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A critical investigation of E-supply chain practice among SCM

Abstract:

Over the past decade a combination of economic, technology and market forces such as globalization, proliferation of product variety, and increasing complexity of supply networks has forced companies to examine and recreate their supply chain strategies (Lee and Whang 2001). The speed of change and the uncertainty about markets evolution has made it more and more important for companies to be aware of the supply chains they participate in. Companies that learn how to build and contribute in strong supply chains will have a significant competitive advantage in their markets (Hugos 2006). In fact, as Li (2007) indicates, the ultimate objective of Supply Chain Management (SCM) is to achieve sustainable competitive advantage. Global sourcing, emphasis on time and quality-based competition, and their respective contributions to greater environmental uncertainty are the main factors influencing SCM. The globalization of supply has compelled companies to look for more effective ways in order to coordinate the flow of materials into and out of the company and move towards closer relationships with suppliers (Mentzer et al. 2001). This research aims to explore the potential impact of implementing E- supply chain practice among SMEs and to investigate different supply chain models and to recommend the most applicable framework for manufacturing SMEs.

Keywords: Supply chain management, E-Business, E-supply chain management, SMEs.

Introduction

Over the past decade a combination of economic, technology and market forces such as globalization, the proliferation of product variety, and increasing complexity of supply networks has forced companies to examine and recreate their supply chain strategies (Lee and Whang 2001). Global sourcing and emphasis on time and quality-based competition as well as their respective contributions to greater environmental uncertainty are the main factors influencing SCM. The globalization of supply has compelled companies to look for more effective ways to coordinate the flow of materials into and out of the company and move toward closer relationships with suppliers (Mentzer et al. 2001).

The approach of conducting business has been continuously changing from the face-to-face human interactions towards the virtual business environment, resulting on the emergence of E-business. E business refers to automated business processes conducted by means of information and electronic

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communication networks via the internet end-to-end. The term “end-to-end business operation” implies smooth interactive and collaborating connections between different parties of an extended demand and supply chain, which involves integrating "designers, suppliers, and buyers, trading partners, logistics providers and end-customers" in the supply chain (Papazoglou and Ribbers, 2006). E-business has transformed business operations and processes as well as creating completely new business models and markets (Jin, 2006). E-business applications and web-based information technologies have basically changed the way companies conduct their business and the way in which they compete with each other (Sanders, 2007).

SCM is considered as a key strategic challenge for companies. In other words, strategic and competitive success of an organization depends on the efficient management of the skills, resources and capabilities of its suppliers, distributors and business processes. Supply chains management is regarded as a critical element of successful e-business implementation (Croom, 2005). Internet and information technologies allow efficient inter-organizational information flows, facilitating SCM (Ooi et al., 2009). Developments in information systems and information technologies allow the virtual integration of the entire supply chain, facilitating the coordination between different parties in a supply chain. The focus of this integration in the context of web-based activities is referred to as E-SCM (Gime nez and Lourenc¸o 2008). Improved customer service, in terms of improved communication and increased speed and efficiency are main benefits of adoption of E-business technologies in supply chain (Wagner et al., 2003). Devaraj et al. (2007), argues that E-business results in potential benefits for supply chains, mainly by enabling enhanced customer service, faster transaction times and reduced product cycles. SMEs play a crucial role in economic development of countries around the world (Ifinedo, 2011). So, the employment of E-business practices in supply chain of SMEs is absolutely necessary in order for them to create efficient communication with their supply chain, improve their performance and gain competitive advantage.

SCM

The speed of change and the uncertainty about markets evolution has made it more and more important for companies to be aware of the supply chains they participate in. In other words, those companies that learn how to build and contribute in strong supply chains will have a significant competitive advantage in their markets (Hugos 2006). Within each organization the supply chain includes all functions involved in receiving and filling a customer request as well as new product development, marketing, operations, distribution, finance, and customer service. A supply chain is dynamic and entails the regular flow of information and product between different stages in supply chain (Chopra and Meindl, 2007). According to Bowersox et al (Cited in Iyer, 2011) SCM is a collaborative-based strategy which connects inter-organizational business processes to create a shared market opportunity.

