

The Effect of E-Business and Information Management on Supply Chain Operations for SMEs

Vatsal Kamlesh Shah

Department of Computer Engineering,
Shah and Anchor Kutchhi Engineering College,
Mumbai, India.

Abstract : *E-business technologies optimize operations of SMEs enormously by enhancing their performance and help them develop sustainable competitive advantage. Breakthroughs in the integration of information and communication technologies into the supply chain management operations of SMEs is an important aspect of efficient business processes that reduces costs of production, enhances customer relationships, and increases the exchange of information among SMEs. However, SMEs have been slow in adopting the principles of management information systems; however it provides one of the key success factors for all types of businesses involving small and medium enterprises. The research aimed at examining the effects of e-business and information management on supply chain operations for SMEs, given that it is important to have SMEs that are able to overcome the challenges of adopting e-business strategies. The research design and methodology employed surveys and use of case studies to determine the benefits of adopting information technology systems into their business operations. The internet has significant impact on how SMEs interact with one another, as well as their consumers, and therefore integration of e-business practices considerably reduces transaction costs and time, makes information easily available, and helps these organizations cope with the challenges of uncertainties since more SMEs are expected to adopt e-business technologies.*

the key success factors in applying the e-businesses supply chain applications should assist in the integration of business processes. Therefore, the adoption of e-business supply management by SMEs in line with the use of the internet is important for contribution to economic growth of these organizations. During the last two decades a combination of market forces such as globalization, amplification of supply networks has forced SMEs to reexamine their supply chain strategies. The markets have revolutionized with factors such as technological and economic changes that SMEs must select tailored e-business applications in order to cope with business environment uncertainties in recreating and implementing their supply chain strategies. It is imperative that SMEs that learn how to create and contribute in well-built supply chains have sustainable competitive advantages. The speed of change against factors such as proliferation of product diversity, emphasis on time, greater environmental uncertainty influences the ultimate goal of the e-business supply chain management for SMEs. The coordination of the flow of materials into and out of the SMEs should fit with cordial relationship with suppliers. Therefore, SMEs are compelled to examine various e-business supply chain models in recommending an applicable framework that is essential to their competitiveness.

1. INTRODUCTION

The extraordinary growth experienced in the field of e-business transactions focused on enhancing the performance of supply chain operations for SME is an important aspect for the competitiveness of companies. The application of the integration processes using electronic communication networks and the transaction performed through high profile of tailoring to the needs of the SMEs should help them collaborate in business markets. The understanding of

A. Background Information

Computers that are connected to the internet have become enormously widespread among business of all types and sizes. When considering technological advancements SMEs have been slower in adopting e-business supply chain models as compared to their larger counterparts. The many benefits of integrating e-business processes in their supply chain operations in relation to sector specific strategies enables them

to have firm organizational structures to their chain values. The little incentive and lack of applicability of e-business is linked to unclear businesses returns [1].

The emergence of electronic commerce application has brought immense new landscape for conducting business, and there for e-business enables SMEs to diversify their business strategy. However, the e-business is presently gaining attention among the SMEs, which implies that the more they embrace e-business strategies they will obviously have better efficiency. It is imperative that SMEs have had challenges in relation to limited resources and capabilities, as well as drawn more research themes [3].

Widespread use of e-business supply chain models facilitates greater opportunities that enhance the efficiency and effectiveness of the SMEs. It implies that the adoption of e-business becomes a key factor in the adoption of global sourcing, and therefore effective use of e-business helps them exchange internal and external transactions. The issue of e-business among SMEs requires more attention since SMEs play an important role towards building the economies of the countries in which they operate [8]. Managing a SMEs e- business supply chain adoption strategy has proved to be a complex and daunting task, and therefore appropriate strategic decisions must bear far reaching implications made on a specific time variable. The extraordinary challenges affecting the management of e-business requires evaluation of the new and existing venture based on burn rates, as well as revenue estimates of the organization. The present market environmental factors have compelled SMEs to apply irrational exuberance based on the sector or industry, which implies that factors such as quality, costs, and profitability must be examined [2].

The utilization of e-business models must make quality, costs, and profitability as the long term goals, which must also include challenges and opportunities based on the supply chain adopted. This must go hand in hand with accommodating the unique business risk issues associated with electronic commerce. Furthermore, identification of key electronic commerce drivers in SMEs business supply chain operations and associated business management models must be industry or sector specific [4].

Essentially managing growth of new information and communication technologies is paramount to managing the information flow, which is important to managing flow of materials. At present, it should be possible to disconnect the flow of physical materials from flow of information. Therefore, the World Wide Web enables the connection of all business entities operating within a single supply chain. This brings about new challenges for SMEs, and therefore new technologies embraced should attempt to optimize the value supply chain. The goals of such integration must consider the final goal of planning the e-business features and activities in relation to the consumers' demands as close as possible [3].

Networking models creates new ways and opportunities for organizing the logistics chain for all facets such as supplies, purchasing, storage, transport, and distribution. The fast changing scenarios therefore, brings about threats and opportunities which the SMEs must cope with in order to have successful and high performing e-business models. It is important to note that faster adoption of e-business supply chain strategies requires the development of appropriate e-logistics innovative ideas that are suited for SMEs. This brings to light the fact that both new and old technological business processes are not creating inefficient and expensive performance. Therefore, to effectively apply the value and utilization of e-business innovative new technologies and operating models must answer pertinent questions in relation to both the internal and external environmental market demands [11].

Many SMEs contend with the question whether e-business supply chain models have a positive impact on performance; however some of the effects are related to the elimination of certain intermediaries including wholesalers and retailers. The e-business supply chain model adopted should focus on the emergence of new players in the sector or industry, as well as the role of the adaptation of traditional logistics chains while taking into account the needs of e-business processes. Furthermore, many SMEs are struggling with internal organizational change management processes when they attempt to make use of their personnel in adopting e-business supply chain models [3].

E-business strategies and applications provide a wide ranging benefits across the inter SMEs and intra SMEs business processes and transactions. Information and communication technologies

improve knowledge and information management internally within the organization, as well as reduce transaction costs. Therefore, e-business supply chain models increase reliability and speed of the transactions for both business to consumer and business to business. Furthermore, effective technological tools improve external communication, help in attracting new customers and retaining new customers, improve the quality of goods and services [3].

