

## SUPPLY CHAIN TRANSFORMATION BY ERP FOR ENHANCING PERFORMANCE: AN EMPIRICAL INVESTIGATION

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### EXECUTIVE SUMMARY

*This paper addresses the implication of transforming supply chain by implementing ERP to enhance corporate performance. The research methodology uses a case study approach employing a fact-based principle that combines quantitative and qualitative methods. A model of supply chain transformation by implementing ERP has been developed based on the findings of the case study. The model exemplifies supply chain transformation for enhancing corporate performance. The paper concludes with findings, implications and recommendations for the future research.*

### INTRODUCTION

This paper addresses the efficacy of Enterprise Resource Planning (ERP) systems for transforming supply chain. Investigation and research work in the enterprise system area has begun to receive increased attention. Existing conceptual frameworks need to be tested, substantiated and refined. Particularly a further understanding of the relationship between the enterprise system and corporate performance would have enormous potential to benefit the firm's long-term Information Technology (IT) strategic performance (e.g., Zheng et al., 2000; Sommer, 2003; Huang et al., 2003; Zeng and Pathak, 2003; Davenport and Brooks, 2004; Nah, 2004; Siau and Tian, 2004).

Corporate investment in Information Technology continues unabated. As the single largest capital expense for American companies, IT investment accounts for up to half of all capital investment by firms (Bakos, 1992; Devenport, 1993; Teach, 1997). Moreover, IT infrastructure accounts for an average of about fifty-eight percent (58%) of the organizational IT budgets and continues to increase each year (Broadbent and Weill, 1997). It is a consensus among business and academic communities that the enterprise system is a top issue in IT management (Niederman et al., 1991; Brancheau et al., 1996; Boar, 1997; Information Week, 1999). This top issue is fundamental enough to warrant much more empirical studies.

The purpose of this paper is to examine the relationship between enterprise system implementation and supply chain transformation, and corporate performance. Through use of a case study methodology, the paper seeks to create a descriptive model which depicts the performance benefits experienced by the organization as a result of ERP implementation.

## LITERATURE REVIEW

In the early 1980's the information systems literature began to address how IT could provide competitive advantages (e.g. Parsons, 1983; Rockart & Scott Morton, 1984; Benjamin et al., 1984; Cash and Konsynski, 1985; Porter and Millar, 1985; Johnston and Vitale, 1988). For example, a number of studies have attempted to document the impact of IT on corporate productivity. However, the findings of this research are inconclusive with some studies reporting IT investment being associated with gains in organizational productivity (Osterman, 1986; Brynjolfsson and Hitt, 1993) and other researchers reporting insignificant relationships (Roach, 1985, 1991; Franke, 1987; Loveman, 1988; Parson et al., 1990; Strassman, 1990; Barua et al., 1991; Weill, 1992).

Skepticism about the potential of IT applications for achieving competitive advantage encouraged research to ascertain whether IT can be a source of sustainable competitive advantage. There is increasing support in the literature that IT per se cannot generate an enduring competitive advantage (Hopper 1990; Kettinger et al., 1994; Mata et al., 1995). Mata et al. (1995) find that managerial IT skills are the only IT resource to be a potential to provide firms sustainable competitive advantage. Other IT resources attributes such as proprietary technology, capital requirements and technical IT skills have not been documented to provide competitive advantage (Mata et al., 1995).

Today, an enterprise information system such as ERP (Enterprise Resource Planning) is becoming a dominant enterprise system (Caruso, 2003). Integrating an enterprise wide system with business processes along supply chains is a real challenge and requires firms to build their ERP competence. Recently, discussions about the competence of managing ERP have been emerging in the literature. This is exemplified by research which has proposed (1) a stage-maturity model for ERP planning systems use (Holland and Light, 2001); (2) a two stage multi-item scale ERP competence constructs (Stratman and Roth, 2002); and (3) a best of breed critical factors for successful implementation for enterprise systems (Light et al., 2001; Nah et al., 2001).

Through managing the integration process, companies may be able to create a competitive edge. The integration process must take into account the unique historical, business and technological situations confronting an organization (Wernerfelt, 1984; Barney, 1991; Duncan, 1995). These situational contexts serve to both (a) complicate the implementation/integration of Enterprise Information Systems; and (b) inhibit the imitation of these systems by competitors (Duncan, 1995). The emergence of this situational outcome may serve to enhance the competitive advantage of firms successfully implementing ERP systems (Duncan, 1995; Light et al., 2001).