Leon-Pena (2008) argues that SCM is the process of managing the movement of products from suppliers to buyers. A leading SCM includes the optimization of operational and strategic information and systems as well as business processes and business value in every stage of enterprise. Supply chains involve a range of different stages and the design of the supply chain will depend on both the roles of the stages involved and customer’s needs. These supply chain stages include:

• Customers

• Retailers

• Wholesalers/Distributors

• Manufacturers

Component/Raw material suppliers (Chopra and Meindl, 2007)

E-SCM

Role of IT in SCM

The use of IT during the last decade has considerably transformed the way in which organizations conduct their business processes. IT is considered to be of significant strategic importance to most companies (Haug et al. 2011). Network design and information technology are main issues of operation and execution in supply chains (Simchi et al, 2004). Information technologies coordinate and integrate business operations in supply chains thus contributing to improved performance advantages (Rodrigues et al., 2004; Wang and Wei, 2007).mIT plays a significant role in creating close relationship between buyers and suppliers relationships and improving the collaboration process. Therefore, if companies need to collaborate with their trading partners, they need to adopt e-business technologies in their supply chain (Subramani's, 2004). Internet technologies such as E-commerce enable companies to enhance information sharing in their supply chain (Chou et al., 2004).

Haug et al. (2011) provided a framework for understanding the concept of IT readiness, which allows companies to identify problematic areas in relation to adoption of IT projects and take the necessary actions to resolve them, as well as demonstrating the progress of IT readiness in a company. They classified IT readiness factors under three categories of "characteristics of company, management and employee" and six dimensions of "pressure to change existing processes, room for risks, IT acquaintance, IT project support, IT skills, and IT project motivation". These dimensions provide a solid basis for evaluating IT-readiness in companies.

Sarosa and Zowghi (2003) identifies factors relevant for IT adoption as follows;

• Attitude, knowledge and support of owner/manager

• Attitude, knowledge and acceptance of employee

• Resource availability

• Suppliers

• Customers

• Competitors

• Government

• IT product vendors

• IT consultants

Chan and Ngai (2007) argue that "relative advantages, costs, organizational factors, technological factors, top management support, external pressures, and individual characteristics" are main factors influencing IT adoption in companies. According to them, "compatibility of the internet with organizational culture and infrastructure and top management support" are the most significant factors affecting internet adoption.

E-Business

E-business is derived from the productive, creative logic behind the digital Information Economy. An E-Business is a flexible, adaptive enterprise which is designed for success in the information economy enabling organizations to develop considering the changes in its environment (Moodley, 2001). E-management represents a management philosophy that reflects important features of the global digital economy, such as

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"dynamic real-time decision-making, customer orientation, and speed in responding to market demands" (Chandra et al. 2002, p. 96). E-business is now a “standard” in industry (Ronaymond and Bergeron, 2008). It is referred to as the use of internet-based tools to support business activities of firms (Cagliano et al., 2005). Wagner et al. (2003) consider E-business as a means of "improving business potential but not the end in itself". According to Moodley (2001) E-Business is basically an Internet application. It includes "a set of information and communication technologies, software, protocols and standards for networking between computers" which supports performing business processes. According to him E-business emergence is result of six major revolutions in the economy:

•Technological Innovation

•Globalization

• Knowledge and information economy

• Appearance of Information and Communication Technologies (ICTs)

• Innovations in business processes

•Telecom regulatory reform

E-business practices enable companies to develop a strategic and effective customer-supplier relationship, and improve the responsiveness to uncertainty and diversity in the business environments (Koh and Maguire, 2004). Based on the study of Wiengarten et al (2011), in order for a firm’s E-business application to create value in terms of improved operational performance, there should be a collaborative approach throughout the supply chain. E-business applications allow a company to examine and control its business processes and operations electronically, and integrate its E-business system and processes across the supply chain. E-business is of significance for the supply chain literature as a result of the increasing need to integrate business processes and information flows and to enhance business operations in all organizational levels (Stevens, 1989 cited in Cagliano et al., 2005). Frohlich and Westbrook (2001) argue that increased supply chain integration as a result of e-business leads to greater cooperation across supply chains. Croom (2005) identifies the primary objectives served by e-business implementation as follows:

•"SCM and integration

•Price pressures and cost reduction

•Knowledge development and learning

•Intellectual property and information flow control

•Speed of change in business

•Managing global customers and suppliers

•Development of e-procurement practices

•Lead time management"3

E-business in the context of SCM

E-business is considered as cornerstone of SCM. Many industries including manufacturing and retailing are investing in E-business to change and streamline their business processes and supply chain operations (Dong

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et al., 2009). Business operations such as communication, transaction, environmental scanning and collaboration with other organizations are now done through the internet and the world-wide-web (Luftman et al., 2006).

The emergence of E-Business has influenced the coordination among different stages in the supply chain. Information technologies have changed customer contact mechanisms and information flows. It has enabled organizations to gain immediate feedback from customers and markets, and share information with suppliers as well as collaborating decision-making throughout the supply chain. This improved level of coordination considerably increases the dependencies among different stages of supply chains, creating significant challenges in strategic positioning, planning, and execution. (Simchi et al, 2004)

Gime nez and Lourenc¸o (2008) define E-SCM as "the impact that the internet has on the integration of key business processes from end-user through original suppliers that provides products, services and information that add value for customers and other stakeholders" (p. 313).

Networked information systems lay the foundation for efficient material flow network from customer order to production, storage, distribution and delivery. Theses systems enable data and information related to demand, supply, and inventory to be made visible and communicated to all parties in the supply chain (Figure 5). However, the challenges of environmental uncertainty and dynamics of the enterprise create difficulties for efficient management of the supply chain (Yin and Khoo, 2007).

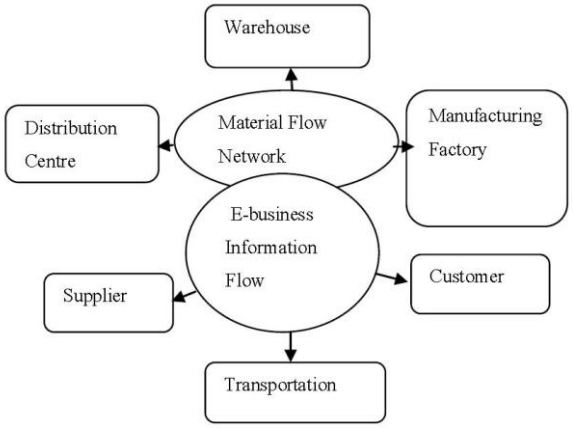

Fig.1 Framework of an E-supply Chain based on Yin and Khoo (2007)

E-SCM system can improve SCM by allowing effective communication between companies in the supply chain as well as providing easy access to information generated. Furthermore, reducing the problem of information overload is considered to be another advantage of e-supply chains (Leon-Pena 2008). Moreover, Shahidan and Netadj (2008) argue that the introduction of e-supply chain model will fill the communication gap between the different trading partners of the supply chain and allow the supply chain network to act as a single entity and sustain their competitiveness within the fast changing environment, the area which makes companies, especially the SMEs, vulnerable in the market place.

Different forms of development of e-business capabilities in the organization include;

E-communication, refers to improvements in products and services and communication with customers and suppliers through the use of web sites, brochure ware, online catalogues, and other types of internet uses (i.e. intranets and extranets) (Turban et al., 2000).

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E-intelligence refers to improvements in operations and decision making, as well as creating new product-market opportunities. The internet enables firms to scan their technological, commercial and competitive environment (Hill and Scott, 2004).

E-commerce refers to buying and selling of products and services through the internet and web-based technologies (Rayport and Jaworski, 2001). E-collaboration refers to integrating and sharing data, through the internet or extranets. Upstream and downstream value chain process are integrated through cooperation and sharing information, allowing various parties in the supply chain to cooperate with each other in the development and design of products (Cassivi et al., 2004).