There are numerous advantages of using effective e-business supply models for SMEs, adoption and effective use is riddled with achievement of fastened growth in online sales and purchases has not taken wide use. Most cases online transactions are mainly domestic based rather than cross border, a situation compounded by the largely lagging behind hindering factors about the SMEs. In order for SMEs to fully adopt e-business supply chain models, e-commerce strategies, and tools, the advantages must outweigh maintenance and investment costs, the potential return motivation, and other commercial issues. The adoption of e-business supply chain models are also hampered with the relative small share the field boasts of in the total commercial market [7].

SMEs cannot cope with the larger firms because just having connectivity such as online information, internet access, marketing, and computers does not necessarily bring large benefits and therefore, most of them will stay with traditional supply chain systems. Other barriers include availability of information communication technologies competencies within SMEs, availability of tailored interoperable SMEs systems, network infrastructure, as well as other related internet support services. Lack of redress systems, reliable trust systems, regulatory differences, and cross country legal differences hamper global supply chain transactions [5].

Policies also affect the adoption of e-business supply chain models given that these policies are designed in a manner that they do not encourage improvement and expansion of quality network infrastructure , as well as a friendly regulatory and legal environment, creation of favorable business environments, improvement of technological diffusion, SMEs tailored policies, business consultation services, e-business supply chain models, e-business awareness programs, and management training in order to improve information and communication technology managerial skills [6].

However, the approach of conducting e-business supply chain process, SMEs must contend with the fact that information and communication technology is continually changing. Moving from traditional physical interactions to the virtual business environment, and therefore ICT managerial skills are important in implementing the change process in order for the SMEs to realize maximum benefits. E-Business is considered widely as a challenge for many SMEs, which implies that competitive success and business strategy is linked to efficient management of resources, skills, as well as distributors, suppliers, and business processes capabilities. Therefore, SMES must implement successful e-business supply chain models, and it is critical to efficient inter organizational information flows, facilitation of internet and information technologies. E- Business and management of goods from suppliers to consumers must optimize the strategic and operational information and systems, business value proposition, and business processes, at every facet of the SMEs [8].

B. Research Aims and Objectives

The aim of the research was to examine how e-business supply chain models have significant effects of performance of SMEs in terms of development of a sustainable competitive advantage and value chain performance. The operational and strategic choices in relation to the role played by the suppliers, distributors, customers, and producers are to be analyzed in order to provide pertinent information regarding the performance, profitability, and sustainability of the value chain. SMEs contribute more than fifty percent of global gross domestic product and approximately ninety percent of employment, therefore there is need to for both national and global based SMEs must be able to develop a competitive advantage that entails the integration of development of organizational supplier bases. Therefore, the holistic supply chain approach needs to consider the overall business elements that analyze the internal and external business environment in order to implement a successful e-business supply chain model.

Therefore, the objectives of the research included:

1. The determination of the effect of e-business and information management on supply chain operations for SMEs

2. The exploration of the extent which the SMEs are aware of effective principles of e-business in the supply chain operations.
3. Identification potential e-business strategies that are accorded priority among the SMEs
4. Identification the priority that SMEs accords e-business strategies in their supply chain operations.
5. Identification of the key success factors in using the e-businesses supply chain applications and integration of business processes
6. Understand how to create and contribute in well-built supply chains have sustainable competitive advantages

C. The Problem Statement

The research needs was to investigate e-business systems that are needed for effective supply chain operations for SMEs, as well as the challenges that they encounter in the adoption of e-business supply chain models. The researcher noted that SMEs have challenges that they must overcome in narrowing the credibility gap with large organizations in achieving competencies in management information systems. The factors of e-business readiness, electronic supply chain models adoption, issues of e-business diffusion, impact and consequences of e-business needs to be analyzed in order to inform performance and competitive advantage parameters.

It is important to review the effect of digital technology on SMES in relation to supply chains, e-marketing, and e-commerce in the implementation of strategies of e-business supply chain models. Furthermore, it is important to address the central issues in the provision of in depth understanding concerning the challenges to information integration in supply chain systems in relation to low adoption of e-business technologies. Additionally, the drivers of success need understanding in relation to the adoption practices in different sectors among the SMEs.

D. Research Questions

The researcher developing the following research questions to help in achieving the aims and objectives of the study, as well as to develop the research hypothesis.

1. What are the effects of e-business and information management on supply chain operations for SMEs?
 2. What is the extent which the SMEs are aware of effective principles of e-business in the supply chain operations?
 3. What are the potential e-business strategies that are accorded priority among the SMEs
 4. How do SMEs accord e-business strategies in their supply chain operations?
 5. What are the key success factors in using the e-businesses supply chain applications and integration of business processes?
 6. How the creation and contribution of well-built supply chains have on sustainable competitive advantages?
- E. *Research Methodology and Design*

SMES was classified on four dimensions namely e-business readiness, electronic supply chain models adoption, issues of e-business diffusion, and impact and consequences of e-business in relation to strategic focus and chain relationship position. The variables analyzed are e-business coordination, efficiency, innovation, and collaboration in relation to managerial and theoretical implications. The sample for the research survey was chosen from a population of was a quasi random stratified sampling method of 278 generating a sample of 50 SMEs for focus group interviews in Pakistan containing different levels of consumers, suppliers, distributors, and producers. The research also identified task oriented and interaction centered case studies of 5 SMEs in exploring the experiences in describing the effects of e-business and information management on supply chain operations for SMEs.

2. LITERATURE REVIEW

Supply chain management drew great attention in the late 1980s, and the concept defined processes such as operations management and logistics. The pace at which the field of supply chain management has evolved, organizations are increasingly become aware of the supply chain models they adopt. SMRs operate in uncertain markets, and therefore it is important for them to learn how to create and participate in strong e-business supply chains that bear considerable effect on the sustainable competitive advantage for their markets. Internally, SMEs supply chain systems include functions that optimize the value chains in areas such as customer

service, distribution, operations, marketing, new product development, and finance [9].

