendor's point of view. Therefore implementing ERP means that the company implementing the system accepts the vendor's assumptions about the business and changes its existing business processes as required by the vendor (Umble, et al. 2003). Accordingly, it is reasonable to assume that business characteristics of a company and the implementation strategies may affect the benefits resulting from the implementation of the systems. To do this, we employ a cluster analysis to identify different group behaviors among companies and examine the differences in performance between the groups of companies. The results of this study show that what kinds of groups exist in terms of the combination between business characteristic with ERP implementation strategies and how their performance differs.

The current study contributes to literature in two ways. First, this research identifies the basic strategies for ERP implementation and their relationship with business characteristic that in turn affects firm performance. Second, this study empirically tests the role of the combination of the business characteristic with ERP implementation strategies in explaining firm performance. In so doing, this study sheds light on the factors that affect the successful implementation of ERP.

## BUSINESS CHARACTERISTICS: MAKE-TO-ORDER/MAKE-TO-STOCK

For manufacturing companies, business requirements such as customization, volume flexibilities, production volume, set-up and production schedules, number of suppliers, and labor skills may determine their business orientations (Yen and Sheu 2004). Typically, this orientation is categorized into two continuums: make-to-order (MTO) and make-to-stock (MTS) (Gupta and Benjaafar 2004). Under MTO approach, a production order is released to the manufacturing facility only after a firm demand has been received, while under MTS approach, products are manufactured in anticipation of future orders and stored in the finished goods inventory (Youssef, van Delft, and Dallery 2004). The MTO production method is good for customization and volume flexibilities (Yen and Sheu 2004) when products are low in volume but high in variety. On the other hand, when products are high in volume but low in variety, the MTS strategy is better than MTO. That is, when there are requests for high production volume, long set ups, stable production schedules, relatively small number of suppliers, lower labor skills, and a functional organization, companies need to implement MTS strategy to obtain immediate reactivity to external demands at the cost of inventory holding costs (Yen and Sheu 2004, Youssef, van Delft, and Dallery 2004).

Recently, an increasing variety in production variety with varying logistical demands (e.g., short due dates, specific products) and production characteristics (e.g., capacity usage, set-up) leads to a combined strategy of both MTO and MTS (Gupta and Benjaafar 2004, Soman, van Donk, and Gaalman 2004). One widely used approach to the combination of these two strategies is the assemble-to-order (Lu, Song, and Yao 2003). Under this strategy, the upstream part of the manufacturing system is controlled through MTS, whereas the downstream part of the manufacturing system is controlled via MTO (Youssef, van Delft, and Dallery 2004). This approach is effective when finished products have high variety but components have low variety. This approach enables mass customization and quick response by using advanced information technology (Lu, Song, and Yao 2003). However, It is noteworthy that very different managerial actions than those required in MTO and MTS strategy are necessary in a combined MTO-MTS production situation where important issues need to be addressed such as which products should be manufactured to stock and which ones on order and, how to allocate capacity among various MTO-MTS products (Soman, van Donk, and Gaalman 2004).

Initially the primary benefits of ERP implementation have been expected to be in the production processes (i.e., better inventory management and faster order processing). These benefits are very important factors to run MTS types of organization. However, practitioners and researchers now generally agree that the real benefits of ERP are its ability to standardize business processes, build a clean database and minimize data complexity (Connolly 1999). This will affect the business process of MTO types of organization, increasing the level of communication with their suppliers and partners. Based on ERP's origin, it is a better view how ERP impacts different types of manufacturing firms. ERP only increases business process efficiencies or it boosts other business areas beyond business process efficiencies.

## ERP IMPLEMENTATION STRATEGIES

In IT implementation, organizations have to either customize the software packages and/or change their existing business processes (Amrani et al., 2006). This is natural process when organizations implement information systems because different organizations, department, and users require costumed systems based on their needs derived from different approaches to task (Pawlowski et al., 1999). In this study, we use two terms to conceptualize those processes: software customization and process re-configuration. Software customization occurs when an adopting organization will not or cannot change its business process, instead it modifies the application to meet business requirements. On the contrary, business re-configuration is defined as an adoption of business processes embedded in ERP application without modifying the application, which leads to business process reengineering for the adopting organization. An ERP is the enterprise-wise software in which all business functions (such as financial, manufacturing, human resources, distribution, and order management) are tightly integrated into a single system with a shared database. While customization is not impossible, the broad scope and close connectivity of all related functions make customization very costly for any ERP implementation (Davenport 1998, Davis 1998).