Theories of E-business adoption in Supply chain

Rogers' (1995) theory of Diffusion of Innovation and Tornatzky and Fleischer's (1990) technology-organization-environment (TOE) model have focused on the study of E-business adoption based on adoption of innovation (Ngai and Gunasekaran, 2004; To and Ngai, 2006). Damanpour (1992) describes innovation as something new to the adopting organization.

TOE model;

This model investigates the adoption of new technologies based on factors such as organization, technology and external environment;

Organization factor refers to "size, centralization, formalization, quality of human resources and complexity of the organization's managerial structure".

Technological context looks into the relevant technologies to the organization.

External environment includes the industry, competitors, and accessibility to suppliers (Shen et al., 2004).

The TOE model integrates different characteristics of the technology, organizational and macro-environmental factors (Li et al., 2010). It includes factors such as "perceived benefits, top management commitment, organizational IS competence/organizational readiness, external pressure, IS vendor support, and financial resources availability" (Ifinedo, 2011).

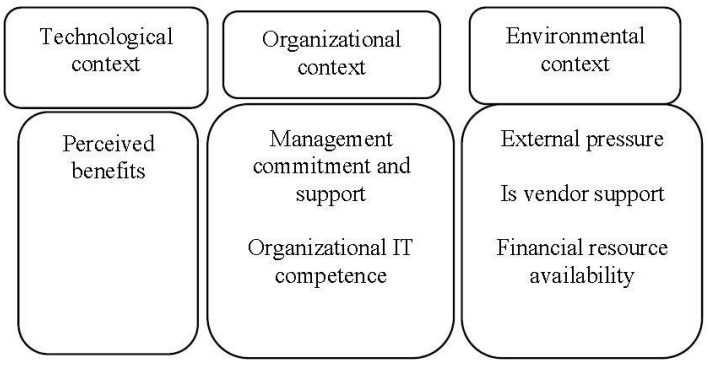

Figure 2. OE model, based on Ifinedo (2011)

Perceived benefits refer to the relative advantage provided by IEBT (Iacovou et al., 1995) which positively influence the adoption of Internet technologies in SMEs. These benefits include improved relationships with suppliers and customers, increased revenue and operational efficiency (Ifinedo 2011).

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Organizational IS competence refers to the level of organizational knowledge about technological innovations, which influences its adoption (Raymond, 2001; Zhu et al., 2006). Management commitment/support refers to top executive support and enthusiasm which is considered crucial for successful acceptance of IEBT and related technologies in SME (Al- Qirim, 2007). External pressure refers to influence of external sources such as competitive pressure, supplier's pressure and customer's pressure on SMEs (Chau & Jim, 2002; Chong et al., 2009).

•Competitive pressure

•Business partners' pressure

•Customer feedback and demand

•IS vendor support refers to the support gained from external sources of technical expertise for implementation of IT applications (Premkumar & Roberts, 1999; Rogers, 2003).

Financial resource availability refers to the ability to invest in complicated IS and IT structures (Love et al., 2001).

Internet and E-supply chain strategy

The Internet is one of the most influential technology innovations of the late twentieth century, It influences all aspects of organizational strategy from "formulation and implementation into producing, innovating and delivery of products and as well as customer relationship". The Internet needs to be integrated into overall business strategy, which are business strategy, IS strategy and ICT Strategy (Figure 8) (McKay and Marshall, Cited in Turban et al, 2006).

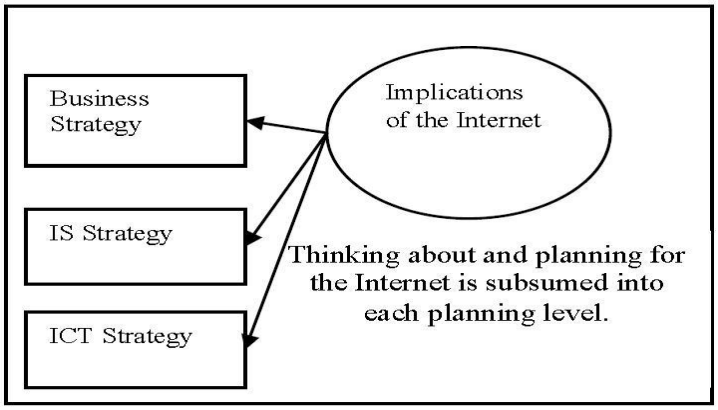

Fig.3 Implications of the internet in strategy, based on Turban et al (2006)

According to Galliers (1999), an organization's information systems (IS) strategy has a direct impact on the operation of its processes and systems across the supply chain.

