Research paper

E-business and e-supply strategy in small and medium sized businesses (SMEs)

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Keywords

Electronic commerce, Small- to medium-sized enterprises, Supply chain management, Scotland

Abstract

The purpose of this research was to investigate e-business and e-supply strategies in Scottish small- and medium-sized enterprises (SMEs). The paper reviews academic literature and recent survey reports on the degree of e-business adoption in the UK and Republic of Ireland. The qualitative methodology undertaken is described, findings are discussed and implications from this study for e-business strategies outlined. This was an exploratory study using a small sample with possible geographic biases. Nevertheless, the data so far are in line with findings from larger studies. The role of support agencies is examined, as well as how government could better serve the SMEs. Finally conclusions and future research plans are presented.

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Introduction

Electronic commerce is one of the most important forces shaping business today (Watson *et al.*, 2000, p. 43). Although few would argue with the proposition that it presents a huge opportunity for creating economic value, nevertheless doing business digitally brings with it significant risks (Adshead, 2001). In circumstances where there are no tried and tested models, developing an e-business strategy involves forays into uncharted waters for most managers. Recent research has shown that, despite technology facilitating improved business practice in terms of developing electronic markets, electronic data interchange and Internet commerce (Whiteley, 2000), a number of SMEs have not taken advantage of this new mode of carrying out business (Smyth and Ibbotson, 2001; Cox *et al.*, 2001; Quayle, 2002; Peet *et al.*, 2002).

Given the foregoing, this paper offers some insights into the degree of e-business implementation and e-supply strategies in Scottish small- and medium-sized enterprises (SMEs). It should be noted that throughout the paper, the term e-business and other related phrases are used interchangeably to mean companies which utilise e-technology in their business operations. In order to set the scene more broadly, the following section will briefly review the concept and philosophy of supply chain management, and how information technologies are forcing managers to rethink and re-shape their business strategies, their use of technologies and their relations with suppliers and customers.

Literature review

Supply chain management captures the notion of organisation and coordination of activities from procurement of raw materials to the final customer. That is, each individual activity services another by focusing on operations across firms' boundaries as opposed to seeking to only optimise internal firm efficiencies (McIvor and McHugh, 2000; Hickens, 2000). In so doing, economic benefits such as reduced time-to-market and lower costs may be achieved, as well as reduced operating expenses, increased

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revenue growth, and improved customer service levels (Graham and Hardaker, 2000). The crucial integrating mechanism is via dynamic information exchange which requires cooperation between firms. Analysts' studies have shown that large companies that have completed supply chain projects typically enjoy improvements in individual supply chain functions ranging from 10-80 per cent. Overall supply chain cost improvement is usually 10-50 per cent (Cross, 2000).

The Internet is being promoted as a means to facilitate collaboration between enterprises in the supply chain to bring about massive cost-saving efficiencies (Tucker and Jones, 2000; Adshead, 2001). It provides advantage through the power of information networks, while re-defining, and at times eliminating, activities in the network (Cross, 2000). Although the supply chain accounts for about 60-70 per cent of the transactions in any company (with the remaining 30 per cent being with the end user), and a similar share of the company's ability to add value, the e-concept remains "off the radar" for many senior managers and executives (Bovel and Martha, 2000).

The challenge of cooperation between firms has always been in achieving the necessary changes in business culture, that is behaviour change and the management of conflict arising from, but not limited to, diverse goals of the parties involved, and unequal risk and rewards (Boddy *et al.*, 1998). Although the arguments appear compelling, the evidence is that industry is not rushing headlong into the arms of super-efficient e-business (Cox, 2001; Peet *et al.*, 2002). Attitudes tend to be reactive (Adshead, 2001), with too many companies taking a non-strategic perspective, thereby limiting opportunities to reshape business (Bovel and Martha, 2000). As well as this there is a misalignment between what the Internet delivers today and the traditional IT infrastructure that supports difficult to change in house applications (Ricknell, 1998).

Ricknell (1998) notes that Internet users are struggling to integrate their intranets with legacy systems, and so restricting their options in delivering appropriate solutions. Also SMEs do not have the skill or time to implement all the intranet applications being requested by the business (Bridge *et al.*, 1998; Stokes, 2000; Smyth and Ibbotson, 2001). Literature points out that an important influencing factor in the adoption of e-business was concerned with losing any competitive position, with either powerful customers spurring them into action, or a fear of the consequences of being left behind (Cross, 2000; Adshead, 2001). At this early stage it is not clear if organisations slower to implement e-business are adversely affected or competitively disadvantaged.

