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INFORMATION TECHNOLOGY AND THE SUPPLY CHAIN MANAGEMENT FOR THE TEXTILE INDUSTRY

By

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Abstract

In this digital age, companies wishing to compete must rethink and rework their use of technology in supply chain relationships. ICT offers powerful advanced technology solutions to support and enhance nearly every facet of the textile business. With the increase in competition, clothing manufacturing companies are taking advantage of IT to improve their supply chain management and utilize it as a competitive advantage. In this article, it is shown that IT can be used to form strategic alliances among all participating companies in the supply chain and also to speed up data interchange among companies, reduce inventory and generally serve the customer more efficiently.

Keywords: *Information technology, Supply chain, Textile industry,*

Introduction

Nowadays, one of the most evident changes in the area of information technology is the Internet. The rate of increase in the use of the Internet is second to none compared to any other technological advances in the modern era (Nakad, et. al., 2010). As the use of the Internet becomes prevalent, it is expected to have a profound impact on our everyday life.

In order to succeed in the competitive global market, Nigerian textile and apparel companies need effective communication among buyers, designers, merchandisers, suppliers and factories. With the increasing availability of computing and communication information networks, there is an imperative to deploy technologies such as the Internet and client/server architecture, to serve the needs of industries.

According to Orlikowski and Iacono (2001), Information Technology (IT) is a tool intended to generate value, whether productivity enhancement, cost reduction, competitive advantage, improved supplier relationships, etc. Previous research has shown that information technology may indeed contribute to the improvement of organizational performance (Brynjolfsson and Hitt 1996; Kohli and Devaraj 2003; Mukhopadhyay et al. 1995). Moreover, the dimensions and extent of IT business value depend on a variety of factors, including the type of IT, management practices, organizational structure, as well as the competitive and macro environment (Brynjolfsson et al. 2002; Cooper et al. 2000; Dewan and Kraemer 2000).

The textile industry is one of the oldest in the world. The oldest known textiles, which date back to about 5000 B.C., are scraps of linen cloth found in Egyptian caves (Gray, 1998). The industry was primarily a family and domestic one until the Industrial Revolution in early part of the 1500s when the first factory system was established (Gray, 1998).

Broadly defined, the textile industry consists of establishments engaged in spinning natural and manmade fibres into yarns and threads. These are then converted (by weaving and knitting) into fabrics. Finally, the fabrics and in some cases the yarns and threads used to make them, are dyed, finished and sold in the market to consumers.

To reach a target market, the marketer uses three kinds of marketing channels. Communication channels deliver messages to and receive messages from target buyers. They include newspapers, magazines, radio, television, mail, telephone, billboards, posters, fliers, CDs, audiotapes, and the Internet. Beyond these, communications are conveyed by facial expressions and clothing, the look of retail stores, and many other media. Marketers are increasingly adding dialogue channels

(e-mail and toll-free numbers) to counterbalance the more normal monologue channels (such as ads). The marketer uses distribution channels to display or deliver the physical product or service(s) to the buyer or user. There are physical distribution channels and service distribution channels, which include warehouses, transportation vehicles, and various trade channels such as distributors, wholesalers, and retailers. The marketer also uses selling channels to effect transactions with potential buyers. Selling channels include not only the distributors and retailers but also the banks and insurance companies that facilitate transactions.

The supply chain describes a longer channel stretching from raw materials to components to final products that are carried to final buyers. For example, the supply chain for women's purses starts with hides, tanning operations, cutting operations, manufacturing, and the marketing channels that bring products to customers. This supply chain represents a value delivery system.

The textile and apparel industry stands out as one of the most globalized industries in the world today. It differs from producer-driven supply chains led by multinational companies. The apparel industry is a buyer-driven commodity chain led by a coalition of retailers, contractors, subcontractors, merchandisers, buyers, and suppliers. Each participating entity plays a role in a network of supply chains which span from fibres, to yarns, to fabrics, to accessories, to garments, to trading and marketing. Geographically, they span multi-continents and cut across regional and national boundaries.

