APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN SMALL AND MEDIUM ENTERPRISES : A REVIEW OF LITERATURE

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Abstract : *Small and Medium Enterprises (SMEs) are an important component of the economy of a country. Information and Communication Technology (ICT) offers tremendous opportunities for the growth and development of SMEs. A number of researchers have tried to explore and investigate various dimensions of the association between ICT and SMEs. Small firm e-business themes that have been investigated include internet usage, website adoption, application of ICT in various operations and processes of SMEs, overcoming barriers to ICT adoption, models of e-business development, and achieving competitive advantage through e-business development. This paper makes an attempt to link various recent researches to present an integrated picture.*

Key Words: *Small and Medium Enterprises, supply chain management, website, internet*

Introduction : Small and Medium Enterprises (SMEs) are usually defined as enterprises that employ not more than 250 employees. The definitions of "small" and "medium" sized enterprises differ from one country to another. SMEs have been defined against various criteria such as the number of workers employed, the volume of output or sales, the value of assets employed, and the usage of energy. The European Union defines the micro-organization as employing up to 9 workers, the small enterprise having between 10 and 99 employees and the medium-sized enterprise having 100–499 employees. The United States of America defines small businesses as having up to 500 employees. In the Asia-Pacific region, SMEs are defined based on employment, assets or combination of the two. The most common range in many countries is from 50-200 employees. Other definitions are based on whether the owner of the enterprise works alongside the workers, the degree of sophistication in management, and whether or not an enterprise lies in the "formal" sector. For example, the OECD (Organisation for Economic Cooperation and Development) defines establishments with up to 19 employees as "very small"; with up to 99 as "small"; from 100 to 499 as "medium"; and with over 500 as "large".

The most widely accepted definition is the one based on the ideas of the Bolton committee (1971). The committee identified the following three important

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factors of a SME:

- they have a relatively small share of their market place;
- they are managed by owners or part owners in a personalized way, and not through the medium of a formalized management structure;
- they are independent, in the sense of not forming part of a larger enterprise.

In India the Micro, Small and Medium Enterprises Development Act, 2006, defines SMEs on the basis of investments in plant and machinery. For enterprises engaged in the manufacture of goods:

- Micro - Investment in plant and machinery less than Rs 2.5 mn
- Small - Investment in plant and machinery over Rs 2.5 mn but not exceeding Rs 50 mn
- Medium – Investment in plant and machinery in excess of SSI limit but less than Rs 100 mn

For enterprises engaged in providing or rendering of services:

- Micro - Investment in equipment not exceeding Rs 1 mn
- Small - Investment in equipment over Rs 1 mn but not exceeding Rs 20 mn
- Medium – Investment in equipment is in excess of SSI limit but less than Rs 50 mn

Small businesses make substantial contributions to national economies and are estimated to account for 80% of global economic growth (Jutla et al., 2002). Small and Medium Enterprises (SMEs) are seen as a critical component in the economic growth of developing countries because they are major source of income, promote entrepreneurship, and provide employment. For this reason, a considerable attention is paid to positioning SMEs to capture emerging business opportunities that have been created by the emergence of knowledge based societies. Many of them are already demonstrating their potentials and capabilities by grasping the opportunities offered by Information and Communication Technology (ICT). Luetkenhorst (2004) found that on an average, they represent over 90% of enterprises and account for 50-60% of employment at a national level.

Despite their potential to contribute to economic growth, Medium and Small Enterprises (MSMEs) are unable to compete well due to exogenous and endogenous constraints (Harvie and Lee, 2002; Kirby and Watson, 2003; Brown, Earle and Lup, 2005; Fogel, Hawk, Morck and Yeung, 2006). Institutional analysis has been used in a variety of ways to diagnose and offer remedies to the functional, performance, and competitiveness issues associated with MSMEs (Basu 1998; Busenitz, Gomez and Spencer, 2000; Carlsson, 2002; Carney and Gedajlovic, 2002). Internet and developments in Information and Communication Technologies (ICTs) have opened new markets and considerably altered existing ones (Brynjolfsson & Kahin, 2002). The

emergence of the ICT has opened up many other opportunities for SMEs. Applications of ICT have been studied in detail by many researchers. These studies have been presented in the following section.