In the UK, the Department of Trade and Industry's (DTI) on-line initiative has set goals for e-business (DTI, 2000). By 2002 its aim was for one million companies to be trading online and for a higher proportion of B2B and B2C transactions to be taking place electronically in the UK than any other G8 country. It also intends to spend £25 million over the next three years to help SMEs get online and is providing some, apparently attractive, incentives. According to the DTI's benchmarking studies the UK is well on the way to trading online. The survey found that 75 per cent of businesses intended to use e-business in the future and 31 per cent intended to buy online. The largest players in the sector will move to e-supply regardless, and they will only work with suppliers who can offer e-generated efficiencies (Adshead, 2001).

Retailers can be viewed from a more advanced perspective and many retail businesses would now recognise and embrace the concept of supply chain management. Retailer activity has become more global in its extent and activities, and consequently they are better at managing and operating supply chains (Loughlin, 1999; Reynolds, 2000), and most supermarkets are aware that the input from suppliers can be helpful to them (Doherty *et al.*, 1999). Implementation of concepts such as quick response (QR) and efficient consumer response (ECR), involving years of investment in systems, have seen many of them achieve the near impossible – cutting costs to the bone, while introducing processes that ensure shelves are always full (Holmes and Srivastava, 1999; Field, 2000). The complexity involved in meeting this demand is bewildering, involving major organisational change (Kotzab, 1999; Fraser *et al.*, 2000). It requires accurate sales forecasting, increased integration with shipping hubs, real-time integration with back-end systems and call centres, real-time tracking and scheduling, invoice

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reconciliation and performance management (Adshead, 2000). Retailers are pushing the boundaries of Internet technology and capability by developing retail exchanges. Proponents of exchanges see them as having considerable power to improve the supply chain and thus the end product for the consumer. Supporters of these exchanges emphasise their competitive and integrating value, however this may not be the case in reality (Sparks and Wagner, 2003).

Larger companies with resources and technical budgets are in a stronger position to implement e-supply strategies, SMEs will continue to find this a challenge. Smyth and Ibbotson's (2001) survey found that the micro enterprise exhibited much lower rates of e-business activity than the larger firm, although greater adoption rates were, not unexpectedly, identified in the smaller high technology type firm. They also identified a number of barriers, some being grounded in a competency/skills gap framework. Development of appropriate skills, investment in staff training and poor knowledge of the Internet start-up process were viewed as central barriers to e-business implementation and growth.

Similarly, the Internet in the UK is not being used to its maximum potential in managing supply and demand effectively. Indeed, claims made for the Internet to transform all aspects of supply chain management appear to be excessive, with only 23 per cent of the organisations surveyed currently using the Internet to improve aspects of their supply management activities (Cox *et al.*, 2001, pp. 247-50). According to Cox *et al.* (2001) the use of the Internet for procurement and logistics is still at an emergent stage, but larger organisations appear to be those that will be the first to demonstrate the costs and benefits from early adoption. For the most part, the majority of e-business strategies are only in the developmental stage and not sufficiently robust, which may mean that companies are developing and implementing inappropriate e-business solutions. These findings have also been supported by Quayle (2002), Daniel *et al.* (2002), Rowley (2002) and Peet *et al.* (2002).

Internet competencies have been examined by Durkin and McGowan (2001a, b). They support the view that the Internet technology can facilitate relationships through its ability to transfer information between actors in a network. By gaining Internet-based competencies, the firm can bypass traditional business barriers such as physical distance between markets, allowing improved interaction between members of a network. A broad range of skills are central to enabling these procedures to occur, and include knowledge of the medium, the vision to predict its usefulness in future business strategies, and the ability to translate the vision into actual proactive business practice, as well as having some technological awareness of how Internet technology operates through to being able to control future business growth using existing technologies.

It seems clear that the first step in a successful e-business strategy is having the company's own systems in order (Feller, 2000). Companies may also need to help their business partners by defining hardware/software/Internet service provider configuration, thus emphasising the importance of close relationships between supply chain partners as being a prerequisite to adopting e-business (Brorson, 1998). As has been found in ECR implementation (Angeles, 2000), it is essential to build B2B relationships through communication first and transaction processing second, after both partners develop a real appreciation of the power of the Internet. Researchers and practitioners need to see the Internet for what it is: an enabling technology and set of tools that can be used in almost any industry and as part of almost any strategy. Only by integrating the Internet into overall strategy will this powerful new technology become an equally powerful force for competitive advantage (Porter, 2001). The main problem to date is that this has not been done to any meaningful extent.