## METHODOLOGY

This research uses a case study approach to reveal the underlying relationship and interaction between implementing ERP and performance at corporate level. As Pearson (1911) stated, the function of science is the classification of facts and the recognition of their sequence and relative significance. The study employs this fact-based principle to explore IT strategic value by combining the quantitative and qualitative approaches.

A firm's competitive position is defined by a bundle of unique resources, relationships and interactions. The task of management is to adjust and renew these resources and relationships as time, competition, and change erode their value (Rumelt, 1984). An enterprise information system can be this special set of resources that is individually developed from firm to firm, with causal ambiguity and historic complexity behind its sharability and reusability (Venkatraman, 1991; Duncan, 1995). Therefore we put forward our first principal hypothesis.

**Hypothesis 1:** The organization, business processes and technology are closely intertwined with the ERP.

ERP systems tend to be developed by external vendors, not an organization's IT personnel who may be much more familiar with their own company's business processes. The ERP covers and integrates many different business processes reengineering, and involves people, business strategy and processes, organizational structure and procedure, technology etc. Indeed, any enterprise software is not just software. It requires changing the way of running business. As a typical process-oriented system, based on the best practices the ERP embeds the business processes of the best practice in the software. It means that the ERP intrinsically requires that the firm's existing business processes converges the ERP' embedded business processes (Nah et al., 2001; Dai and Duserick, 2005). This leads us to articulate second principal hypothesis.

Hypothesis 2: If guided by a well defined business strategy and if fully integrated with business processes, the ERP has influentially positive impacts on the firm's sustainable competitive advantage and vice versa.

Generally, there have been three main categories of studies in measurement of IT value: "key ratios", "competitive interaction" and "microeconomic" approaches (Mahmood, 1993). Sethi and King, (1994) view different perspectives on the measurement as signifying two fundamental approaches to measuring IT-related competitive advantage: outcome approach and trait approach.

The outcome approach suggests using outcomes as the dominant criterion, such as revenue growth rate, return on investment, return on assets, profits, net worth etc. This approach has been seen in the broader area of organizational effectiveness research (Cameron, 1986). Typical criticism and problem with this approach are that the variables are very aggregate and thus insensitive to the effects of a single IT application (Crowston and Treacy, 1986). Nevertheless, the aggregate feature of variables is the measurement necessity in this study because we are concerned with the impact of the ERP on the corporate level rather than that of a single IT application on a business function level.

The trait approach identifies important traits or attributes that characterize competitive advantage, such as the traits of competitive forces, value activities, strategic thrusts and customer resource life cycle. This approach defines the attainment of a normative state and recommends the measurement of "means" (Hamilton and Chervany, 1981). The advantage of this approach is that it would render deep understanding of how and why IT affects competitive advantage, and the interrelationships among components and subcomponents of competitive advantage. However, it is difficult to select right attributes that possess germane content and adequate operational measures.

A small number of IT value studies demonstrate that it can be done within the same study to combine quantitative and qualitative measures at multiple levels, though it is difficult (Belcher and Watson, 1993; Barua et al., 1991; Desmaris et al., 1997; Vandenbosch and Huff, 1997). Then we put forward third principal hypothesis.

Hypothesis 3: The ERP impact on the firm's performance can be appropriately explained and evaluated by a combination of the outcome and trait measures at the corporate level.

As Bridgman (1980, p. 535) observed, "The scientific method, as far as it is a method, is nothing more than doing one's damndest with one's mind, no holds barred." In this study, Tobin's q is used as an outcome measure. Tobin's q is the ratio of the market value of the firm (share price times number of shares) to the replacement cost of its assets. A q value greater than one means that the market believes the assets can generate cash flows that exceed the liquidation value of those assets.

The Tobin's q has been used to explain a wide variety of phenomena, e.g., value of technological assets (Griliches, 1981; Cockburn and Griliches, 1988; Hal, 1993), capitalized value of monopoly (Salinger, 1984; Smirlock et al., 1984), profitable investment opportunities (Lang and Litzberger, 1989), a firm's intangible value (Hirschey, 1982; Hall 1993; Megna and Klock, 1993), returns from diversification (Wernerfelt and Montgomery, 1988; Lang and Stulz, 1994), brand equity (Simon and Sullivan, 1993), business performance (Chen and Lee, 1995), measuring intellectual capital (Dzinkowski, 2000), and learning organization performance (Ellinger et al., 2002).