With the shrinking profit margin that led to the closure of most Nigerian textile mills, and the advent of modern computing communication networks, it is imperative that the textile and apparel industry seriously consider establishing a cost effective IT infrastructure to maintain their competitive edge.

The aim here is to give information on how the adoption of information communications technologies (ICT) could enable Nigeria to increase the productivity of its key industries; improve its global competitive position in key markets; and drive the overall economic growth of the country.

The Sti ky Situation of the Textile Sector

Although emerging studies are beginning to examine pieces of the network-era of IT business value (Chatfield and Yetton 2000; Mukhopadhyay and Kekre 2002), our knowledge remains scanty or rudimentary and unsystematic in Nigeria. Researchers have adopted diverse conceptual, theoretical, and analytic approaches and employed various empirical methodologies at multiple levels of analysis (Brynjolfsson 1993; Brynjolfsson and Yang 1996; Dedrick et al. 2003; Wilson 1995).

The term IT business value is commonly used to refer to the organizational performance impacts of IT, including productivity enhancement, profitability improvement, cost reduction, competitive advantage, inventory reduction, and other measures of performance (Devaraj and Kohli 2003; Hitt and Brynjolfsson 1996; Kriebel and Kauffman 1988) To emphasize, IT may enable a firm to improve efficiency regardless of whether mimicked by competitors, or, may yield performance impacts unique to a particular firm relative to its competitors, i.e., competitive impacts.

We have observed that the absence of a strong ICT infrastructure has prevented the Textile sector from reaping the full benefits this strategic shift was intended to produce. The Textile industries have continued to struggle with the following challenges:

a. ***Limited visibility into market trends, shifting consumer and market demand, and increasing water, energy, and labor costs.*** Without an industry database, buyers and sellers were not aware of unused capacity in the value chain, and were not in a position to increase utilization and efficiencies by matching buyers and sellers.
b. ***Untapped business development opportunities.*** The absence of a marketing directory with company, product, and contact details made targeting new customers difficult.
c. ***Superb quality and reliability.*** Keeping pace with the "fast fashion" model led to production errors, late deliveries, and inferior quality.
d. ***Limited collaboration.*** The current and traditional clustering strategy excluded remotely located textile companies, which in turn impeded collaborative design, development, and product and service delivery.
e. ***Inefficient operations.*** With disprop 330 ICT investments throughout the Textile sector value chain, those partners unable to invest in expensive solutions became the weakest links and had a negative impact on operations.
f. ***Lost or delayed information.*** Non-standard and non-immediate ways of communicating among buyers, exporters, suppliers, and their smaller suppliers compromised the delivery of critical information.

To improve performance as well as reduce the incidence of missed opportunities and lost revenue, the operations across the Textile sector value chain,

must be optimized so that all partners become more aware of the market needs. Many buyers and sellers, however, are not well-prepared, and may not be able to respond appropriately due to limited access to capital, technology, and skilled workers.

Functionality of the Information Technology

The functionality of the Information Technology based systems can be classified into three types:

Information access: Information can be retrieved and shared through the Internet, or other electronic systems. The information servers serve as information repository and distribution centre, such as most of the homepages on the Internet.

Information coordination: Information can be contributed and utilized within multiple organizations. The information flow becomes two way communications instead of one way access. In information coordination, the information is updated and retrieved by multiple users for different purposes. Furthermore, the information server can coordinate the information for syncronization or management, such as project management and electronic markets.

Information processing: In addition to information access and coordination, information processing is very useful for many applications. The information servers need to process the information or data from the clients and return the result. In this case, the servers function as application programs transparent to users.

Overall System Design

The overall system design is to achieve the application requirements while the communication infrastructure will adopt the prevailing industry standards and protocols supported by the Internet. The information technology infrastructure does not only favour textile and apparel industry. The infrastructure can also be adopted by other industrial applications in Nigeria, such as service industry, transportation logistics, and CAD/CAPP/CAM.