ICT can be used as a strategic weapon to support the business strategy of companies (Venkatraman and Henderson, 1999). New ICTs based on microelectronics, telecommunications, and network-oriented software have created the digital nervous system for the new economy to operate. Network-oriented ICTs allow complexity and speed in SCM through the compression of time, knowledge and space. Interrelated digital networks allow companies to integrate the essential elements of the supply chain into competitive production systems (Moodley, 2001).

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ICTs enable companies in developing countries to become internationally competitive, as well as becoming more integrated into the global production system. New information and communication technologies (ICTs) have made supply chain integration inevitable allowing for speed and complexity in SCM (Moodley, 2001). Taylor and Murphy (2004) argue that attention should be changed from "ICT as an end in itself towards ICT as a means to an end". This approach will allow companies to recognize business opportunities and create business value and high revenue. Information and Communication Technology provides powerful tools that allow organizations to improve supply chain performance significantly, through enhanced process efficiency and integration (Cagliano et al., 2005).

The internet and SCM

Cooper et al. (1997) investigated the concept of E-SCM processes by identifying a set of topics related to the SCM processes such as; CRM, customer service management, demand management, e-fulfillment, e-procurement, manufacturing flow management, product development and commercialization, and reverse logistics. Gime´nez and Lourenc¸o (2008) identified the major issues around the impact of the internet on SCM, using a classification scheme and developing a framework based on the idea that SCM is the management of supply chain processes. They focused on the impact of the internet on the supply chain processes by adding some other topics to the classification of Cooper et al. (1997), such as supply chain relationships, planning and optimization tools and information flows, industry structure, competitive challenge and Impact of the internet on performance.

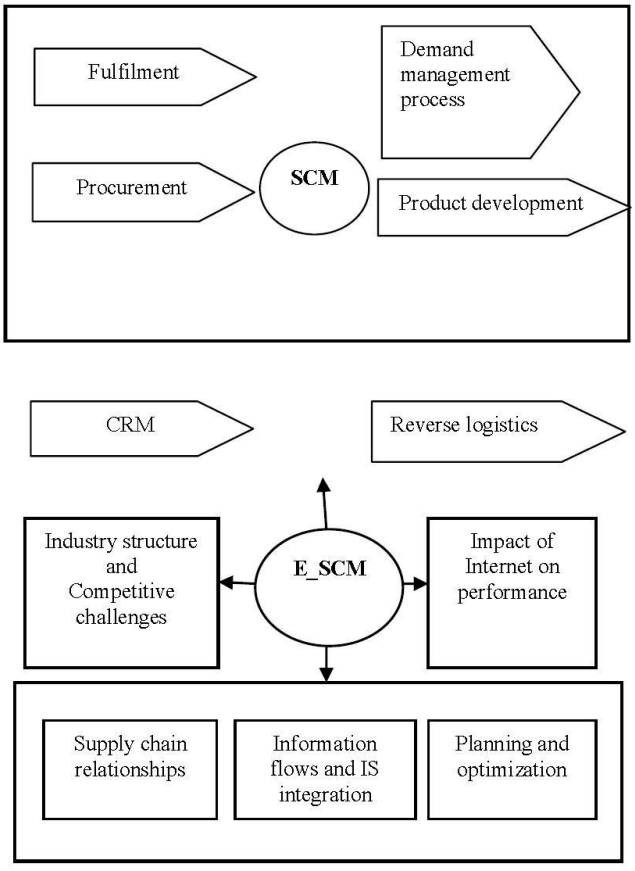

Fig.4 A framework for e-SCM, based on Gime nez and Lourenc¸o (2008)