IT-related trait performance will be evaluated in terms of publicly recognized rankings by business or industrial communities, such as rankings of Fortune's or Standard & Poor's industrial indexes since these types of rankings would be very objective, reasonable, market-oriented, and recognized authoritative proxies for the firm's competitive trait performance.

Wyeth, a global leader in pharmaceuticals, consumer health care products, and animal health care products has been selected for this study because of its recent implementation of enterprise resource systems.

A three-step procedure has been implemented to achieve the case selection and data collection tasks. First, one hundred sixty five (165) United States corporations in the tri-state region of Pennsylvania, New Jersey and New York were initially selected from Harris Industrial Directories (Harris, 2002 and 2003) based on their operation history (business and information system operated and stock issued for more than five years), size (more than 100 employees and 10 million revenue) and company contact information.

Second, site visits and interviews with initially selected companies' IT management were conducted to evaluate the potential for case study and data collection. Consequently, Wyeth was selected as the firm for the basis of this research.

Third, focusing on the selected company, data collection was conducted through corporate site visits, interviews, discussion notes and company documentation such as annual reports, archival records, financial reports, electronic databases, and other publications. This interview data was supplemented by gaining access to unpublished presentations by key corporate executives and through extensive conversations with Wyeth's Director of Global Strategic Sourcing.

**TABLE 1: WYETH EXECUTIVE PRESENTATIONS AND/OR INTERVIEWS**

Executive Consulted	Managerial Role
John Lunger	Director, Global Strategic Sourcing Support
Thomas Bailey	Manager, SAP APO Implementation

**WYETH**

Wyeth, headquartered in Madison, New Jersey, is a global pharmaceutical research and manufacturing company with 52,762 employees and annual sales of nearly \$14.6 billion in 2002 in more than 140 countries<sup>1</sup>. The company changed its name from American Home Products (AHP) to Wyeth in 2002.

Wyeth develops and markets traditional pharmaceuticals, vaccines, and biotechnology products that serve both human and animal health care. It has strong product lines in both prescription medications and in consumer health products, including over-the-counter (OTC) medications and nutritional supplements. Wyeth has four divisions: Wyeth Pharmaceuticals, Wyeth Research, Wyeth Consumer Healthcare and Fort Dodge Animal Health.

The company initiated a series of acquisitions and divestitures aimed at transforming itself into a major pharmaceutical company in 1994. In that year, AHP spent about \$9.7 billion to acquire American Cyanamid. This purchase expanded its product line to vaccines, cancer agents, and antibiotics. AHP also received a majority interest in Immunex Corp., a biotechnology firm. A major agricultural chemical business also came with the acquisition. Immunex rejected Wyeth's 1995 attempt to purchase the remainder of the company. In 1996, AHP bought the remainder of Genetics Institute. In 1997, it purchased an animal health products company, and in 1998, a vitamin and nutritional supplement manufacturer. AHP sold many of its traditional product lines during these same years to help pay for these purchases and to narrow its focus to human and animal pharmaceuticals.

Wyeth entered the 21st century with a strong pharmaceutical franchise. Its pharmaceuticals had one of the longest remaining patent lives in the industry, with strengths in vaccines, biotechnology, and traditional pharmaceuticals. Wyeth's products spanned a wide range of treatment areas, and, on average, it had about 60 potential products in its research pipeline and a powerful presence in the consumer health market. Wyeth also maintained a significant presence in the animal health market through its Fort Dodge division.

**Wyeth SAP Implementation**

Wyeth's products are sold in more than 140 countries. Its product portfolio has treatments across a wide range of therapeutic areas, including over the counter drugs and hormone replacement therapy products in the Premarin product family. Its worldwide resources include manufacturing facilities on five continents, and a research and development platform encompassing pharmaceuticals, vaccines and biotechnology.

<sup>1</sup> Wyeth 2002 Annual Report.



As a company grown through acquisitions, Wyeth faces the formidable task of knitting together disparate information systems into a single enterprise<sup>2</sup>. The system chosen by Wyeth for the integration has been SAP. In early 2000, the SAP Enterprise Resource Buyer was selected for Wyeth major business division-Wyeth Pharmaceuticals. In addition, Wyeth has been also implementing SAP APO 3.0<sup>3</sup> for integrating its global supply chain.

Headquartered in Collegeville, Pennsylvania, U.S.A., Wyeth Pharmaceuticals has global operations consisting of 37 manufacturing/distribution facilities in 17 countries and distribution centers to market products in over 60 nations. Wyeth employs 44,000 people on a worldwide basis and generates \$6.6 billions in global spending.