Most of these applications cover all of the information access, coordination and processing functions. The information technology infrastructure is highly cost effective for the executive managers, designers and merchandisers in the textile and apparel industry. The information technology infrastructure also helps to speed up their retrieval of worldwide industry information. By always being able to keep track of the most current product trends world-wide, the users' competitive advantage will be increased. This provides the necessary information infrastructure to put the Government Industry Projects' applications to practical use. With the advent of the new technology, we can continuously improve the performance, such as real-time access and solid security, for this infrastructure.

The Need For IT

1. **Lack of information on demand and supply aspects:** Most of the decisions a manager takes are related to demand and supply issues. But unfortunately very few are able to get it. as a result decisions taken carries risk and uncertainty. Excess inventory is one of the most common problems faced by managers which further results in long cycle-time, outdated stock, poor sale, low rates, and reduction in order visibility and finally leads to customer dissatisfaction.
2. **Long procurement time:** In a traditional textile industry, procurement process takes a much longer time. So, the retailers need to forecast demand and identify consumption trends at a much earlier stage. Lack of clarity about future can either result in early stock out, delay or overstock.
3. **Supply chain in-competency:** With the urge for getting global, apparel and textiles are facing hurdles of inefficiency in carrying out various processes involved right from designing, developing samples, getting approval, manufacturing, dispatching to payment procedures. The total time taken can get extended to one year or even longer. If we calculate, production actually accounts for just ten to twenty percent of the total time. Rest of the time is taken for the information processing from one end to the other. The trajectory of development of Information Technology has intersected every application in textile industry. From enhancing performance of textile manufacturing and tighter process control, IT has inserted intelligence at every node of textile supply chain.
4. **The global trade:** It is a fact that a company going global is opened with lot of opportunities as well as threats in terms of competition, changing trends, and other environmental changes. It necessitates managing every kind of information efficiently and at much faster speed.

IT and the Supply Chain Management

1. **Sharing of Information:** Proper flow of information among supply chain member is very crucial. Such flow of information can influence

the performance of overall supply chain operations. It includes data about customers and their demand, inventory status, production and promotion plan, shipment schedules, payment details, etc. Bar coding and Electronic data interchange are the two information technology tools which can facilitate information integration. Bar coding facilitates recording of detailed data by converting it to electronic form and can be easily shared among members through EDI system. EDI with its high efficiency is able to replace the traditional ways of transmission like telephone, mail and even fax. EDI enables managers to analyze and apply it in their business decisions. It also helps in expediting order cycle that reduces investment in inventory. EDI based network enables Company to maintain quick response and closure relations with suppliers and customers, who are geographically dispersed. Manufacturers and retailers can share even new designs developed through CAD/CAM.

2. **Supports planning and execution operations:** Planning and coordination are very important issues in supply chain management. The next step after sharing information is planning which includes joint design and implementation for product introduction, demand forecasting and replenishment. Supply chain members decide their roles and responsibility which is coordinated through the IT system. Various software tools like MRP, MRP-II, APSS facilitates planning and coordination between different functional areas within the organization.
3. **Material Requirements Planning (MRP):** It helps in managing manufacturing processes based on production planning and inventory control system. Proper implementation of MRP ensures availability of material for production and product for consumption at right time optimizes the level of inventory and helps in scheduling various activities. MRP system uses computer databases to store lead times and order quantity. MRP includes mainly three steps: first assessing the requirement of how many units of components is required to produce a final product; here it applies logic to implement Bill of Material (BOM) explosions. Second step includes deducting the stock in hand from gross to find out net requirement. Finally, scheduling manufacturing activities such that finished goods are available when required, assuming the lead time.
4. **Manufacturing Resource Planning (MRPII) system**: Is a logical extension of MRP system which covers the entire manufacturing function. This typically includes machine loading, scheduling, feedback and Software extension programmes in addition to material requirement planning. It provides the mechanism to evaluate the feasibility of a production schedule under a given set of constraints.
5. **Distribution Requirement Planning (DRP)**: This has the ability to solve both capacity and material constraints and quickly propagates the effects of problems in both backward and forward direction throughout the supply chain.
6. **The Advance Planning and Scheduling (APSS) system**: This includes both material focus of MRP and rapid response scheduling power of MRP-II.
7. **Coordination of logistics flows:** Workflow coordination can include activities such as procurement, order execution, implementing changes, design optimization, and financial exchanges which results in cost and time efficiency. The results are cost-effective, speedy and reliable supply chain operations.