Dynamic supply chains should entail e-business principles in enabling regular flow of information, as well as products and services between all stages of the supply chain system. Collaborative based value chain strategies links inter-organizational business process that builds shared markets, and defines the combination of art and science in creating e-business supply chains that effectively sources products and services from the suppliers and delivers to the customers. The application of ICT in the last ten years has largely changed the manner in which organizations conduct their business operations. Effective network designs and information technology has considerably contributed to the main aspects affecting the operation and execution of supply chains [7].

Web driven technologies provide greater potential in relation to the coordination of supply chains, which enables organizations to attain higher levels of performance. Information and communication technologies play an important role in building a close relationship between suppliers and buyers. Therefore, if SMEs find the need to collaborate with their counterpart trading partners, it is important that they adopt e-business technologies within their supply chains. Internet technologies including electronic commerce enable organizations improve the information sharing within their supply chains [15].

The benefits regarding management information systems in terms of customer relationship management includes decreases transaction costs, improved transaction processing, enables prompt feedback to customer demands. The close statistical association between productivity, competitiveness, and information and communication technologies initiates the investments participation methods should fulfill expectations. Companies should investigate the framework that makes them know the e-business systems to adopt, and therefore organizations that are information technology ready allows them in the identification problematic and risk areas in relation to the adoption of information technology projects , demonstrate information technology ready , and taking necessary and sufficient actions in solving problem areas [23].

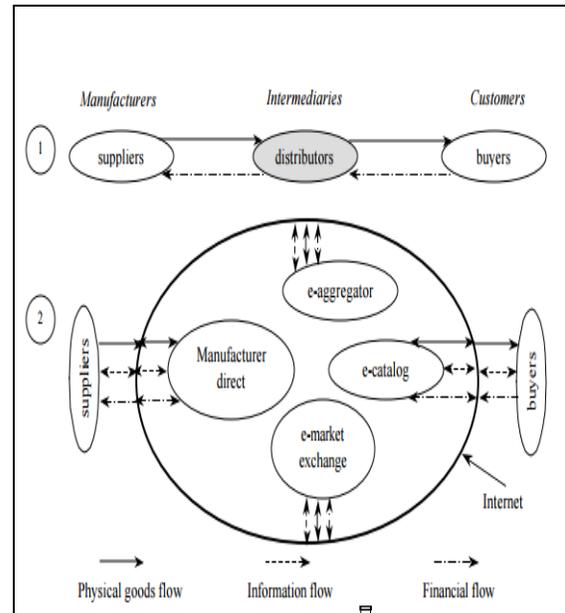


Figure 1 : Framework for Integrated supply chain network

The variety of advantages of adoption of information technology in supply chain functions include organizational factors, relative costs, management support, internal and external pressures, technological factors, and individual characteristics are key to influencing information technology adoption in organizations. Compatibility of the internet against organizational culture, management support, and infrastructure significantly affect adoption of the internet. While adopting information technology in the supply chain strategy, the organization must examine the organizational size, integration level of management information systems, compatibility strategy that considers implementation outcomes, level of training of employees, and executive support in initiating technological change [12].

A. Key Value Chain Drivers

The key value chain drivers that leads organizations to particular avenues of inter organizational flows of information and materials flows linear relationships in traditional supply however, the flow of information from suppliers, distributors, and supply chains that focused on material flow management. The main emphasis was the way of completing processes from inputs to finished products that are smoothly delivered to customers. Supply chain management was mainly driven by logistics management that dealt with warehousing, shipping, and materials replenishment [7].

However, internet based supply chain system offers superior channels of communication that enables supply networks that enables interactions with other stakeholders directly. E-business supply chain management has shifted to systems that manage both the material flow, as well as management of flow of information and financials. Supply chain networks are critical components of e-business strategies that are created and implemented in order to drive enterprises towards the effective adoption of e-business models [4].

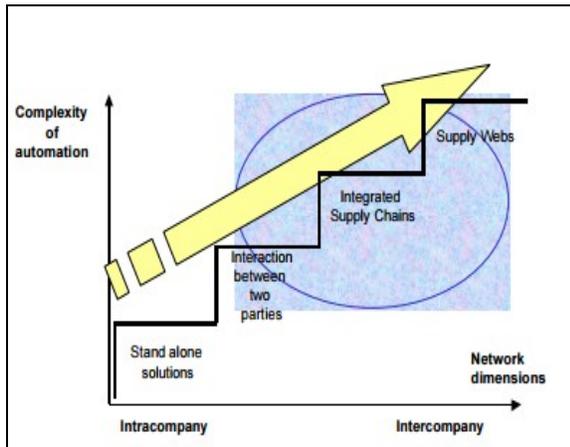


Figure 2 : Transitioning from traditional to web based systems

Web based supply chain models are critical to two main objective namely real collaboration and identification of seamless coordination among chain stakeholders. Information sharing is a key driver of value chains, and therefore with the widespread application of virtual private network, electronic data interchange, internet, and intranet organizations should optimize theory business processes. Some typical examples such as Just in Time, Vendor managed Inventory cuts operational costs and reduce cycle times for business activities such as distribution, purchasing, and production. Web based supply chain management enables the creation of wider avenues for coordination and collaboration of receiving and exchanging information of supply chain participation in activities including shipping, production, and purchasing in real time. Therefore, web based supply chain systems have replaced the traditional supply chain management systems that focused on planning, production, and forecasting using retrospect data into more responsive supply chain systems that are e-business driven [17].

Use of Internet and ICT among SMEs

The Use of Internet and ICT among SMEs is increasingly prevalent where a majority of SMEs are equipped with computers, and internet access continues to be embraced with the increasing internet penetration. E-business is drawn from effective and productive creation of logic that drives digital information economy that enables SMEs in developing considerable changes in the internal and external business environment. E-business represents management philosophies that mirror pertinent characteristics and features that enable global digital economy. That is dynamically real time for effective decision making, speed of response to consumers' demands, and customer orientation [19].

E-business refers to tools that internet based that supports business activities of SMEs, and therefore e-business standards improves business potential and more particularly supply chain management. E-business application in small and medium enterprise includes internet tools such as sets of information and communication technologies, protocols, standards, and software that used in networking computers that affects the performance of SMEs [7].