Development of the conceptual model

Globalisation, technology, e-business barriers and competency-based issues have been shown to interact in the development of e-business in the smaller firm. These have been assembled in a working conceptual framework (Figure 1) in order to understand the process of e-business development in the smaller firm, as well as endeavouring to explain why some firms lack the commitment

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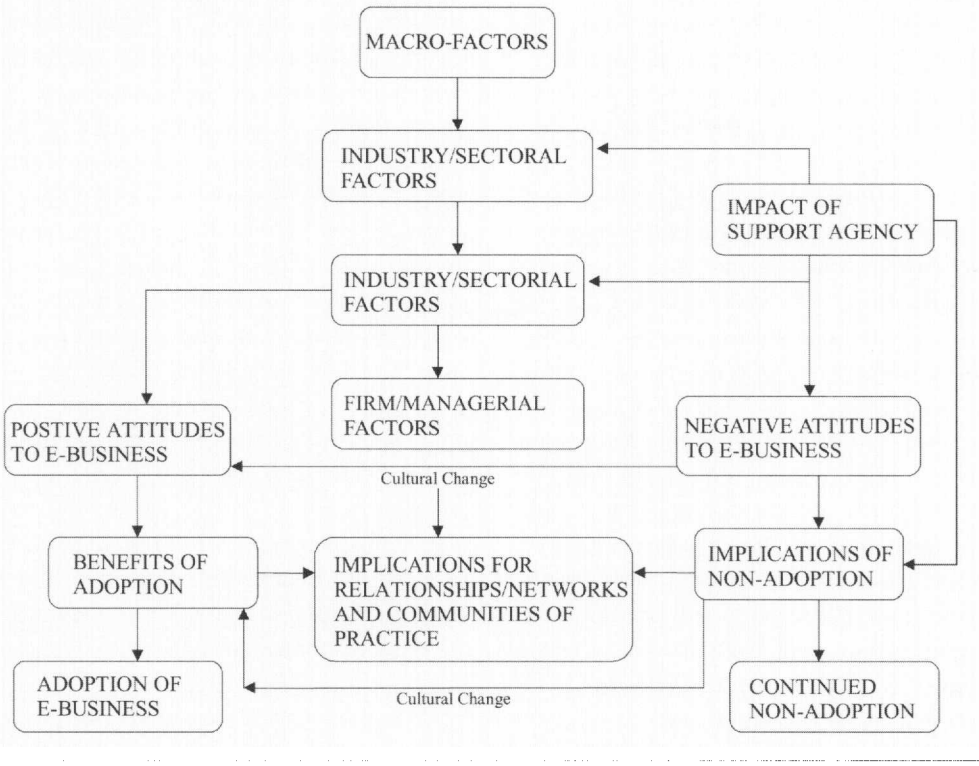
Figure 1 E-business adoption, conceptual framework



to developing this orientation. For a fuller explanation of the conceptual development refer to Fillis *et al.* (forthcoming a).

Macro-level factors are the drivers behind technological change. Globalisation effects and the subsequent removal of a range of geographical and physical barriers offer new opportunities for the smaller firm in domestic and international markets. Instead of presenting an all-embracing framework, it is believed that specific industry and sectoral factors will influence the SME in its demand for e-business. The needs of the hi-tech computer software company differ greatly from the craft micro-enterprise. However, both will benefit in different ways from the adoption of new technology (Fillis, 2000). For example, the former can trade their products virtually while the latter can save time searching for export-related information, using the time freed up to develop new products. Attitudes will vary depending on a range of firm and managerial level factors. The micro-enterprise will have different needs to the multinational corporation; business to business organisations will use the Web to interface differently to business to consumer companies. It is expected that a range of positive and negative attitudes will be found among firms of all sizes, but particularly strong differences are expected within the smaller firm. On identifying these differences of opinion, it is also predicted that quite separate sets of business, marketing, entrepreneurial and Internet competencies will be identified. In addition, fostering of cultural and philosophical change may be needed in order to increase active participation in e-business usage among those firms, which initially show low levels of interest. Targeting appropriate programmes of business support from government and other agencies can enable this cultural change. There will, of course, be other companies expressing no interest whatsoever in adopting an e-business orientation.