ICT IN SUPPLY CHAIN

ICT can assist in improving the supply chain management. Network technologies seems to enhance efficiency through a reduction in transaction costs and bring new commercial opportunities for small firms. Hvolby and Trienekens (2002) designed a framework for supply chain planning for small and medium sized companies and believe that increased customer demands and new ICT opportunities will require new system solutions for SMEs in the areas of vendor-managed inventory, supplier hubs, electronic markets and advanced planning systems, to be able to take part of the network economy.

Zheng et al. (2004) have examined how e-business affects small firms in supply chains. They mentioned the widening gaps between large and small firm investment and strategy for exploitation of e-business and developed a new framework based on three key issues—cautiousness, contingency and cost-benefit. This has been supported by Koh and Saad (2006), who observed that information sharing is an enabler for better coordination and planning of the supply chain. In spite of these benefits, it seems that, in the supply links of SMEs, information systems are hardly used to share information. Welker et al (2008) found that supply partners tend to share information by means of direct contact instead of advanced ICT usage. Possible explanations are the low level of user knowledge, the high costs associated with implementation, and the possibility that a company configures its ERP system for use in supply transactions linked to simple business conditions rather than for its more complex business situations.

Chiarvesio , Maria and Micelli (2004) have shown in a longitudinal analysis of ICT diffusion within Italian districts that the foreseen convergence between the district economic model and new technologies should not be taken for granted. They observed specific evolutionary paths concerning technology innovation in local systems, which may have implications upon issues of economic policy.

INTERNET IN SMEs

The Internet is viewed as a new way of building and maintaining the relationship between the supplier and buyer, resulting in one-to-one marketing and the building of loyalty via relationship marketing (Zineldin, 2000). Use of Internet poses both strong opportunities and challenges for small businesses globally. Despite the widespread acceptance of internet in corporate environments, the extent of internet use continues to vary widely among small businesses (Sadowski et al., 2002). Kula and Tatoglu (2003) investigated the nature and extent of internet use and the role of firm- and industry-specific by SMEs in an emerging market economy of Turkey, and

found significant differences in (1) amount of resources allocated for export development and (2) international experience of the SME. In general, the SMEs have been found to have a positive attitudes regarding Internet use. The SMEs were found to be of the opinion that the internet will become more attractive in future in terms of enhancing company's image of being an important tool of doing business electronically.

O'Keefe et al. (1998) investigated the strengths and weaknesses of being an early adopter of the Web from a small firm context. They believe that proactive first users of information technology can gain business advantage in the same manner as early market entrants. Certain characteristics of SMEs make them suitable for internet usage. Courtney, (2001) proposed that, flexibility inherent in the small firm is especially suited to the Internet and e-business. Research on problems has tended to focus on external constraints for doing business with little being been done in terms of modelling the process (Katsikeas and Morgan, 1994). Simmons, Armstrong & Durkin (2008) have tried to identify the important role that the small business marketing context plays with in Internet technology adoption.

Though conceptual models depicting the stages involved in the development of Internet systems have appeared in the literature (e.g. CBI and KPMG Consulting, 2001; Earl, 2000; Rayport and Jaworski, 2002) and there have been attempts to identify and describe the different phases that small businesses move through with respect to the sophistication of their use of Internet technologies (e.g. Daniel et al., 2002; Rao et al., 2003), Levy and Powell, (2000) believe that there is little evidence that SMEs follow a 'stages of growth' model for Internet adoption.

Quelch and Klein (1996) see the internet in terms of increasing global exposure, lowering barriers to enter in the form of international advertising costs, adoption of global market niche strategies, reduction of the importance of intermediaries and the internet as a marketing research medium. Hamill and Gregory (1997) investigated the growth of internet marketing by internationalizing small firms, and found that British firms are lagging behind their American counterparts and potentially losing competitive advantage in the international marketplace.

Many researchers have focused on barriers of internet adoption. Wai-Pun etal., (1997) have classified barriers as either technical or social. The former include poor telecommunications structure and security of transactions and the later may relate to lack of trust of the medium, poor knowledge of the medium and insufficient skill in IT, and general lack of awareness of potential opportunities for its use. Other barriers identified include security and privacy worries, costs of consultants and lack of IT competence. The amount of limited resources within the small firm serves as a barrier to e-business adoption (Thong,

2001). The small firm often views cost as a barrier unless they can clearly see a competitive advantage in doing so (Clarke, 1997). Although the majority of small firms in Europe and the USA have access to the Internet, this does not necessarily mean that access is directly related to practice (Hobley, 2001).