E-business has increasingly emerged to six outcomes in the SMEs, as well as revolutionizing the economy such as globalization, technological innovation, business processes innovations, knowledge and information technology, as telecom regulatory reform. E-business practices enables SMEs in creating strategies that are effective for effective responsiveness to uncertainty, improved customer supplier relationship, , and enabling diversity within the business environment. In order for SMEs to e-business applications to build value chains with reference to enhanced operational and strategic performance, there needs for a collaborative approach through all stages of the supply chain [16].

E-business applications enable SMEs to control and examine their business processes, integration of e-business systems, electronic operations, and processes across all levels of the supply chain. The outcomes of e-business systems for SMEs are related to enhancing information flows and integration of business processes that leads to greater collaboration and cooperation across supply chains. Then objectives served by the adoption of e-business strategies by SMEs include supply change management and integration, costs reduction and price pressures, learning and knowledge

development, speed of change in business, information flow control and intellectual property, lead time management, development of electronic procurement best practices, and managing global suppliers and customers [13].

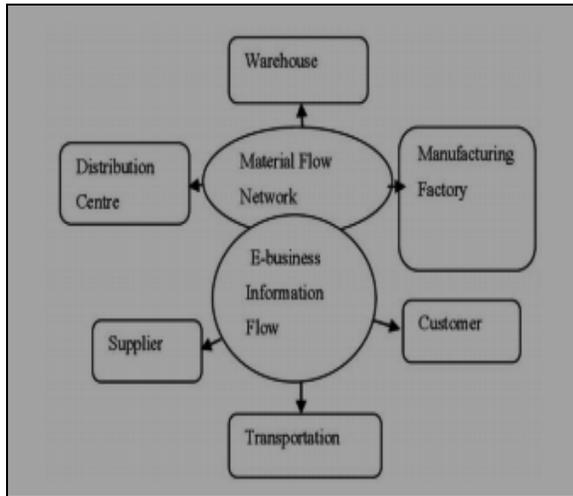


Figure 3 : Framework for e-business based supply chain

In order to improve quality of products and services, as well as communication with suppliers and customers using websites, online catalogues, brochure ware, and other kinds of internet uses such as internet and intranet creates e-intelligence that improves operations, creation of new market opportunities, and decision making.

B. Theoretical Background

The theoretical underpinnings and conceptual foundations highlights the significance on the scope of supply chain in the context of SMEs plays a vital role in transforming the contours of performance and management integration. E-business technologies among SMEs review aspects of major theories, research processes, major themes, and contextual studies that help in explaining the adoption of e-business and its applications. Performance at business processes level and deployment of theoretical perspectives into supply change management of SMEs covers strategic management, entrepreneurial management, marketing management, as well as research approaches that are innovation related [20].

A careful analysis of literature on e-business on SMEs provides theoretical foundations that are related to enabling suitable frameworks for studying the effect of adoption of information systems. Such studies identify theories that helps explain the

adoption of the internet through the examination of several empirical studies. Furthermore, the effect of e-business on organizational performance, as well as the consequences of technological factors and attributes, environmental characteristics, and e-business systems and resources. Therefore, drawing upon theoretical perspectives in combination with empirical researches provides appropriate frameworks necessary for the adoption of e-business among SMES [33].

Theory of Diffusion of Innovation

The theory of Diffusion of Innovation is based on the Technology Organization and Environment (TOE) Model that is focused in studying e-business adoption of innovation. Innovation refers to something new to the adopting SMEs. The Technology Organization and Environment Model investigate the adoption strategies of new technologies that consider organizations in terms of the technological advancements and the external environment. The theory of Diffusion of Innovation refers to the organization as the formalization, size, quality of human resources, the size, and managerial structure complexity. Therefore, technological context examines the relevant technologies that are appropriate to the organization, while the external environment investigates the competitors, industry, and the accessibility of the suppliers [14].

The Technology Organization and Environment model integrates various attributes of factors such as micro environment, organizational structure, and technological development. This implies that pertinent factors include commitment of executive management, perceived benefits, external pressure, information technology readiness, availability of financial resources, and information technology vendor support.

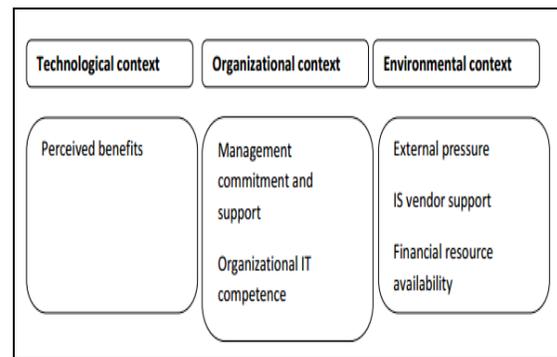


Figure 4 : Theory of diffusion of innovation

Organizational competence describes the level of organizational knowledge as regards technological innovations that affects adoption, while executive management commitment investigates top management support and enthusiasm considered to successfully accept e-business and related technologies for SMEs. External pressures on the other hand, refer to the influential external market forces including completion pressures, customers' pressures, and suppliers' pressures on SMES. Others are business partners' pressures, customer feedback and demand, and information technology vendor support that are gained from external sources in implementing e-business strategies. Finally, financial availability is important for gauging the abilities of investing complicated information systems, as well as information systems infrastructures [25].

Game Theory perspective

Game theory perspective considers stakeholder power relationships in e-business adoption, and therefore assists the strategic decision making process in circumstances where the actions of others is regarded before, as well as components of one's own actions that are decided upon. Therefore, by speculatively exploring the game theory in relation to relevant research considers the inter dependencies that occur between organizations in describing the empirical evidence from organizations. This implies that there is need for recognizing powerful stakeholders, and therefore act while taking into account their own needs and expectations [23].

Organizational stakeholder power refers to the ability of an interested organization in influencing the behavior of other organizations based on the explanatory factor depending on the nature and extent of e-business adoption by SMEs. This implies that external stakeholders readily exert pressure upon other supply chain organizations in adopting e-business processes depending on the relative power differences. Identification of customer power is acknowledged to exert pressure on e-business adoption in the small and medium business sector, where a large number of significant customers bear the power to pressure the SMEs in adopting e-business practices of the organizations' suppliers. Therefore, the customer power influences the streamlining process, reduction of transaction costs, improvement of business process efficiency through online communication, and taking of orders [16].