IT contributes towards the maximizing the value of textile supply chain through integrating supply chain operations within and outside the organization and collaborating the acts of vendors and customers based on shared forecasts. Internet adds to IT contribution towards supply chain management through coordination, integration and even automation of critical business processes. New system of the supply chain game emerges as a result of business innovation fuelled by the Internet.

Many supplying companies maintain demand data by style, size, fabric and color to replenish inventory at retail outlet. Level of replenishing is predetermined by both parties after reviewing history of sales by product and buying behavior of the community.

New Business Models

1. **Data mining and data warehousing:** Data mining is the process of analyzing data from different viewpoints and summarizing it into useful information that can be used as a basis of monitoring and control, enabling companies to focus on the most important aspects of their business. It allows users to analyze data from many different dimensions, categorize it, and summarize the relationships identified. In short it is the process of finding correlations or relationship among dozens of fields in large

relational databases. Data warehousing is the repository of data and can be defined as a process of centralized data management and retrieval. Centralization of data maximizes user access and analysis.

2. **E-commerce:** E-commerce can be B2B (Business To Business) and B2C (Business To Customer). B2C commerce is the direct selling to consumers through Internet. While B2B marketplace can be defined as neutral Internet-based intermediaries that focus on specific business processes, host electronic marketplaces, and use various market-making mechanisms to mediate transactions among businesses. B2B appears to be more prospective than B2C.
3. **E-retailing:** The textile-retail giants are adding an Internet shopping-component to their offering. It has affected their distribution and warehousing infrastructure. As a result of going online, retailers have changed their supply chain strategy. High volume products with stable demand are stocked in local stores, while low-volume products are stocked centrally for online purchasing.

Companies prefer a direct route to consumers by closely scrutinizing individual customer's tastes, preferences, habits, and buying patterns. Instead of waiting for consumers to visit their stores, retailers simply send them e-mails with offers. Internet has facilitated quick response system. With the use of web-enabled technology it is possible to have automatic customer replenishment system.

Model Derivation

By and large, we may conclude that the locus of IT business value generation is the organization that invests in and deploys IT resources, which we call the focal firm. However, we which to say that external factors also play a role in shaping the extent to which IT business value can be generated and captured. In particular, the competitive environment – including industry characteristics and trading partners – as well as the macro environment are salient to IT business value generation. We thus derive an integrative model of IT business value (Figure 1) that comprises three domains: (1) focal firm; (2) competitive environment; and (3) macro environment. Using the resource-based view as a primary theoretical lens, the model describes how phenomena resident within each domain shape the relationship between IT and organizational performance.

To operate the IT resource, we bond these formulations with Barney's (1991) classification of firm resources into physical capital, human capital, and organizational capital resources, the former two containing components of the IT resource, while all three contain components of complementary organizational resources.