Fillis and Wagner (2005) have proposed that psychological barriers can be overcome through increased awareness of internet benefits, operational barriers can be overcome through the use of data transfer of online documentation, organizational problems can be dealt with through the adoption of low-cost market research resources and product and market barriers can also be overcome by online market research and improving customer orientation through online feedback

Internet is particularly useful for SMEs involved in exporting. Though there is a global marketing potential of the internet for exporting SMEs, earlier research (e.g., Hamill and Gregory, 1997) does not distinguish clearly between exporters and non-exporters. Internet serves different roles and purposes within the marketing activities of exporting SMEs. Each may have the capacity to replace or substitute tasks performed by traditional export channel intermediaries. Houghton et al. (2001) and Houghton and Winklhofer (2002) showed that website adoption appeared to be stimulated by assistance from personal contact networks, whilst lack of information technology knowledge acted as an obstacle. Daniel et al., 2002 and DTI, 2000 report that staff workload, a high level of perceived risk, the importance of augmented product dimensions and compatibility with existing marketing channels are likely to act as obstacles to e-commerce adoption, but higher levels of supplier service, Information Technology knowledge and entrepreneurship stimulate e-commerce adoption.

Levenburh and Dandridge (2000) found marked differences in frequency and type of useage internet among firms by size gradation. More frequent and more sophisticated use of the internet exists by firms with four or more full-time equivalent employees, and firms with intentions for growth in the next six months, including sales change, employment change and export plans. Table 1 summarizes these researches on internet in SMEs.

Table 1 (Page No.96)

WEBSITE ADOPTION

Internet adoption for many small businesses is manifested in websites, which are viewed as providing the most value within an inherently marketing-driven context (Jones et al., 2003; Marcolin et al., 2005; Martin and Matlay, 2003; Pflughoeft et al., 2003; Quinton and Harridge-March, 2003; Raymond, 2001; Rowley, 2004; Sellitto et al., 2003; Sparkes and Thomas, 2001; Standing et al., 1998).

There is a wide ranging evidence to prove importance of small businesses and the opportunities presented by website adoption globally, and therefore it

becomes important to understand the key issues that affect website adoption (Chen et al., 2003; Pfl ughoeft et al., 2003; Raymond, 2001). Website adoption for small businesses is not a standardized process. There could be several reasons for website adoption. Researches have shown that perception of benefits of IT innovations is a reason behind website usage (Poon and Swatman, 1999; Rogers, 1995). Houghton and Winklhofer (2002) believe there are several reasons behind the need to understand what determines website adoption more clearly because first, individual determinants will result in the sophistication and relevance of the website adopted and second, knowledge of the determinants of small business website adoption will assist in more focused efforts to stimulate adoption in small businesses.

With fragmented literature available in relation to what actually determines small business internet and, specifically, website adoption, with no holistic model to guide researchers (Fillis et al., 2003; Pflughoeft et al., 2003), various researchers point out that small business website adoption is not clearly understood, with specific limitations in relation to what determines adoption (Downie, 2003; Fillis et al., 2003; Houghton and Winklhofer, 2002; Martin and Matlay, 2003). In this context, Pflughoeft et al. (2003) believe there is a need for a conceptualization of the determinants of small business website adoption.

Several authors have proposed factors which could affect adoption/nonadoption of websites and e-commerce within exporting SMEs (e.g., Houghton et al., 2001), or have highlighted the potential effect of website and e-commerce adoption on channel relationships (e.g. Jevons and Gabbott, 2000; Webb, 2002). Frazier (1999) even suggests that manufacturers using a highly selective distribution channel in which the dependence and investment in intermediaries is high, should avoid the use of the internet for e-commerce, and focus upon providing websites with the information on distributor and agent contact details.

Other barriers include finding difficulty with the design and upkeep of websites (Blackburn and Athayde, 2000), together with low expectations of what can be achieved (Poon and Swatman, 1999). Simmons , Armstrong and Durkin (2008) provided an interpretation of what determines small business website adoption by stressing upon the important role that the small business marketing context plays within internet technology adoption.