Therefore, acknowledgement of customer power is a key driver of e-business principles for various power regimes through leverage situations such as buyer and seller relationships. In the power game theory, powerful customers can also impede the adoption of e-business practices by the suppliers in situations where it is inclining to their own interest.

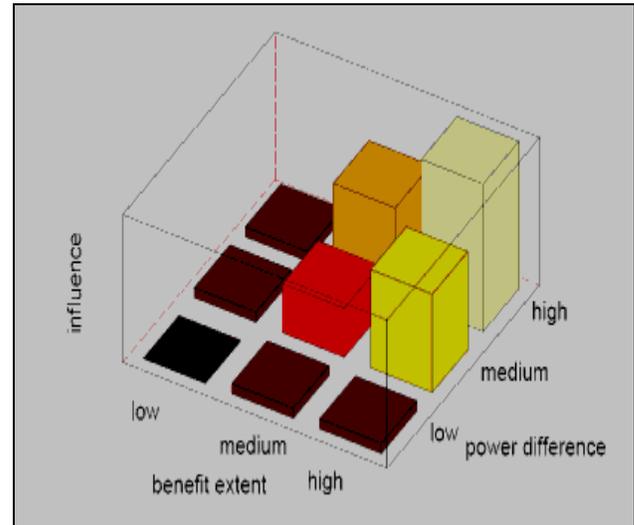


Figure 5 : Role framework of powerful stakeholder's roles

In spite of the level of power differences occurring between organizations, there must be some minimal benefits that affect the number of adaptors of e-business processes that implies low probability that will be influenced on the other organizations. It is important to note that strategic power games performs as a useful model used in interactive decision making where the Nash equilibrium emanating from the Game Theory are applied in exploring the likelihood outcomes between powerful stakeholders , as well as less powerful stakeholders so that an estimate of strategic decision making is involved. Therefore, it is imperative to note that organizations are not free in determining their own e-business strategies, which must be guided by relative advantage perception, as well as affected by availability of resources for both implementation and ongoing maintenance processes [18].

Organizational Innovation Theory

Organizational innovation theory investigates a wide range of innovation adoption research and assimilation in organizations on definitional issues affecting organizational performance. The two domains of innovation are the e-business domain

defines innovation and attributes of e-business. The definition domain refers to innovation as the adoption of internally prompted or purchased device, program, product or service, process, or policy relevant for new adoption in the organization [28].

Attributes of e-business innovation on the other hand, are well specified to affect the organization's adoption pattern, antecedents, rate of innovation, and process of adoption. Therefore, organizations must acknowledge the classification of attributes in order to avoid generality of innovation research. Furthermore, the attributes that drive innovation are organizational focus administrative and technical, radical against incremental, peripheral verse central, adaptability in terms of flexible and inflexible, low or high uncertainty, and pervasiveness in relation to how or low, and communication with respect to high communication or low communication [19].

E-business Innovation and organizational performance

The importance of innovation as a source of value chain creation changes how industries operate, which implies that performance is innovation based. Innovation theory focuses on the significance of technology in considering innovative application of technology as key to new production methods and products, opening new markets, and development of new sourcing methods [19].

The internet is the most revolutionary technological innovation of the latter half of the twentieth century, and it has affected all facets of organizational strategy. The influences of the internet are wide ranging such as innovating and delivering of products, implementation and formulation, and customer relationship.

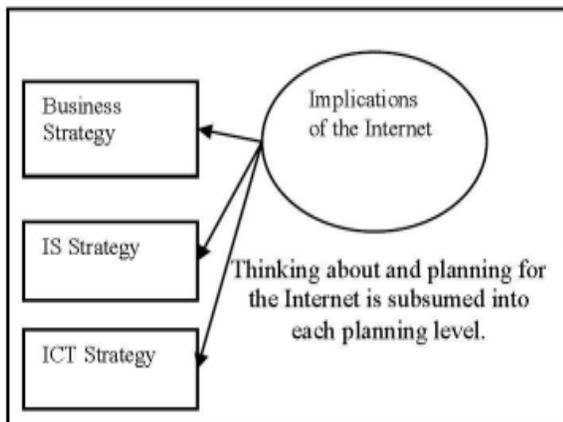


Figure 6 : Internet technologies adoption

The internet integrates the overall business innovative strategy, information systems strategy, and information communication strategy. Therefore innovative organizational information systems are highly correlated to the effects of operation of a company's systems and business processes across the supply chain. Knowledge management is an important aspect of optimizing innovative initiatives in the adoption of e-business supply chains in SMEs, and therefore they can access needed knowledge and resources in enabling them to acquire necessary skills both business and technical areas in order to take full advantage of innovative e-business technologies [22]. When SMES are considering adopting e-business technologies in the supply chain operations, they should become increasingly aware of integrating innovative customer relationship management systems and supply chain management systems. Implementation of innovative electronic supply systems with web pages offers real time exchange of information capabilities in gaining a sustainable competitive advantage. Integrating knowledge management systems and e-business technologies enables SMES to drastically reduce operational costs, as well as enormous improvements in product development, as well as quality service for customers [18].

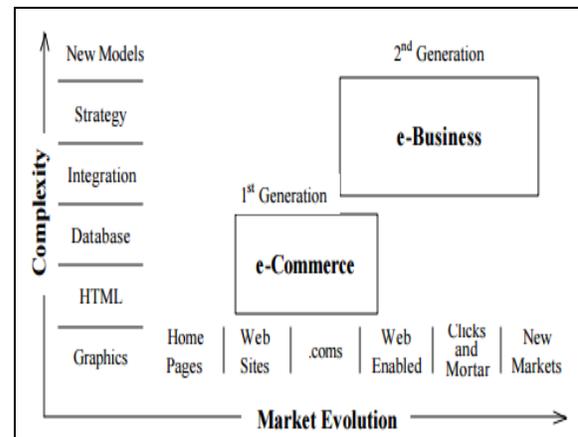


Figure 7 : Implications of integration

SMEs must have informed investments in order to achieve maximum return on investments when adopting innovative e-business practices into their business processes. Therefore, adoption of information and communication technologies should include ICT functions such as applying internet to publicize and broadcast their pertinent information into the World Wide Web. SMEs that have newly adopted the application of internet technologies are considered progressive. Therefore, the sequence of

using email and development of web sites incorporated into selling, buying, and offering payment mechanisms into electronic commerce requires full emersion into technologies that supports e-business systems. Hence, the transformational aspects of technologies offers a suitable platform for innovation initiative that provides a fertile ground for improving quality of service for customers and suppliers alike [32].