The high cost and lengthy implementation process persuade most organizations to align their business processes with the functionality provided by the ERP, rather than customizing the ERP to match their existing processes. According to Forrester Research, only five percent of the Fortune 1000 companies that had purchased an ERP application customized it to match their business processes (Davis 1998). Implementation of an ERP typically entails using the business models included in the ERP software package (Slater 1998). While some companies opt to customize ERP to fit their organizations, the majority of organizations prefer

to install off-the-shelf ERP implementations as a way to avoid customization by altering their business processes. The important fact is that the cost of customization is formidable, and there is a trade-off between convenience/functionality and customization.

Customization and re-configuration are not discrete but on continuum. Thus, organizations, with ERP implementation, have opportunities to define, identify, and improve their business process through business process re-engineering (BPR) approach to enhance business process over different functionalities (Hammer and Champy, 1991).

## ERP IMPLEMENTATION APPROACHES

ERP implementation is no easy task. Once started, there is no way of going back due to the considerable expense of ERP implementation (Bingi 1999). Accordingly, companies have developed various approaches to the implementation. Parr and Shanks (2000) categorized ERP implementation approaches based on the number of implemented modules. First, comprehensive implementation, so called 'big bang' approach, refers to a total effort to implement all modules of the ERP package to their organizations with the tremendous efforts targeted for business process reengineering (BPR)." This approach is the option frequently used by multi-national companies. The second approach is called Vanilla. This approach is for less ambitious companies which want less BPR and few ERP functionalities in probably one site only. The last approach is middle-road, which is in-between the comprehensive and vanilla approaches. This approach can be defined as a phased approach (Parr and Shanks 2000). The phased approach can be further divided into two types, one proceeds module-by-module and the other goes site-by-site (Boudreau, 1999). Recently, companies have followed more structured ways of implementing ERP based on their degree of need for integration. This partial implementation is possible due to the modularity of ERP. Companies may decide to adopt financial accounting module without changes in it process but make significant changes in materials management module.

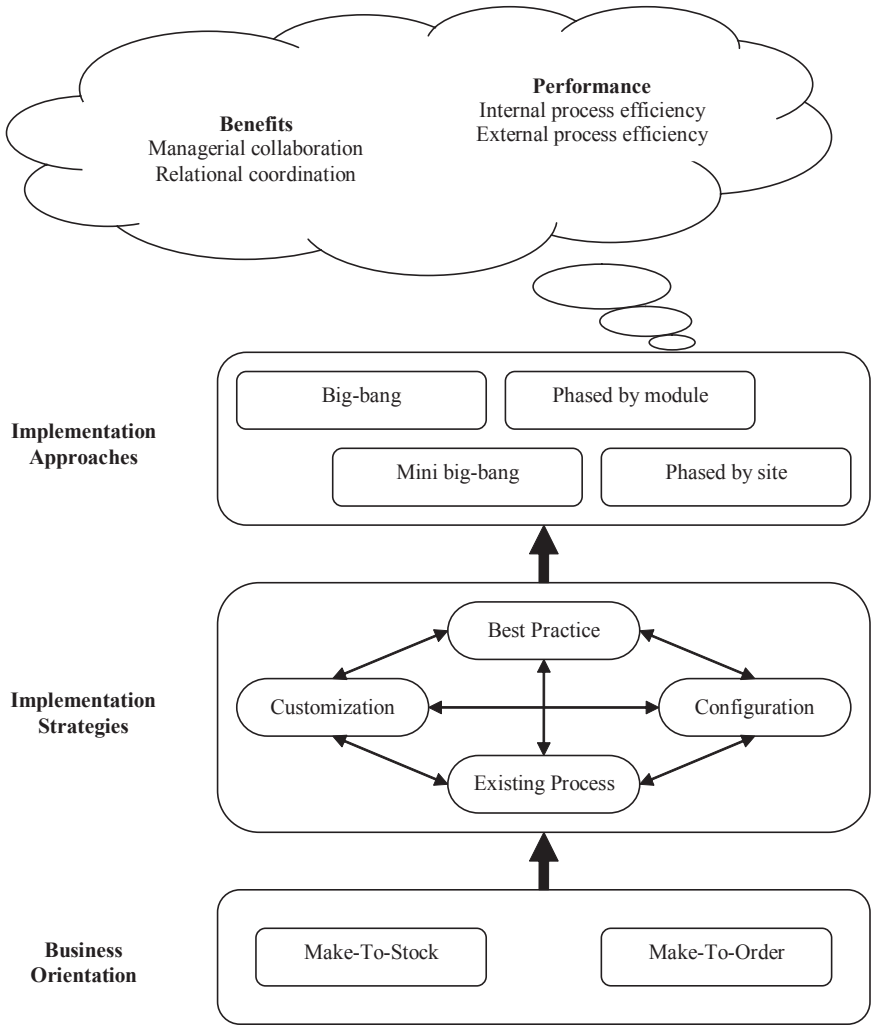
Based on companies' business characteristics and inter-relationship between functions, a variety of mixed implementation approaches can be used together. Companies can take a big bang approach to go live all ERP modules at a single period of time or they can open several modules at different dates, mini big bang. For phased approach, companies can set each phase based on ERP modules or companies' sites.