Various surveys (http://www.gallup.com, http://www.ami-usa.com) have shown that small businesses are establishing Web sites primarily to advertise and promote their business, rather than to conduct e-commerce. They found that SME use the internet to mainly buy, not to sell products (Annual Small Business Survey 2005, http://www.berr.gov.uk/files/file38237.pdf). Among the SMEs with a Web site, only 27 percent are currently selling on the Internet, and these organizations average less than three Web based orders per month (Dun

& Bradstreet's 20th Annual Small Business Survey, http://www.dnb.com, 2001). Scholars have stressed the potential of electronic transaction management, where small and large companies could exploit Websites and electronic markets to carry out exchanges speedily, efficiently and independently from their location (Malone et al., 1989 ; Bakos, 1998).

Critically, within the website adoption context, the marketing function has been identified as a key driver of website adoption, with websites viewed as essentially marketing tools (Datta et al., 2005; Evans and Mathur, 2005; Jones et al., 2003; Kierzkowski et al., 1996; Marcolin et al., 2005; Martin and Matlay, 2003; Pfl ughoeft et al., 2003; Phippen, 2004; Quinton and Harridge-March, 2003; Rowley, 2004; Sellitto et al., 2003; Teo and Tan, 2002; Varadarajan and Yadav, 2002).

Hoffman and Novak (1997) associated marketing-oriented firm behaviour with the development of a future web-based competitive advantage, due to its ability to provide company access to customer, market and technology intelligence. In the small business context, Jones et al. (2003) argue that a marketing orientation allows them to use their websites to maintain a competitive advantage facilitating customer, market and technological intelligence among other benefits. Further, Martin and Matlay (2003) found that effective website adoption stemmed from small businesses, which recognized the value of websites in terms of their usefulness in the marketing effort, with websites viewed as essential marketing tools. Indeed, Martin and Matlay (2003) found that websites were often effectively used by small businesses to develop stronger and more effective relationships with customers, with attempts to use them in order to change customer perceptions of the firm and its products and services being evident. Vadapalli and Ramamurthy (1997) state that when adopting a technology, firms must perceive the positive effects of the adoption for themselves and their customers if they are to develop effective websites. More specifically, various researchers believe that effective website adoption is linked to perceptions as to its value for marketing purposes (Downie, 2003; Martin and Matlay, 2003; Pfl ughoeft et al., 2003; Quinton and Harridge-March, 2003; Varadarajan and Yadav, 2002).

Specifically, small businesses are particularly constrained by resource factors, and are therefore more sensitive than larger organizations to adoption costs (Lewis and Cockrill, 2002; Van Smith and Webster, 2000). If there are no clear benefits in website adoption, they will still adopt websites that are, however, poorly executed (Jones et al., 2004). Sadowski et al. (2002) warns against over-concentration on perceived costs/barriers as it prevented many small businesses from properly exploring the benefits that could be extracted from website adoption.

In considering the establishment of a website, Barling and Stark (1998) argue

that it does not necessarily assume pre-existing business relationships, but instead makes possible new opportunities with potential customers and business partners. It has been found that for website adoption to be effective there is a need to integrate the online purpose with the overall business purpose. This integrated approach will allow all the competencies for the successful adoption of a website to be integrated and directed in an appropriate direction (Jones et al., 2003; McGowan et al., 2001). It is concluded that having a clear overall purpose for being online is therefore important as a means of focusing companies on what they are hoping to achieve with their websites, which in turn will be an important component within the strategic development determinant in relation to the ultimate websites adopted. Within the small business context, Sadowski et al. (2002) state that these considerations should be related to a clearly developed online business.

Various researchers have recognized cultural problems as key barriers of perception that a small business will have to overcome in order to effectively adopt websites (Chappel and Feindt, 1999; Donovan, 1997; Smith and Webster, 2000; Straeder and Shaw, 2000). Industry culture will impact on small businesses in their adoption of websites (Sadowski et al. (2002) and Fillis and Wagner (2005). Studies have also shown that website adoption levels within an industry sector can directly affect the adoption strategy of small businesses in the same sector (Poon,1998).

In relation to website adoption within the small business context, Subba Rao et al. (2003) proposed a 3 stage model relating to the websites they adopt:

1. Presence (Static Websites);
2. Portals (Interactive Websites);
3. Transactions Integration (Interactive / Transactional Websites)

Table 2 summarizes the researches on website adoption in SMEs.