Research methodology

Research context

The DTI, in association with Scottish Enterprise, has proactively encouraged company participation in e-business. In support of this development, local enterprise councils (LECs) have provided low cost education and training workshops to raise awareness of the benefits of e-commerce to small businesses in the areas. Despite considerable publicity, the take up for e-business introductory courses was disappointing. In addition, although some

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SMEs had constructed basic Web sites, many of these firms have yet to integrate the technology throughout the business. Many set up a Web site and wait for "something to happen", instead of running the Web site alongside other marketing and supply activities.

The foregoing context is the background for this project and the aim was to investigate reasons why local companies appeared not to be interested in utilising e-commerce as a business and supply chain tool. This would involve ascertaining the current state of connectivity within local companies and investigating the socially complex behaviour associated with implementation and utilisation of e-commerce strategies.

Literature pointed to the importance of nurturing supply chain partners in the successful implementation of e-supply strategies, and with such a behavioural emphasie the researchers felt it would be difficult to capture this using a quantitative survey technique. In order to yield deeper insight into the local and current situation, issues were explored by adopting a more exploratory and qualitative approach to data collection (Strauss and Corbin, 1998).

Research design

In the first instance, a "mind-map" was produced using the structure of the conceptual framework, and based on the literature review of the factors which are believed to influence e-business adoption (Fillis *et al.*, forthcoming b) (Figure 2).

The categories A-G display a number of themes, which provided the structure for data gathering and ensured consistency in approach by each researcher. An interview schedule was developed to further guarantee that the necessary primary data were obtained. It was the intention to ascertain: the reasons for the lack of interest in e-business workshops; the strategic objectives of companies participating in the digital world; and the opportunities and threats perceived by SMEs. In addition, evaluation of relational strategies, the degree of integration of e-business in the business as a whole, as well as factors that promoted successful and unsuccessful e-business implementation were also deemed relevant.

The target population for this study was drawn from a LEC database. Small and medium sized businesses were extracted from the database. To select the sample every twentieth company of the 2,400 firms was chosen and sent an introductory letter describing the project and requesting participation. Each letter contained a stamped addressed return envelope and returnable portion, which indicated whether the key decision maker would be available for interview. The letter sought to ascertain if the business currently used e-business and, if not, whether it intended to use it in the future. This information was used to fine tune the interview questions for each company. Out of the 120 letters sent 49 were returned, 28 not being available for interview and 21 prepared to be interviewed. Out of the initial sample of 21, 18 face-to-face interviews were finally conducted, and two were by telephone and one could not be contacted (Table I).

Interviewees were all at senior manager level, many of whom were owner managers, and interview duration was between one and two hours. All transcript were analysed by the research team individually and themes clustered as per the conceptual framework. Further analysis was undertaken collectively by the research group and themes were distilled further. The following section uses the framework to structure and describe the findings from this study.

Research findings

Macro-factors

Macro-factors were drawn from the literature and have been voiced by respondents as motivating e-business adoption. The main concern with the notion of rapid expansion was the speed at which small companies would be required to change, in terms of production, skills and logistical infrastructure. In addition, the tension experienced by some entrepreneurs and owner/managers was identified as another factor, in terms of the impact of growth on their chosen life style and degree of control and influence over the product and company culture. The macro-factors influencing e-business adoption also included a recognition of technology as a driver for growth and removal of geographical barriers.

Industry and sector factors

According to the data, the propensity to develop e-business activities varies by sector.