This implies that SMEs must have informed innovation grounds of immensely improving their performance. Therefore, the important variables to consider include customers, competitors, suppliers, government, information technology consultants and vendors. It is imperative that these organizations investigate their internal and external business environments, as well as the availability of resources and relative advantages of costs. The owner or manager attitude, knowledge, and support are also important to be considered together with the individual characteristics of the managers and employees. There should also be the existence of technology leaders in these SMEs, as well as level of technology education and training in terms of employee knowledge, acceptance, and attitudes in order to encourage innovative practices with the aim of increasing performance for a sustainable competitive advantage development [16].

e-business impacts SMEs performance by allowing organizational learning and knowledge management, and therefore e-business innovation provides new capabilities which produces values through the creation of more efficient markets, making value, enabling easier access, and supply chains more efficient. Furthermore, e-business enables disruption of present pricing power, extending reach and enabling mass communication. Therefore, SMEs should adopt e-business early in order to cannibalize existing distribution channels that consequently affect performance [17].

3. CASE STUDIES

Case 1: Dell's Case Study

Dell Inc overcame the challenges of the recent economic crunch since 200, which marks the result of the company's success by demonstrating the deployment of e-business technologies. The company enhanced its supply chain effectiveness , as well as its responsiveness in the sharing of real time information concerning delivery status, inventory,

shipment status together with pertinent information including product availability, product design, and demand across it supply chain and partners. The company was able to set up a customer driven personal computer configuration capability. Therefore, Dell's e-business supply chain model consisted of a make to order assembly model, which received orders from the direct to customer retail channels. The company employed call centers, phone, and fax orders; however there were no retail stores [15].

The company's website was effectively applied in leveraging the software applications in combination with experiences from the customer service representatives in creating an interactive and effective self-service. The web application enabled online customers in setting up their own product orders, and they could be able to make choices on different computer configurations through the interactive choice board. The choice board provided the customers with the ability to display price differences for various components, as well as calculate the total price prior to closing the transaction [15].

Furthermore, customers enter their personal computer order using the website e-commerce capabilities, which then translate the order into designs and components ensuring right resources are electronically scheduled in filling the order demands. The procure team select various computer configurations from pre-negotiated prices that fits the company's need and infrastructure standards. The super-efficient supply chain enabled Dell to succeed by effectively integrating and implementing e-business supply chain model [15].

Case 2: DMA, USA

Distribution Market Advantage (DMA) took advantage of the gradual growth in the restaurant industry in the chain restaurant sector. A group of fourteen large distributors came together to serve national and regional restaurant chains through the creation of need for vendors to supply food and other services to chain stores at competitive prices, as well as supported by timely delivery together with detailed reporting services. They operated over 50 warehouses, owned 3500 trucks, and generated approximately \$9 billion from sales in United States, Alaska, and the Caribbean [22].

They pursued a e-business customer facing ordering system, which was internet based centralized customer ordering, as well as reporting system for

national accounts eliminating the use of phone, fax, and dial up ordering systems that were operated by individual warehouses. The e-business supply chain model enabled users to completely search and use display capabilities. The transaction is finalized in seconds and electronically forwarded to the distributors who acknowledge delivery to the stores. DMA currently has adopted a seamless, cost effective, state of the art, and responsive distribution of its products, and the e-business solution coordinates sales and order processes, reduces client's order inconsistencies, and improves order accuracy [22].

Case 3: A Case Study of a Rural-Based Travel Agency

This case study describes the adoption strategy of e-business by Borgsmiller Travel, which transitioned to e-commerce business from a traditional travel agency. The change management process involved progress from just providing unspecialized services in its local market, but transition to compete into the global market with a particular interest to travel to Malaysia. The key drivers of e-business transition included the identification of niche market, and therefore identifying the appropriate technology to invest in, as well as competent human resource that were necessary to conduct the e-business. The company provided executive management support in promoting the new e-business strategy, and therefore Borgsmiller Travel focused on the need for a company website that was maintained with a focus on the need to consistently provide new marketing information and materials in fulfilling the needs of the online customers for getting fresh website content continually [29].

Case 4: PeaPod Inc

PeaPod Inc. founded in 1989 in Skoki, Illinois fulfilled online orders by using packaging, picking, and delivery of grocery from their affiliated traditional supermarkets from 8 different metropolitan markets. The consolidated grocery industry encounters conflict of interest over brand ownership and customers with other independent grocers. The company solved this problem by adopting an e-business strategy of sharing strategic information, as well as improve revenue model that had limitations in handling partners relations [28].

The company transitioned from the traditional supplier-retailer based fulfillment model to a dedicated centralized model distribution and

inventory management. The new e-business supply chain model picked orders, packed, and delivered using a dedicated inventory from centralized warehouses, where the company maintained product offerings using perimeter retailers. The new e-business strategy improved delivery efficiencies enabling products being cross docked possible, which reduced need for warehouse additional products [28]. The e-business model enabled the company enhance control over customer quality, improved cost structure, reduced customer fees, and reduced order fulfillment costs. The internet managed supply chain prompted the company to establish four centralized distribution centers that resulted in higher customer demand. The case study illustrates how companies adopt e-business strategies in redesigning and managing supply chains, thus reducing conflicts with partners. By setting up the online stores, PeaPod was able to use the e-business strategy to win over competitors within the cyber business domain [28].

4. RESULTS AND ANALYSIS

The issues that research identified together with the empirical evidence are crucial for supply chain management for SMEs success, and therefore issues including time to market, financial management, and management information systems. Therefore, in addressing e-business issues for the SMEs include aspects of priority of adopting new information and communication technologies in managing their value chains. Others include customer relationship management, research and development, purchasing, distribution, marketing, and others. The e-business development is crucial in addressing innovation issues that are consistent with technological advancements using an enlightened approach [14].