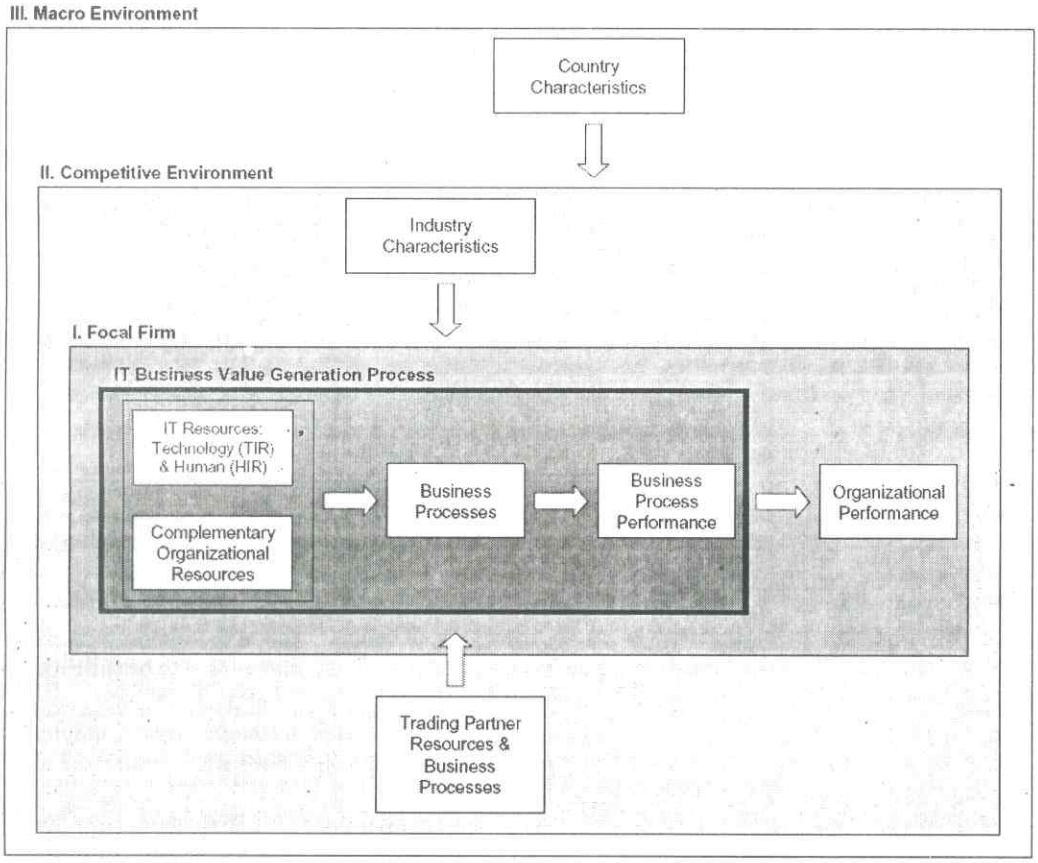


FIGURE 1: IT Business value model

With reference to Figure 1, physical capital resources comprise plant and equipment, geographic location, access to raw materials, and physical technology, a subset of which is the technological IT resource (TIR). TIR can be further categorized into (1) IT infrastructure, i.e., shared technology and technology services across the organization; and (2) specific business applications that utilize the infrastructure, i.e., purchasing systems, sales analysis tools, etc. (Broadbent and Weill 1997). TIR thus includes both hardware and software (Table 1). The separation of TIR into infrastructure and business applications is consistent with how companies view their physical IT assets, an important consideration as firms view the two in different ways when making investment decisions and setting performance expectations (Weill et al. 2002).

The second resource is the firm's human capital, which refers to expertise and knowledge (Barney 1991), and we thus call the second component of the IT resource the human IT resource (HIR). Similar to prior characterizations (Bharadwaj 2000; Dehning and Richardson 2002; Ross et al. 1996), HIR denotes both technical and managerial knowledge. Examples of technical expertise include application development, integration of multiple systems, and maintenance of existing systems; managerial skills include the ability to identify appropriate projects, marshal adequate resources, and lead and motivate development teams to complete projects according to specification and within time and budgetary constraints. Though technical and managerial expertise are often intertwined, they are nonetheless distinct concepts, and their conceptualization as such is necessary for precision in describing IT investment impacts. Human IT expertise may be associated with the entire technological infrastructure of the organization or may reside locally within business units and be associated with specific business applications.