Figure 1 illustrates the relationship between the production orientation in manufacturing companies, ERP implementation strategies, and implementation approaches. It is assumed in this paper that business orientation affects the selection of ERP implementation strategies which subsequently influence the choice of the implementation approaches. We discuss this relationship in the next section.

## RESEARCH HYPOTHESES

In the previous sections, we discussed production orientations in manufacturing companies, ERP implementation strategies and approaches. As discussed earlier, a different business orientation leads to a different resource allocation system

*Figure 1. Business orientation, ERP implementation strategies and approaches*



and distinctive communication systems to align the downstream, midstream, and upstream processes to customer needs (Prasad, Tata, and Madan 2005). For example, compared to the more traditional MTS orientation, the MTO strategy requires managers to answer for the added complexity resulting from the increased production complexity including product range, more detailed specifications on batch sizes and due dates (Prasad, Tata, and Madan 2005).

As such, the business orientation affects the subsequent implementation strategy of and approach to ERP application. This relationship between the orientation, implementation strategy and approach can be understood in terms of organizational configuration referring to "commonly occurring clusters of attributes of organizational strategies, structures, and processes" (Ketchen, Thomas, and Snow 1993, p. 1278). The basic premise of the configuration theory is that identifying groups different from others but similar within the group allows the better understanding of the relationship between organizational characteristics and performance (Ketchen, Thomas, and Snow 1993). In this study, we define the clusters of the companies based on three configuration variables: business orientation, ERP implementation strategy and implementation approach. We believe that making clusters of companies that have similar business orientation and pursue similar implementation strategy and approach is a better way of understanding the differential effect of ERP implementation on firm performance. That is, if the implementation strategy and approach well fit the business orientation of a company, the company may achieve a better performance.

Therefore, we hypothesize:

Hypothesis 1: The performance of companies pursuing different combination of business orientation, ERP implementation strategy, and implementation approach is significantly different from that of others.

## CONCLUDING REMARKS

In this study, we will investigate what kinds of clusters exist in the ERP implementation context and how the clusters affect firm performance. We will do so using cluster analysis and drawing on the concept of the fit between business orientations and ERP Implementation strategy and approach (Ketchen, Thomas, and Snow 1993). The major implication of this study lies in the finding that where there is discrepancy in business orientation, i.e., production strategies, there may be a gap in the firm performance. Another contribution of this study will be the observation made regarding the role of ERP implementation strategy and approach in determining the types of configuration of groups. This observation will allow the understanding what kinds of firms can be classified as a group and what kinds are not.

## REFERENCES

Available upon by request.

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