Before the SAP Enterprise Resource Buyer implementation, the procurement process was paper driven and disjointed with stand-alone activities. Data was manually entered and involved tedious and time-consuming entries without guaranteed accuracy. Mistakes and incorrect entries caused delays in purchasing. Additionally, customer deliveries were late and orders could not be tracked. Signatures for approvals were required and approved orders were commonly faxed by hand. Not all data was electronically stored. Much of this data was maintained in paper documents which could be easily lost or misfiled.

Consequently, the focus for the SAP project was to integrate all of the purchasing data and to have global visibility across the organization. The implementation objectives would be to streamline processes, to increase service levels and to reduce costs.

The following table summarizes the interactions between the business initiatives and the IT initiatives at Wyeth.

**TABEL 2: WYETH BUSINESS AND IT INTERACTIONS**

PERIOD	BUSINESS INITIATIVE	IT INITIATIVE
Since 1990's	Transform disparate business processes and systems into a globally integrated supply chain	Upgrade manufacturing resource planning system
	Restructure product lines by disposing some traditional products	Implement data warehousing
	Reduce indirect goods and service spend	Implement SAP system since 2000
	Solve the system interoperability	

The company has started to implement SAP systems since the early 2000 to integrate its global supply chain. The approach to implementation was to keep the team lean and rely heavily on internal resources focusing on adoption rather than scale. During the implementation the internal team of three full-time IT professionals partnered with three external SAP consultants. The budget was less than \$2.5MM for the implementation expense after initial license purchase. The greatest challenges were not technical, but process and change management. The implementation team has addressed these with varied success through over-communication and by forcing compliance (Langer, 2002).

<sup>2</sup> During the 1990s, the company made a series of efforts to solve the system interoperability, for example, whittling the company's 13 separate messaging and E-mail systems down to two, Novell's GroupWise and Lotus' cc: Mail; phasing out Apple workstations used in its research and development laboratories in favor of Intel machines, upgrading manufacturing resource planning systems and adding manufacturing execution systems and scheduling applications, implementing data warehousing to help revamp its sales operations, building a warehouse management system (WMS) at Vonore in Tenn to its 85 percent of Wyeth's pharmaceutical distribution in the continental US.

<sup>3</sup> APO stands for Advanced Planner and Optimizer, a set of software applications from SAP for supply chain management. APO is designed to help a company improve production planning, pricing, scheduling, and product shipping. APO can be integrated with SAP R/3 and legacy ERP systems.



The SAP implementation solved the problems surrounding the outdated paper driven process. The entire process from requisition to check is now automated electronically and stored in one central database. The data is visible and accessible throughout the company. The streamlined purchasing process allows for adjustment to enable the most cost effective procurement. Orders, goods receipts and inventory balances are all kept current and available in real time from the single central database.

The SAP procurement project started to go-live in October 2000. The entire purchase process now efficiently integrates business processes and saves significant corporate resources. For example, when the planning module generates production needs and requisitions, vendor selections are automatically selected with consideration to lead times to enable uninterrupted production. Automatic pricing, availability checks, product comparisons, and vendor selection are instantly available. Upon confirmation of the purchase order, the order will be immediately printed and faxed by the system. Electronic verification of the invoice is returned and then automatic payment is performed to the vendor.

While the accurate and true ROI is difficult to calculate as in many other SAP implementations, the live Wyeth SAP Enterprise Resource Buyer sites have begun to realize the benefits of the implementation in terms of increased financial control, streamlined purchasing process and improved compliance.

Wyeth's SAP APO implementation is still continuing with the purpose of transforming its disparate systems and various business processes into a globally integrated supply chain. The objectives of this transformational process include consolidating (a) legacy forecasting and market intelligence systems to better identify customer needs/requirements; and (b) supply and demand planning into a single integrated system.

Lessons learned from the Wyeth SAP implementation include using on-going multiple training methods such as instructor led, WebEx and I-tutor, and choosing the appropriate implementation partner.