Complementary Organizational Resources

Although it is possible to apply IT for improved organizational performance with few organizational changes (McAfee 2002), successful

application of IT is often accompanied by significant organizational change (Brynjolfsson and Hitt 2000; Brynjolfsson et al. 2002; Cooper et al. 2000), including policies and rules, organizational structure, workplace practices, and organizational culture. When synergies between IT and other firm resources exist, we call the latter complementary organizational resources. The RBV literature provides guidance regarding the classification of complementary organizational resources. Returning to Barney's (1991) classification of firm resources, complementary organizational resources may include non-IT physical capital resources, non-IT human capital resources, and organizational capital resources, e.g., formal reporting structures and informal relationships within and among firms.

TABLE 1: Explanation of Model

I. FOCAL FIRM	
IT Resources a. Technological IT Resources (TIR)	Infrastructure: shared technology & technology services across the enterprise. Business applications: utilize the infrastructure, e.g., purchasing, sales, etc. Technical skills: programming, systems integration, database development, etc.
b. Human IT resources (HIR)	Managerial skills: collaboration with business units & external organizations, project planning, etc.
Complementary Organizational Resources	Organizational resources complementary to IT, categories of which include non-IT physical resources, non-IT human resources, and organizational resources (Barney 1991) and examples of which include organizational structure, policies and rules, workplace practices, culture, etc.
Business Processes	Activities underlying value generating processes (transforming inputs to outputs). Inbound logistics, manufacturing, sales, distribution, customer service, etc.
Performance a. Business process performance	Operational efficiency of specific business processes, measures of which include customer service, flexibility, information sharing, and inventory management.
b. Organizational performance	Overall firm performance, including productivity, efficiency, profitability, market value, competitive advantage, etc.
II. COMPETITIVE ENVIRONMENT	
a. Industry Characteristics	Industry factors shaping the way in which IT is applied within focal firm to generate business value, including competitiveness, regulation, clockspeed, etc.
b. Trading Partner Resources & Business Processes	IT and non-IT resources and business processes of trading partners such as buyers, suppliers, and co-opetitors.
III. MACRO ENVIRONMENT	
Country characteristics	Macro factors shaping IT application and IT business value generation, including the level of development, basic infrastructure, education, research and development investment, population growth rate, culture, etc.

The macro environment is dynamic and complex, and there is a paucity of IT business value research in this area. However, examining the range of macro factors that potentially shape IT business value generation, telecommunications infrastructure, and in particular, Internet diffusion, would appear to be an important factor enabling firms to apply IT for improved performance.

Telecommunications infrastructure varies widely across countries (Pilat 2003). Given such variation, researchers have explored how heterogeneity in telecommunications infrastructure

may be associated with macro performance. Roller and Waverman (2001) find empirically that the extent of telecommunications infrastructure is associated with economic growth. According to Straub and Watson (2001, pp. 338), "The net-enabled organization (NEO) coordinates its activities and interacts with its stakeholders through the exchange of messages over electronic networks." Having squeezed most of the efficiencies out of internal connectivity, organizations are looking to their external environment to coordinate the production and delivery of goods and services, with the potential for orders of magnitude increases in efficiency (Hammer 2001). However, without a sufficient telecommunications infrastructure, i.e., broad diffusion of high-speed Internet connections throughout the economy, the resulting network externalities and net-enabled efficiencies are limited. Emerging empirical evidence of differences in IT business value across developed and developing countries may be a manifestation of differences in Internet diffusion (Dewan and Kraemer 2000; Tam 1998).

From the perspective of resource-based theory, telecommunications infrastructure is not a resource in the conventional sense as it is not owned and operated by the focal firm. Rather, it can be conceptualized as a country-specific asset available to all firms. As firms and their trading partners adopt and co-specialize their own IT to the telecom infrastructure, the extent of generated IT business value is likely to increase. However, the circumstances under which this occurs are unclear due to a lack of prior research. Thus, although differences in telecommunications infrastructure across countries enable varying opportunities of co-specialization with focal firm IT resources, the nature of resulting benefits in specific contexts is uncertain.