The potential of e-business in enhancing supply chain performance makes value to be delivered, as well as value creation as compared to the traditional approaches. This implies that internet applications create standardization across all levels of the supply chain using divergent platforms. It is imperative that e-business enables faster communication between producers, retail channels, and distributors' participants. The communication aspect is largely aimed at improving the supply chain management in delivering information and materials to customers [21]

However, SMEs seem not to have embraced the e-business principles in considering flow of both information and materials, and it is their perception concerning consumers' needs is very similar across

sectors and industry. The problems associated with reliability, quality, and pricing are conducted in an uncertain environment, and therefore highest priorities are accorded the same manner as low priority investment costs [21].

The theoretical contribution of the research findings on the nature of the SMEs in operating their supply chain relationships is mainly threefold. The first considers the difference between SMEs and the large enterprises, and therefore the analysis provides key terms of reference in examining the performance issues in relation to competitive advantage with respect to the management practices. However, the major characteristics identifies the types of SMEs in relation to strategic position and focus of e-business adoption , while transitioning from tradition supply chain management methods to the web based systems. The e-business supply chain models adopted by SMEs provides informed insights into dynamically understanding the particular changes that are required in transforming SMEs in terms of their supply chain relationships [21].

The dynamics of the e-business supply chain models include purchasing element consisting of stable volume requirements, flexible delivery times, less variation in mix, and large quantities. Manufacturing dynamics include long run production, high quality, high productivity, and low production costs, while warehousing consists of considerable variety of products, low prices, high stock, and short order lead times. Furthermore, e-business models reduce costs, increases profits, service levels, and flexibility [30].

It is not completely clear the specific e-business strategies that SMEs should adopt in developing sustainable competitive advantages, however there are great enthusiasm concerning the various expectations. The adoption of e-business tools in the supply chain processes has immense benefits. The results reveal a consistent close link between the application of internet technologies and the supply chain integration mechanisms that are retaliated. The current trends towards globalization posses' great opportunities and threats for SMEs adoption rates of e-business strategies within the supply chains. In order to achieve the integration structure that optimally fits the needs of type SMEs is paramount to various research frameworks. Therefore, e-business strategies are paramount to the suitable development of SMEs, and it is imperative that electronic operations strategies bear significant positive effects in improving the partners' collaboration and integration into the operational environments [30].

The empirical research evidence focuses on development efforts in SMEs in guiding the adoption of e-business strategies in their supply chain operations. The benefits of e-business upon the SMEs include improved efficiency in the operations that enables them sufficient time for working with tedious data, as well as information processing activities. The application of e-business solutions is linked to information quality, and therefore successful SMEs have established more e-business approaches that are most important to their businesses. Furthermore, e-business solutions helps in collaboration planning, as well as sharing of pertinent information related to agility of the supply networks, however, to achieve complete success the SMEs must augment with processes redesigning [30].

5. DISCUSSION

Discussion from the results on the effect of e-business and information management on the supply chain operations for SMEs has pertinent information management implications. The managers and owners of SMEs come from diverse backgrounds, and employment diverse models of e-business adoption. After an in depth diagnosis of the e-business technologies and practices, it is paramount that the present position needs to be enhance by electronic strategies which consequently enhances the capabilities of the SMEs [28].

In view of the ever changing market environment landscape, the supply chain relationships of SMEs must face market realities such as immense uncertainties in the adoption path chosen to use internet technologies in the supply chains. The research implications provide a striking balance for the practical steps to take when considering adoption of e-business in the operations of SMEs. Given that most of the benefits of adopting e-business strategies revolves around issues of competitive advantages and performance, it is prudent to have informed growth paths. Therefore, considerable benchmarking of the present e-business supply chains models is paramount to know what can work, and which strategies cannot work for sector and industry specific supply chain management methods [28].

SMEs provide immense opportunities for the growth of regional and national economies, and therefore the development of e-business expertise is necessary in helping with sustainable development of these organizations. However, SMEs seem to be aware of e-business strategies adoption is still riddled with a

number of challenges, but what is clear is that the future survival of these organizations depends on the adoption of e-business strategies within their supply chain models [28].

The supply chain integration into business processes of SMEs requires e-business initiatives for different chains depending on the type of value chain expectations. Within different value chains SMEs must remain connected in supporting devolved intermediaries using a contingency approach that bridges the gap between the suppliers and the customers, as well as other partners across all layers of the supply chain. The adoption portfolio of e-business strategies must use appropriate models that are suited for a particular market, as well as the level of capabilities of the personnel, as well as the awareness levels of all partners in order to participate effectively in the e-business environment [20]

6. CONCLUSION AND FUTURE DIRECTION OF RESEARCH

The study attempts to analyze the effects of e-business and information management of the supply chain operation for SMEs, and therefore explores different strategies in the integration structures with the business strategies. Various models of e-business supply chains can be employed for the benefit of the SMEs in terms of gaining competitive edge, as well as performance of these organizations. The conceptual models of e-commerce, operations, and marketing must achieve complete integration in order to align the short term and long term goals of SMEs such as increased revenues, maximum profitability. It is evident that there are several limitations in the adoption of e-business environments among the SMEs as compared to the larger enterprises counterparts. However, it is important to note that the benefits of adopting internet technologies in the supply chains add enormous value to the customers, as well as the other partners of these SMEs. There are many changes in the competitive landscape for most SMEs, and therefore the results of the research indicate that adoption of e-business strategies has benefits for the business processes of SMEs.

The internet has significant impact on how SMEs interact with one another, as well as their consumers, and therefore integration of e-business practices considerably reduces transaction costs and time, makes information easily available, and helps these organizations cope with the challenges of uncertainties. The driving forces of integration

therefore include costs, expertise, and in depth research in transferring from the traditional supply chain methods to one that coordinates both the flow of information and materials.

A lot of research is expected to be conducted in this area, and therefore the future direction should focus on performing empirical studies concerning the implementation of the internet in research and product development efforts. Furthermore, the application of decision support systems should be enhanced in order to help SMEs with a sense of belonging to the domain of knowledge creation and preservation with regards to e-business benefits. More SMEs are expected to adopt e-business technologies, and therefore strategies should be developed to help them cope with challenges associated with uncertain market conditions.