Figure 2 Interview guide

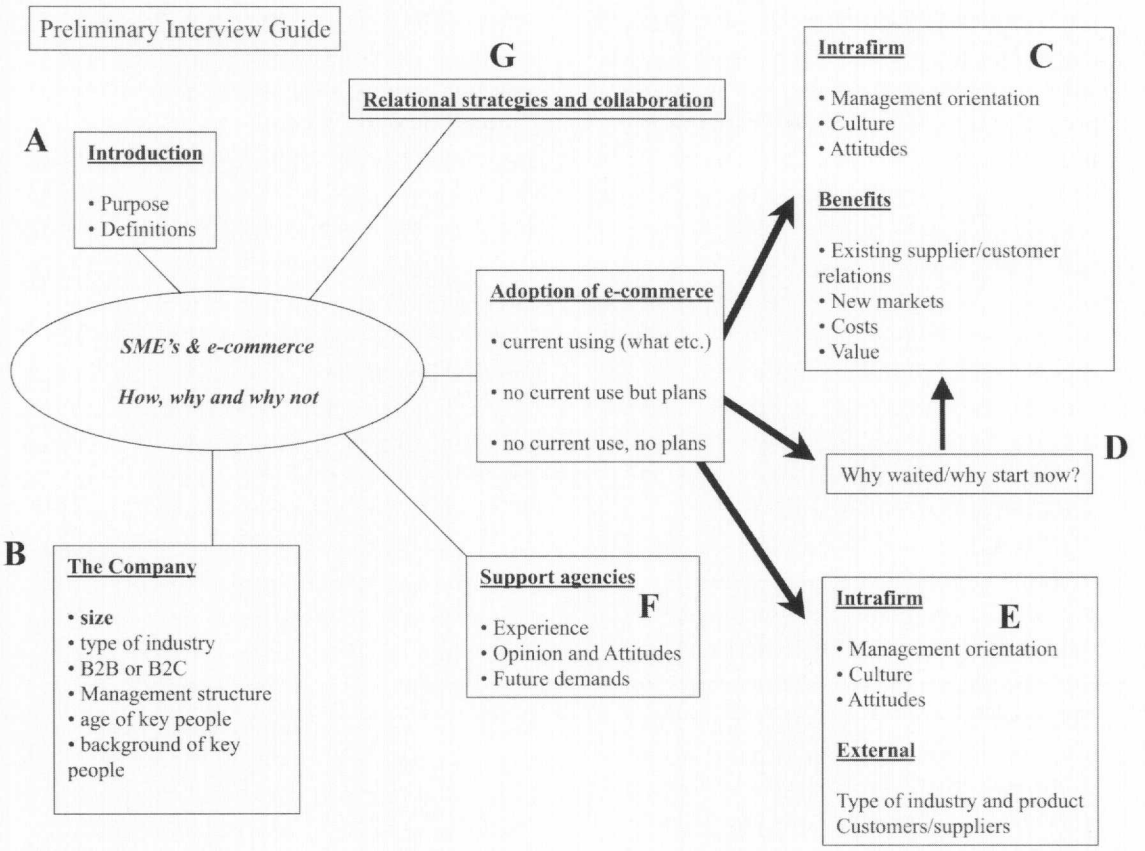

Table I Industry sector of participating firms

Industry sector	No. of companies
Engineering	5
Information technology	6
Manufacturing	4
Service	5
Total	20

E-business adoption in a B2B environment has been found to be mainly customer driven. In the sample, suppliers involved with powerful customers had little choice but to implement e-business strategies in order to maintain that business. In most cases the customer and supplier worked quite closely so that the customer's needs were accommodated however, there was no evidence that the customer assisted the supplier company in the investment of equipment.

Traditional, longer running businesses such as the foundry were found to be less likely to conduct business in a virtual environment. Although the foundry managers were proactive in developing internal e-mail links and also designing a Web site, there was little attempt to extend this into a wider business context. The foundry customers, mainly bulk raw material suppliers, were reluctant to conduct business over the Internet, such as order processing and payment. Reasons given were that the marketplace was quite small and all players had developed long-standing relationships, with systems and procedures perceived as efficient. This reluctance on the part of the main customers to see potential or recognise the need to change resulted in minimal, if any, investment in Internet technology.

As would be expected, SMEs in hi-technology industries exhibited greater e-business participation rates than firms from a lower technology base. Indeed, in some cases it was fundamental and they had been conducting business in this manner from the outset. Industry specific technology drivers ensured that these companies were early adopters and e-business was now a way of life.

Firm/managerial factors

Managers were keen to exploit the potential of the Internet and those firms with high degrees of entrepreneurial orientation exhibited high e-business adoption rates. Some did voice

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concerns regarding the impact on their life style if the company were to grow too large.

An important firm factor influencing degree of connectivity was the level of skills and competencies within the firm. Although most respondents stated that there was a range of technical competencies within the firms, there was a dearth of specifically related e-business competencies. It was in those firms where managers possessed superior e-business skills that we saw evidence of implementation beyond that of an inactive Web page. Paradoxically, these firms and managers were held back because they had to spend time training and educating staff, in technology skills, and behaviour change and in some cases educating their customers as well. For the most part, managers recognised the potential growth benefits to the business, but factors such as time to train staff and lack of internal competencies resulted in sub-optomising the technology available.

Positive attitudes to e-business

Positive attitudes were demonstrated in small companies that were subsidiaries to substantial larger companies, driven by the parent organisation and also supported in terms of technology competencies and resource commitment.

E-mail and Web pages were standard with all participants, but implementation rarely went further than that, with the exception of hi-technology SMEs. Business was still conducted using traditional communication media although two companies did have EDI as a means of transferring real time data from the customer to the supplier.