Recommendations

To overcome all the aforementioned problems, we are suggesting the following;

1. An industry directory application that would connect the entire Textile sector ecosystem by letting all partners register, view supply and demand, and contact and communicate with each other. This, combined with an online marketplace application that compiles buy/sell postings, would increase visibility into capability and capacity across the value chain and improve overall ICT utilization. This could be tagged "Facebook of Textiles" of which the value proposition resembles that of Facebook – by registering and providing information on their companies, Buyers and sellers gain access to communication tools and business processes that improve their visibility, productivity, and market opportunities, and reduce the cost of production cycle time.
2. Efficient, flexible collaboration tools such as virtual communities, virtual meetings, and a collaboration platform would extend the traditional clustering model to include overseas branch offices or factories and remotely located buyers and sellers, enabling them to work, share information, and design in collaboration with others as if they were within the cluster. Real-time communication tools (voice, video, data) would enable the prompt exchange of information among value chain partners.
3. Custom applications developed to enable information exchange, workflow management, and visibility among related companies of the value chain of a large exporter. Applications for sampling, product planning, and design would be open and simple to ensure all partners can share and use them through the platform.

A connectivity package so that buyers and sellers can connect to the platform and with each other without incurring unreasonably high costs. Providing a common platform that is accessed via the Internet facilitates stakeholder sharing and helps ensure that all buyers and sellers, regardless of size and level of complexity, can easily adopt ICT to advance their businesses.

Conclusion

We have learned that IT is valuable, offering an extensive menu of potential benefits ranging from flexibility and quality improvement to cost reduction and productivity enhancement. Our presentation also suggests that the synergies resulting from technical and human IT resources likely result in short-lived competitive advantages. Regarding the mechanisms by which value is achieved, we learned that the high degree of complexity leads to a context-contingent set of synergistic combinations of IT and other organizational resources, including workplace practices, change initiatives, organizational structure, and financial condition. In summary, despite its limitations, we are hopeful that our article not only sheds light on a difficult and complex subject, but also shines a ray, albeit modest, on the future.

Suggestions For Further Studies

Finally, studies that incorporate macro characteristics – whether in multiple case studies or in empirical research – are needed to examine which macro characteristics are salient and how they may interact with one another in shaping the ability of firms to apply IT for organizational improvement. The examination of similar firms in a single industry across multiple countries might enable the isolation of macro factors that are the source of differential IT business value.

References

Barney, J.B. "Firm Resources and Sustained Competitive Advantage," *Journal of Management* (17:1) 1991, p 99–120.

Bharadwaj, A.S. "A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Examination," *MIS Quarterly* (24:1) 2000, pp 169-196.

Broadbent, M., and Weill, P. "Management by Maxim: How Business and IT Managers Can Create IT Infrastructures," *Sloan Management Review* (38:3) 1997, pp 77- 92.

Brynjolfsson, E. "The Productivity Paradox of Information Technology," *Communications of the ACM* (36:12) 1993, pp 66-77.

Brynjolfsson, E., and Hitt, L. "Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending," *Management Science* (42:4) 1996, pp 541-558.

Brynjolfsson, E., and Hitt, L. "Beyond Computation: Information Technology, Organizational Transformation and Business Performance," *Journal of Economic Perspectives* (14:4) 2000, pp 23-48.

Brynjolfsson, E., Hitt, L., and Yang, S. "Intangible Assets: Computers and Organizational Capital," *Brooking Papers on Economic Activity* (1) 2002, pp 137- 181.

Brynjolfsson, E., and Yang, S. "Information Technology and Productivity: A Review of the Literature," *Advances in Computers* (43) 1996, pp 179-214.

Chatfield, A.K., and Yetton, P. "Strategic Payoff from EDI as a Function of EDI Embeddedness," *Journal of Management Information Systems* (16:4) 2000, pp 195-224.