E-SCM in SMEs

Characteristics of SMEs

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SMEs are of huge importance for the economies of many countries (Haug et al. 2011). "SMEs are major economic players and a potent source of national, regional and local economic growth." (Taylor and Murphy, 2004)

The Department for Business, Enterprise and Regulatory Reform (Great Britain, BERR 2009) uses the following definitions for small and medium sized companies:

•Small firm: 0-49 employees

•Medium firm: 50-249 employees

SMEs are a significant part of the developed economies throughout the world. In the European Union, for instance, SMEs represent more than half of all businesses, employing about 66% of all labor (UNIDO 2003). It is clearly important to distinguish SMEs' inherent characteristics in order to consider aspects of SCM among them. From theoretical point of view, SMEs have certain advantages over large enterprises; for instance, they have the advantage of flexibility and are able to overcome governance problems more easily than large companies (McIntyre 2002).

The lack of financial resources of SMEs and the reluctance to invest in complicated IS are main barriers to the adoption of E-business technologies in SMEs (Love et al., 2001). SMEs inability to make huge investments in the area of e-business and knowledge management is a major problem in taking advantage of ICT. Moreover, most SMEs cannot afford to rely on outside consultants to make a knowledge transfer and efficient contribution to their business (Soriano et al., 2002). Many SMEs resists for the adoption of E-business, mainly due to high cost and reliance on their conventional business processes (Jun et al., 2000).

The most common form of technology used in SMEs is networked computers (Maguire et al., 2007). SMEs do not have enough knowledge about IT and E-business applications (Jutla et al., 1999; Riemenschneider & McKinney, 1999). Lack of computer literacy and knowledge regarding the benefits of IS application is another significant barrier to IS adoption in SMEs (Thong and Yap, cited in Ifinedo, 2011). Chircu and Kauffman (2000) argue that inability to acquire required knowledge and skill in new technologies, and lack of training and education are main obstacles to the successful adoption of information systems.

Koh and Maguire (2004) carried out a research examining the extent the e-business and knowledge management approaches are being used by SMEs. according to them, since large companies have access to required knowledge and resources, they can easily make use of e-business and knowledge management, while, many SMEs do not have access to appropriate skills, both the technical and business areas, and guidelines to take advantage of the E-business technologies.

6.2. E-supply chain adoption in SMEs

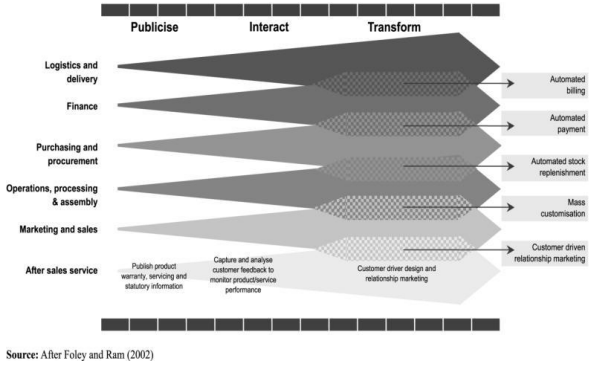
Many SMEs are now moving to the E-business era and use E-business technologies in their business operations and production processes. They are becoming aware of the importance of integrating SCM and CRM with ERP systems in order to create competitive edge in their E-business. E-SCM and CRM concepts such as "building long-term partnerships with suppliers, involving suppliers in new product development, and inviting customers to enterprise events or product launches" are being more and more practiced (Koh and Maguire, 2004. p 345).

Most SMEs consider E-business just as email and setting up Web sites (Taylor and Murphy, 2004). The study Wagner et al. (2003) investigated the level of e-business and e-supply chain implementation in SMEs. Based on their study, implementation of E-business technologies in SMEs goes rarely further than email and web pages and they still conduct their business using traditional communication, in spite of having EDI for real time information exchange between the customer and the supplier (Wagner et al., 2003).