### Wyeth Performance Scorecard

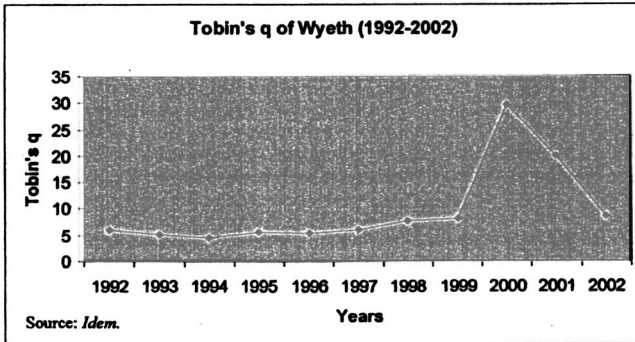
Since the 1990s, Wyeth has begun to modernize its disparate information systems into a single integrated enterprise system. In 2000, the company implemented an SAP system to integrate its global supply chain. The self-reported benefits gained from the SAP implementation are confirmed by Wyeth's Tobin's q for the 1992-2002 timeframe (Table 3). The data indicate that the positive impact of the value of an ERP contributes to sustained competitive advantage. High corporate and industry rankings for Wyeth provide additional qualitative measures for the implicit positive impact of an ERP on corporate performance during for this transformational period.

TABLE 3: TOBIN'Q-WYETH (1992-2002)

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Mean
5.9356	5.1867	4.5157	5.4897	5.3891	6.0860	7.6951	8.2351	29.582	19.896	8.4979	9.6827
Note: Tobin's q is calculated by the formula of $q = \text{Market Value} / (\text{Total Assets} - \text{Total Liabilities})$ , based on the data of <i>Wyeth Annual Reports (2000-2002)</i> , <i>Wyeth Worldscope 10-K History (1993-2002)</i> , Disclosure Inc. 1996.											



FIGURE 1: TOBIN'Q-WYETH (1992-2002)



As shown in the above table and figure, Tobin's q of Wyeth is well above one for each of the eleven years, with a mean of 9.6827 for the eleven years. Very notably, the q value jumped up from 8.2351 of 1999 to 29.5820 and 19.8968 for 2000 and 2001 respectively when Wyeth was implementing the SAP systems to integrate its supply chain. This is the financial market's extremely strong reaction to the Wyeth supply chain transformation. The q value went down from the peak to 8.4979 for 2002, but which is still higher than any value in any year of the 1990s.

For the eleven years of 1992 to 2002 as a whole, Wyeth has an extraordinarily significant performance of the q value with a mean of 9.6827. This shows us that Wyeth's initiative to transform its disparate information systems into a single integrated enterprise system was successfully recognized by the financial market. It also indicates that there are much great values of the firm caught by the market but uncounted in the firm's financial statements. It should be emphasized that the Wyeth's financial statements included a significant item of Intangible Assets in the Assets category. And the value of Intangible Assets has been included in the formula for calculating Tobin's q. This means that there must be highly significant value of unrecognized nontraditional intangible assets embedded and hidden in the firm but detected by the market mechanism.

Because Wyeth's transforming its disparate information systems into a single integrated enterprise system, particularly its supply chain integration, and also because all values of traditional intangibles were already counted in the financial statements, it would be implied that the significant q value above one be contributed by the unrecognized intangible assets embedded in its improved information system and IT-integrated supply chain. It is not claiming that the q value above one is fully contributed by the transformation, but significantly. Otherwise, it would be difficult imagine that Wyeth can even stay as a leader in the highly competitive business for the last eleven years, without its significantly integrated and improved supply chain for such a large firm. This statement is also supplemented by the following business rankings including top IT innovators rankings for Wyeth in the period. They provide additional corroboration for the positive impact successful ERP implementation can have on a firm's performance.



**TABLE 4: WYETH RANKINGS (2001-2002)**

RANKING	2001	2002
Top Fortune 500 Companies in New Jersey	7	7
Top Fortune 1,000 Companies in Pharmaceuticals	7	7
Top Prescription Drug Makers	8	
Top Pharmaceutical Companies in U.S. Chemical Patents	6	
Most Profitable Companies by Return on Shareholders' Equity	9	
World's Most Valuable Pharmaceutical/Biotechnology Companies	7	
Largest Major Drug Companies by Revenue	5	
Largest Major Drug Companies by Net Income	5	
Largest Companies in the U.S	55	
S&P 500 Companies with the Best Return on Equity	9	
S&P 500 Companies with the Best Net Margin	7	
Leading Information Technology Innovators in the Biotechnology and Pharmaceuticals Industry		3
Largest Pharmaceutical Companies by Revenue		5
Largest Chemicals Companies by Sales		8
Most Admired Pharmaceuticals Companies		6
Most Profitable Pharmaceutical Companies		4
Most Profitable Companies by Return on Revenue		2
Leading Information Technology Innovators		82
Top Drug Companies by Sales Per Ad Dollar		6
Top S&P 500 Companies in the Pharmaceuticals and Biotechnology Industry		7

Note: The rankings are retrieved from *Business Rankings* of the Gale Databases (Thomson Gale 2003).