Cooper, B.L., Watson, H.J., Wixom, B.H., and Goodhue, D.L. "Data Warehousing Supports Corporate Strategy at First American Corporation," *MIS Quarterly* (24:4) 2000, pp 547-567.

Dedrick, J., Gurbaxani, V., and Kraemer, K.L. "Information Technology and Economic Performance: A Critical Review of the Empirical Evidence," *ACM Computing Surveys* (35:1) 2003, pp 1-27.

Dehning, B., and Richardson, V.J. "Returns on Investments in Information Technology: A Research Synthesis," *Journal of Information Systems Management* (16:1) 2002.

Devaraj, S., and Kohli, R. "Performance Impacts of Information Technology: Is Actual Usage the Missing Link," *Management Science* (49:3), March 2003, pp 273-289.

Dewan, S., and Kraemer, K.L. "Information Technology and Productivity: Evidence from Country-Level Data," *Management Science* (46:4) 2000, pp 548-562.

Gray Stephen (1998), "CAD/CAM In Clothing and Textile". Grower Publishing Limited.

Hammer, M. "The Superefficient Company," *Harvard Business Review* (79:8) 2001, pp 82-91.

Hitt, L., and Brynjolfsson, E. "Productivity, Business Profitability and Consumer Surplus: Three Different Measures of Information Technology Value," *MIS Quarterly* (20:2) 1996, pp 121-142.

Kohli, R., and Devaraj, S. "Measuring Information Technology Payoff: A Meta-Analysis of Structural Variables in Firm-Level Empirical Research," *Information Systems Research* (14:2) 2003, pp 127-145.

Kriebel, C., and Kauffman, R. "Measuring and Modeling the Business Value of Information Technologies," in: *Measuring Business Value of Information Technologies*, ICIT Press, 1988.

McAfee, A. "The Impact of Enterprise Information Technology Adoption on Operational Performance: An Empirical Investigation," *Production and Operations Management* (11:1) 2002, pp 33-53.

Mukhopadhyay, T., and Kekre, S. "Strategic and Operational Benefits of Electronic Integration in B2B Procurement Processes," *Management Science* (48:10) 2002, pp 1301-1313.

Mukhopadhyay, T., Kekre, S., and Kalathur, S. "Business Value of Information Technology: A Study of Electronic Data Interchange," *MIS Quarterly* (19:2) 1995, pp 137-156.

Nakad, Z. Jones, M., Martin, T., Fawaz, W; 2010: Networking in E-textiles; Computer Communications 33 (2010) 655–666

Orlikowski, W.J., and Iacono, C.S. "Desperately Seeking the 'IT' in IT Research - A Call to

Theorizing the IT Artifact," *Information Systems Research* (12:2) 2001, pp 121- 134.

Pilat, D. (ed.) *ICT and Economic Growth: Evidence from OECD Countries, Industries and Firms*. Organisation for Economic Co-Operation and Development, 2003. 71

Roller, L.-H., and Waverman, L. "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach," *American Economic Review* (91:4) 2001, pp 909-924.

Ross, J.W., Beath, C., and Goodhue, D.L. "Develop Long-term Competitiveness Through IT Assets," *Sloan Management Review* (38:1) 1996, pp 31-42.

Straub, D.W., and Watson, R.T. "Transformational Issues in Researching IS and Net-Enabled Organizations," *Information Systems Research* (12:4) 2001, pp 337-345.

Tam, K.Y. "The Impact of Information Technology Investments on Firm Performance and Evaluation: Evidence from Newly Industrialized Economies," *Information Systems Research* (9:1) 1998, pp 85-98.

Weill, P., Subramani, M.R., and Broadbent, M. "Building IT Infrastructure for Strategic Agility," *Sloan Management Review* (44:1) 2002, pp 57-65.

Wilson, D. "IT Investment and Its Productivity Effects: An Organizational Sociologist's Perspective on Directions for Future Research," *Economics of Innovation and New Technology* (3) 1995, pp 235-251.