Maguire et al. (2007) investigated the use of ICT in SMEs in the context of gaining competitive advantage, discussing the extent to which e-business and knowledge management approaches are being used by SMEs. According to them ICT allows cost reduction and improvements in product development and service quality in SMEs, resulting in gaining competitive advantage. According to them "sales forecasting, customer analysis and pricing" are the most effective ways of using ICT in SMEs, which results in gaining competitive advantage."In today's business environment the effective use of IS and IT can provide small firms with the opportunity to take advantage of ICT" (Maguire et al., 2007, p 37).

According to Chong and Ooi (2008), SMEs need to make huge investments and share information efficiently in order to adopt e-business practices in their business processes. Moreover, they need to develop long-term relationship with their trading partners. Taylor and Murphy (2004) argue that in order for SMEs to engage in sustainable economic growth in the knowledge economy, they need to apply the Internet and brochure Web pages in their business operations, establish transaction Web sites and change their business organization and operations by integrating their Web sites and supply chain processes.

Foley and Ram's (2002) investigated patterns of acceptance of E-business technologies in supply chain of SMEs by providing PITs model (Publishing, interacting, transforming) which considers the adoption of ICT and e-business technologies amongst SMEs (Figure 10). This model is based on the functions and activities ICT can be used for in the firm. In other words, the internet and ICT is used by SMEs to publicize and broadcast information on a Web site, interact with customers and suppliers through electronic inter-related networks and transform their business conduction (Taylor and Murphy, 2004).



Source: After Foley and Ram (2002)

Fig.5 The PITs model of ICT adoption by SMEs

Firms that have newly adopted the Internet start from one single area (e-commerce or e-procurement), and move subsequently to wider adoption strategies Similarly, Taylor and Murphy (2004) argue that information technology adoption in SMEs is considered to be progressive. "The sequence begins with the use of e-mail and progresses through Web site development to the buying, selling and payment mechanisms of e-commerce, to the SCM of e-business and the new business models built on full immersion in the technology" (Taylor and Murphy, 2004, p. 283). The "adoption ladder" emphasizes the "transformational aspects of technology" and the main "social processes" from which it develops (Scarborough and Corbett, 1992), suggesting that all SMEs can follow a set of prescribed and progressive steps (Taylor and Murphy, 2004). This "adoption ladder" which is supported by the UK government's Department of Trade and Industry (DTI) is illustrated in Figure 6.

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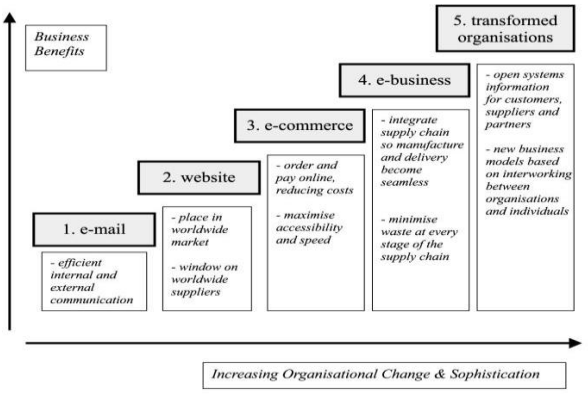

Source: Martin and Matlay (2001) adapted from Cisco-led Information Age Partnership study on e-commerce in small business

Fig.6 The DTI adoption ladder

The different nature of SMEs, and the way SMEs recognize and develop business opportunities need to be considered when assessing the adoption of ICT and e-business technologies in SMEs (Taylor and Murphy, 2004). IT adoption in SMEs differ from larger companies as they usually face the problems of lack of financial resources, lack of expertise and skilled employee, and they often have a rigid production plan which focuses mainly at the cost of strategic planning (Huin, 2004; Lee et al., 2005; Forsman, 2008; Andersson and Tell, 2009). Given their resource limitations compared to larger organizations, they incur higher costs and risks adopting e-business practices such as IT. Moreover, challenges facing large firms and SMEs differ significantly, so, the adoption of IS is quite different in their organizational structure (Barua et al. 2001). Information systems successfully adopted by large companies may not be appropriate for SMEs (Premkumar, 2003). Wagner et al. (2003) argues that "globalization, technology, E-business barriers and competency-based issues" influence the development of E-supply chain in SMEs.