REFERENCES

- [1]. Baloglu S, Pekcan YA (2006). The website design and internet site marketing practices of upscale and luxury hotels in Turkey. *Tourism Manage.* 27: 171-176.
- [2]. Petersen K, Handfield R, Ragatz GL (2003). A Model of supplier integration into new product development. *J. Prod. Innov. Manage.*, 20: 284-299.
- [3]. Childerhouse P, Towill DR (2003). Simplified material flow holds the key to supply chain integration. *OMEGA*, 31: 17-27.
- [4]. Brown, D.H. and Lockett N. (2004), 'The Potential of Critical E-Aggregation Applications for Engaging SMEs in E-Business', *European Journal of Information Systems*, Vol 13(1), pp 21-34.
- [5]. Iacovou, C., Benbassat, I. and Dexter, A. (1995) 'EDI and Small Organisations: Adoption and Impact of Technology', *MIS Quarterly*. 19(4), 465-85.
- [6]. Lockett, N. and Brown, D.H. (2005) 'Aggregation and the Role of Trusted Third Parties in SME E-Business Engagement: A Regional Policy Issue.' *International Small Business Journal*, (forthcoming)
- [7]. Windrum, P. and de Berranger, P. (2003) 'The Adoption of E-Business Technology by SMEs', in *Competitive Advantage in SMEs*, Jones, O. and Tilley, F., John Wiley & Sons, Cheltenham, UK.

- [8]. Wymer, S. A., & Regan, E. A. (2005). Factors Influencing e-commerce Adoption and Use by Small and Medium Businesses. *Electronic Markets*, 15(4), 438 - 453.
- [9]. Accenture. (2014). Racing toward a complete digital lifestyle: Digital consumers crave more. Accenture Digital Consumer Tech Survey 2014, Accenture, Los Angeles USA.
- [10]. Alonso-Almeida, M. D. M., & Llach, J. (2013). Adoption and use of technology in small business environments. *The Service Industries Journal*, 33(15/16), 1456–1472. doi: 10.1080/02642069.2011.634904 [Taylor & Francis Online]
- [11]. Astuti, N. C., & Nasution, R. A. (2014). Technology readiness and e-commerce adoption among entrepreneurs of SMEs in Bandung City, Indonesia. *Gadjah Mada International Journal of Business*, 16(1), 69–88.
- [12]. Caldwell, N., Harland, C., Powell, P., & Zheng, J. (2013). Impact of e-business on perceived supply chain risks. *Journal of Small Business and Enterprise Development*, 20(4), 688–715. doi: 10.1108/JSBED-12-2011-0036 [CrossRef]
- [13]. Carr, N. G. (2003). It doesn't matter. *Harvard Business Review*, 81(5), 41–49.
- [14]. Cataldo, A., & McQueen, R. (2014). Strategic driver or unimportant commodity? *Industrial Engineering*, 46(2), 36–41.
- [15]. Grant, K., Edgar, D., Sukumar, A., & Meyer, M. (2014). 'Risky business': Perceptions of e-business risk by UK small and medium sized enterprises (SMEs). *International Journal of Information Management*, 34(2), 99–122. doi: 10.1016/j.ijinfomgt.2013.11.001 [CrossRef]
- [16]. Gupta, P., Seetharaman, A., & Raj, J. R. (2013). The usage and adoption of cloud computing by small and medium businesses. *International Journal of Information Management*, 33(5), 861–874. doi: 10.1016/j.ijinfomgt.2013.07.001 [CrossRef]
- [17]. Hall, A. R. (2005). *Generalised method of moments*. Oxford: Oxford University Press.
- [18]. Harrigan, P., & Miles, M. P. (2014). From e-CRM to s-CRM. Critical factors underpinning the social CRM activities of SMEs. *Small Enterprise Research: The Journal of SEAAANZ*, 21(1), 99–116. doi: 10.1080/13215906.2014.11082079 [Taylor & Francis Online]
- [19]. Jones, P., Simmons, G., Packham, G., Beynon-Davies, P., & Pickernell, D. (2014). An exploration of the attitudes and strategic responses of sole-proprietor micro-enterprises in adopting information and communication technology. *International Small Business Journal*, 32(3), 285–306.
- [20]. Alam, S. S. and Ahsan, M.N. (2007). ICT adoption in Malaysian SMEs from services sectors: preliminary findings. *Journal of Internet Banking and Commerce*, 12 (3), 1-11.
- [21]. Al-Qirim, N. (2007). The adoption of ecommerce communications and applications technologies in small businesses in New Zealand. *Electronic Commerce Research and Applications*, 6 (4), 462-73
- [22]. Chopra, S. and Meindl, P. (2007). *Supply chain management: strategy, planning and operation*. (3 ed.). Prentice Hall, New York.
- [23]. Chou, D. C., Tan, X. and Yen, D.C. (2004). Web technology and supply chain management. *Information Management & Computer Security*, 12 (4), 338-349.
- [24]. Cooper, M. C., Lambert, D. M. and Pagh, J. D. (1997). *Supply chain management: more than a new name for logistics*. *The International Journal of Logistics Management*, 8 (1), 1-13.
- [25]. Lee, J. (2003). E-manufacturing – foundation, tools, and transformation. *Robotics and Computer Integrated Manufacturing*, 19, 501-7.
- [26]. Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design*. Li, D., Lai, F. and Wang, J. (2010). E-business assimilation in China's International trade firms: The technology-organization-environment framework. *Journal of Global Information Management*, 18 (1), 39-65.
- [27]. Grant RM (1996). Prospering in dynamically-competitive environments: organizational knowledge as knowledge integration. *Organ. Sci.*, 7(4): 375-387.
- [28]. Guillen G, Badell M, Puigjaner L 2007. A holistic framework for shortterm supply chain management integrating production and corporate financial planning. *Int. J. Prod. Econ.*, 106: 288-306.

[30]. Gunasekaran A, Ngai EWT (2004). Information systems in supply chain integration and management. *Eur. J. Oper. Res.*, 159: 269-295.

[31]. Hult G, Swan K (2003). A Research agenda for the nexus of product development and supply chain management processes. *J. Prod. Inno. Manage.*, 20: 333-336.

[32]. Kehoe DF, Boughton NJ (2001). New paradigms in planning and control across manufacturing supply chains: the utilization of

internet technologies. *Int. J. Oper. Prod. Manage.*, 21: 582-593.

[33]. Khouja M (2003). Synchronization in supply chains: implications for design and management. *J. Oper. Res. Soc.*, 54: 984-994.