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OTHER ISSUES

a) Virtual teams

Matlay and Westhead (2005) focuses upon the emergence of Virtual Teams that increasingly form the competitive core of successful entrepreneurship in Europe and identified the stages and processes specific to Virtual Teams, from formation to the fulfilment or adjournment of specific tasks and projects and advantages and disadvantages of Virtual Teams

b) Business Process Reengineering

Certain studies have stressed firms' opportunities to redesign processes and business organisations through electronic networks on a world-wide scale (e.g. Scott Morton, 1991; Tapscott,

1996)

c) **Knowledge Management**

The OECD (2001) found that merely 13% (of SMEs) have formalized strategies for their knowledge management and Holm (2002) found that up to 79% (of SMEs) do not have any action plans with respect to knowledge management. (Holm and Poufelt, 2003) revealed that small firms do indeed manage knowledge informally as part of their normal activities, without the use of the terminology and concepts of KM. However, contrary to expectations, on occasion some also engage in formal KM. Very often it is associated with the introduction of new Information and Communications Technology (ICT) systems, such as intranets and knowledge capture or sharing systems, for example. It is also characterized by the creation of new KM structures, and new management roles with appropriate labels such as Chief Knowledge Officer (Redoli, García-Díez and López-Coronado (2008).

d) **Electronic Data Interchange**

Iacovou et al. (1995) studied the factors influencing the adoption of Electronic Data Interchange (EDI). Among the factors included were perceived benefits, organizational readiness, and external pressure. Kuan and Chau (2001) determined the factors influencing the adoption of EDI in small businesses using a technology, organization, environment framework. The technology factor as in Iacovou's 1995 study incorporated perceived direct and indirect benefits of EDI. The organization factor consisted of perceived financial cost and perceived technical competence. The environment factor included a new variable: perceived government pressure.

e) **Towards optimizing assimilation of ICT in SME**

Many researchers have offered suggestions based on their researches to improve and optimize the assimilation of ICT in various SME operations.

For the growth of SMEs, Poon (1998) identifies the importance of the interplay between market conditions, supply chain issues, industry characteristics, particular style of management, innovation ability and entrepreneurial thinking. Jones et al. (2003) develop a stage model of Web-based commerce adoption. Lohrke et al. (2006) highlighted the benefits of reducing an SME's transaction costs. (Gupta, 2007) proposed that cooperative model of learning can make enterprise more competitive.

Initiatives like The "VIKAS" Project in India (collaboration between NMCC and Microsoft India) which aims at stimulation ICT absorption in the manufacturing sector may be a positive

step in that direction. (http://www.projectvikas.com).

Business process re-engineering (BPR) is recognized as a means of either improving efficiency or of enabling full value-added changes to be achieved within the small- and medium-sized enterprises (Levy and Powell 2005).

Wong & Lu (2005) identified the key factors of successful computerization in SMEs which include focus on allocating their limited resources in implementing information systems efficiently, Setting a good plan is a critical step and the success of information systems strongly depends on external information technology expertise, the cost incurred to improve the environment within an enterprise for implementing information systems (should deserve more concerns than the money directly invested), and the support from chief executive officers. SME take up of e-business is different to that of large firms. The implication is a need for a contingent, SME characteristic-based approach to determining how SMEs employ ICT, rather than a 'one size fits all' solution. Thus the usefulness of some of the e-business models for SMEs that have been reviewed here is not clear.

A multidisciplinary review of current e-business models by Zheng et al (2004) found they were derived from, and most suitable to a large firm perspective and concluded that a contingent approach is needed, which is informed by managerial trade offs, risk as experienced by SMEs and recognition of the static nature of markets. Bhattarai suggests that competitiveness of SMEs in Emergent Business Environment may be increased by price restructuring, customized services to IT product/ service users, cultural and intellectual shifts, among other measures. Managers need to align ICT adoption and the strategic focus of the firm more consistently (Bayo-Moriones, Lera-López 2007).

Poon and Swatman (1999) identify the importance of entrepreneurship and managerial support as the way in which sustainable advantage can be obtained. e-business competitive advantage can be achieved through the exploitation of relevant hard and soft competencies, selected from a wider portfolio of relevant skills. Competitive advantage is achieved by thinking entrepreneurially about e-business issues (Fillis and Wagner 2005).

As the small firm moves from traditional business to e-business, this must be accompanied by the development of appropriate knowledge and competence among the employees. The internal competencies of the organization are central to efficient production of products and services through the construction of profitable relationships with customers (Schuppel et al., 1998). The small firms grows through the ability to exploit its internal knowledge competencies and the entrepreneurial small firm is best placed to do so with its higher levels of creative thinking (Blackler, 1995). So, there is a need to view SME e-business development in terms of how well the owner-manager and related key decision makers can develop and exploit an

appropriately built competency portfolio (Fillis and Wagner 2005).