**Supply Chain Transformation by Implementing ERP**

Driven by the competitive forces, Wyeth needs to significantly modernize its supply chain. The greatest challenge Wyeth faces is not technical but process and change management. The strategic initiative is to consolidate its inconsistent business processes along its supply chain across locations by integrating its disparate information systems into a single integrated enterprise system. The implementation of the flexible enterprise IT projects becomes a strategic enabler for supply chain transformation.

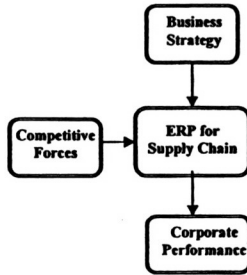
Wyeth's approach to the implementation includes keeping the team lean, relying heavily on internal resources, senior management support, effective communication at all levels, multiple training methods.

The model of Supply Chain Transformation by ERP (Figure 2) depicts the experience of the successful implementation of Wyeth's ERP projects for transforming the supply chain. As the company grew through acquisitions in the global competition environment, Wyeth defined a supply chain transformation strategy by knitting together disparate information systems into a single enterprise system for integrating its global supply chain. The company chose the ERP system and took a phased implementation approach of focusing on gradually successful adoption rather than simultaneous large scale implementation. This strategic utilization of ERP for integrating the supply chain resulted in the improved corporate performance evidenced by the Tobin's q and the business rankings.





FIGURE 2: SUPPLY CHAIN TRANSFORMATION BY ERP



### FINDINGS AND IMPLICATIONS

Strategic utilization of IT is a corporate resource that is a potential source of sustainable competitive advantage, as verified by Wyeth's SAP implementation to integrate its global supply chain. For Wyeth, as their implementation management emphasized, the greatest challenge for the implementation of enterprise system is strategic and change management rather than technical issues. As a company operating on the five continents, products spanned a wide range of treatment areas, grown through acquisitions, Wyeth faces the formidable task of knitting together disparate information systems into a single enterprise.

Wyeth's strategic initiative is to consolidate its inconsistent business processes along its supply chain across locations by integrating its disparate information systems into a single integrated enterprise system. The implementation objectives are to streamline processes, increase service levels and reduce costs. The successful implementation of the competitive enterprise system becomes a strategic enabler for supply chain transformation. Wyeth's successful approach to the implementation includes keeping the team lean, relying heavily on internal resources, senior management support, effective communication at all levels, and multiple training methods.

The intensive relationship and interactions between the enterprise system and managerial capability are critical factors. The experience of Wyeth echoes the viewpoint that managerial IT skills are the only IT resource to be a potential to provide firms sustainable competitive advantage, among other IT resources attributes such as proprietary technology, capital requirements and technical IT skills (e.g., Mata et al., 1995; Sambamurthy and Zmud, 1997; Feeny and Willcocks, 1998).

### RECOMMENDATIONS FOR FUTURE RESEARCH

There are two important issues that need further investigation. The first is the issue of whether the strategic IT managerial capacity is a source of competitive advantage in general. The second issue for future research is the development of measurement of IT managerial capability and its performance.

This study indicates that an enterprise information system such as the ERP by itself may be a competitive advantage if properly implemented. At Wyeth, the ERP is a strategic enabler for integrating its supply chain, which improves the company performance. It is the use of the ERP under a unique context that ultimately creates competitive advantage. Therefore it is illogical or difficult for rivals to imitate.

Thus, what is essential is the ability to manage, to apply IT for a well-defined specific business strategy under a unique context, and to implement a cross-functional and/or cross-activity integration which is much beyond the technology integration. It is this type of the ability to manage IT that may be a sustainable source of competitive advantage. Thus this type of managerial IT capability warrants further empirical studies.

As far as the measurement development is concerned, in addition to the firm-level measures used in this study such as the Tobin's q, those factors that have great impacts on the ERP and its performance need to be identified. For example, some proxy measures may be appropriate targets for research, such as number of years the IT team has worked in the IT area and/or in the management job, qualifications of education and training in the management and IT, number of courses for on-job training, budget for employee training, customers/users evaluation of IT functions.

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