Haug et al. (2011) carried out a research on IT adoption in SMEs by identifying the main factors that define the readiness for adopting IT in SMEs. They suggested a framework for identifying IT readiness in SMEs. They classified IT readiness factors under three categories of "characteristics of company, management and employee" and six dimensions of "pressure to change existing processes, room for risks, IT acquaintance, IT project support, IT skills, and IT project motivation". These dimensions provide a solid basis for evaluating IT-readiness in companies. In general, Haug et al. (2011) classified the IT adoption factors in existing literature under eight factors;

(1) Suppliers, customers, competitors, government, IT product vendors, and IT consultants

(2) External pressures

(3) Resources availability

(4) Relative advantages and costs

(5) Owner/manager knowledge, attitude and support

(6) Individual characteristics

(7) Existence of technology leaders and level of technological education

(8) Employee knowledge, attitude and employee acceptance

The acceptance of IEBT by SMEs is viewed from the point of view of innovation (Ifinedo, 2011). Therefore a combination of the TOE model and Diffusion of Innovation theory, which investigates the adoption of new technologies based on the adoption of innovation, will be discussed in adopting E-supply chain process in SMEs

Conclusions

E-SCM system can improve SCM by allowing effective communication between companies in the supply chain as well as providing easy access to information generated. Furthermore, reducing the problem of information overload is considered to be another advantage of e-supply chains (Leon-Pena 2008). Moreover, Shahidan and Netadj (2008) argue that the introduction of e-supply chain model will fill the communication gap between the different trading partners of the supply chain and allow the supply chain network to act as a single entity and sustain their competitiveness within the fast changing environment, the area which makes companies, especially the SMEs, vulnerable in the market place.

According to Ronaymond and Bergeron (2008) SMEs need to align their business and e-business strategies in order to be less vulnerable to changes in their business environment and to internal inefficiencies-business strategy needs to be defined considering the supply chain processes supported by e-business as well as the related use of information sharing and system coupling mechanisms with both customers and suppliers (Cagliano et al., 2005).

SMEs are different from larger companies in the context of IT adoptions (Thong et al., 1996; Lee et al., 2005). Given their resource limitations compared to larger organizations, they incur higher costs and risks adopting e-business practices such as IT. Moreover, challenges facing large firms and SMEs differ significantly, so, the adoption of IS is quite different in their organizational structure (Barua et al. 2001; Thong et al., 1996). Wagner et al. (2003) argues that "globalization, technology, E-business barriers and competency-based issues" influence the development of E-supply chain in SMEs. The different nature of SMEs, and the way SMEs recognize and develop business opportunities need to be considered when assessing the adoption of ICT and e-business technologies in SMEs (Taylor and Murphy, 2004).

Success in SMEs is based on a strong and supportive working relationship between the customer and supplier. Therefore, network relationships are of significance for SMEs (Wagner et al., 2003). SMEs need to effectively share information in order to implement e-business successfully in their supply chain. In other words, SMEs that are willing to share essential supply chain information with their trading partners are more likely to adopt e-business (Ooi et al., 2009).

For SMEs to successfully adopt IEBT, their managers and staff need to have a reasonable level of understanding of the application of IS in their business operations (Caldeira and Ward, 2002). The study of Chwelos et al. (2001) indicates that factors such as "perceived benefits, organizational readiness, and external pressure" play a significant role on IOS acceptance and successful adoption of E-business technologies in SMEs.

SMEs need to be flexible and adapt easily to changes in the environment. They should have competitive operational and technological strategies which allow development of various e-business capabilities in order to improve their competitive position. Investments in e-business alone do not lead to performance improvement in SMEs, especially if they are not coherent with the environment and strategic objectives. SMEs need to improve their capability of technology management, and receive support from researchers and knowledge transfer agents (Ronaymond and Bergeron, 2008).

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