CONCLUSION

Researches have identified SMEs as a driver in boosting the economy of a country. Adoption of ICT in SMEs is still low, particularly in developing countries. There are a number of factors that affect the decision of owner-managers of these enterprises to adopt ICT. Researches till the recent past explored various dimensions of application of ICT in big firms only, but now researchers have begun to explore the implications of adoption of ICT for small firms also. They have tried to identify the barriers to successful adoption and have developed and critically analysed various business models. The most explored research theme seems to be Internet and website adoption. A considerable research has also been done for the role of ICT in effective supply chain management in these firms. The review of existing literature in the area of ICT and SME reveals that there are still a few aspects that need attention of researchers. These include management of human resource in SMEs in ICT enabled small firms, inter-firm interactions to reap synergies in global context, innovation in SMEs in the changed business environment, a descriptive approach in offering alternatives for overcoming barriers and Total Quality Management in SMEs, amongst others.

For a global market, IT adoption seems to have become the minimum requirement for survival in the SME sector. An integrated approach to ICT is required that will result in effective use of technology while bringing the opportunity cost to its minimum.

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Table 1: A summary of researches on adoption of Internet in SMEs

Area of research	Authors
Nature and extent of usage	Levenburh and Dandridge (2000); Sadowski et al. (2002). Kula, Tatoglu, (2003)
Factors affecting Internet adoption	Kula, Tatoglu (2003)
Benefits	Zineldin (2000); O'Keefe et al. (1998); Quelch and Klein (1996)
small business marketing context within Internet technology adoption.	Simmons, Armstrong & Durkin (2008); Hamill and Gregory (1997)
Stages of internet adoption	CBI and KPMG Consulting (2001; Earl (2000); Rayport and Jaworski (2002); Daniel et al. (2002); Rao et al. (2003); Levy and Powell, (2003)
Factors affecting adoption	Wai-Pun etal., (1997); Clarke, 1997; Houghton et al. (2001) and Houghton and Winklhofer (2002); Daniel et al. (2002); DTI (2000)

Table 2 : Research on website theme in SMEs

Themes	Authors
Resource factors	Lewis and Cockrill (2002); Van Smith and Webster (2000)
Conditions for establishing website	Barling and Stark (1998); Jones et al. (2003); McGowan et al. (2001); Sadowski et al. (2002); Jones et al. (2004).
Models of adoption	Subba Rao et al. (2003);
Impact of industry trends	Poon (1998); Sadowski et al. (2002) and Fillis and Wagner (2005)
Factors in adoption of website	Chappel and Feindt (1999); Donovan, (1997); Smith and Webster (2000); Straeder and Shaw (2000); Sadowski et al. (2002); Houghton et al. (2001); Chen et al., (2003); Pfl ughoeft et al. (2003); Raymond, (2001); Poon and Swatman (1999); Rogers (1995)
Marketing function as a driver in adoption	Datta et al. (2005); Evans and Mathur, (2005); Jones et al. (2003); Kierzkowski et al., (1996); Marcolin et al., (2005); Martin and Matlay, (2003); Pfl ughoeft et al., (2003); Phippen (2004); Quinton and Harridge-March, (2003); Rowley (2004); Sellitto et al. (2003); Teo and Tan, (2002); Varadarajan and Yadav, (2002); Hoffman and Novak (1997), Jones et al. (2003); Martin and Matlay (2003); Downie (2003); Martin and Matlay (2003); Pfl ughoeft et al. (2003); Quinton and Harridge-March (2003); Simmons, Armstrong , Durkin (2008); (http://www.gallup.com, http://www.ami-usa.com); (http://www.dnb.com (http://www. businesssurvival. com/reports/Verizonsurvey.html).
Customers as driver	Martin and Matlay (2003); Vadapalli and Ramamurthy (1997)
Benefits	Malone et al. (1989); Bakos (1998).
Barriers	Blackburn and Athayde, (2000); Poon and Swatman (1999)
Identification of lack of adequate research	Fillis et al. (2003); Pfl ughoeft et al.(2003); Downie (2003); Houghton and Winklhofer, (2002); Martin and Matlay (2003); Pfl ughoeft et al. (2003)
Impact of website adoption	Jevons and Gabbott (2000); Webb (2002).