As has been stated already, e-business was driven by the customer, and only by a supplier in a niche market situation. For example, this applied to the gas generator company which at the time of interviewing was using the Internet to extend the company marketplace and had gained new business in Japan and other parts of the world as a result of the Web page. The company was currently making further technological investments to extend the scope of the Web page and on-line procurement and logistical capabilities. However, the company had limited internal competencies and was dependent on external consultant support to provide ongoing training and maintenance. Although the manager recognised this, he had some misgivings as to the duration of assistance given by the LEC, as this would be a long-term project and of considerable economic importance to the area. This company had grown from start-up to in excess of £4 million profit in three years.

Negative attitudes to e-business

Customer influence over the direction and strategy of the supplier was considerable, and in some instances it was a one-way street, with the supplier gaining little from the supposed improved communication. Indeed, the customer expected more information from the supplier, but did not recognise that by sharing real-time information, demand data, as well as forecasting and scheduling planning, would enhance both companies' business potential. As with all technology purported to improve supply chain relationships, the reality is often different from the rhetoric.

Some negative attitudes and cultures within firms towards e-business were also evident. Managerial time to be invested in change management is something that SMEs are not geared up to. Also, anxiety about the ability to handle increased business reinforced negative attitudes as well as skills issues. Funding was seen as a major problem for SMEs in general and not specifically related to technology. It was the experience by a number of the respondents that government policy and, in particular, lending institutions had an adverse attitude to supporting SMEs. Other negative attitudes include a concern for security and fraud.

Benefits of adoption

Improved customer services was one of the most important benefits cited by most of the interviewees in terms of improved communication, increased speed and efficiency from supplier to customer. Overall, the reasons cited as benefits for adoption were fairly standard however, most of the firms in the sample were in the early stages of adoption and therefore, although they had certain expectations, the data so far indicate that few sustainable or real benefits were clear at this time.

Factors that influenced this finding included cost of implementation, behavioural change and training of internal staff, supplier or customer development, and a dearth of

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technological skills within the organisations themselves. Those managers who possessed such competencies tended to be further down the line of implementation of sophisticated supply strategies, such as order processing and payment on line. But still the problem remained of educating customers or suppliers in its use.

Implications of non-adoption

The data suggest that there are few real performance benefits evident in the early stages of adoption and that the expectation of potential benefits is motivating those early adopters. It may be better to be prepared and the danger of losing valued customers is also a powerful driver. Non-adoption may be a competitive disadvantage as the players in the network take up and implement e-supply strategies, but it is not clear whether adoption is a competitive advantage due to the inertia shown by many.

Relationship/network/communities of practice

The B2B business environment does encourage closer customer and supplier relationships and the study provides evidence of some long-standing, close business relations. As with other technology solutions such as ECR in retailing or JIT in manufacturing, success must be based on a strong and supportive working relationship between the customer and supplier. In other words, e-business is a means of improving business potential but is not the end in itself. The Internet was not seen as a substitute for improving working relations between customers. Network relationships remain very important to SMEs and the smaller companies already operate within communities of practice which are more influenced by personal affiliations than e-business.

The nature of the business clearly drove the ability to work on-line with supply chain members, but even in those circumstances companies were inhibited because of weak links in the supply chain, either downstream with customers or upstream with suppliers. In order for the e-supply strategy to be effective all members have to develop at the same time. As a consequence, companies whose corporate strategy involved e-business forced suppliers to adapt and change with them, creating a ripple effect throughout that particular supply chain – communication, information acquisition and aspects of relationship management improve. Early adopters can force the strategic direction of their supply chains, however, we do not have evidence that e-supply strategies have been fully implemented in any business in our sample. Above all, if the customer does not see the potential or recognise the need to change, very little will happen.

Local enterprise agencies

Although many firms in the sample took advantage of funding and assistance from the LEC, this was still seen as insufficient for the full integration into the business. Overall, the LEC was seen as appropriate for general support but lacked an understanding of the smaller firm's e-business needs. That is, they gave assistance to set up a Web site, but this did not go beyond an initial start-up phase. Thereafter, the SME was left on its own, with the choice of involving a consultant on a longer term basis. In general the feeling was that the companies could not fault the LEC for the help they got up to a point, but that they were left to deal with the more complex implementation, both internally with employees and externally with customers and suppliers. The problem of limited e-business skills and competencies surfaced once more, both within the LEC and also within the firms.

Discussion of findings

Literature advocates that adoption of e-business and e-supply strategies will have a dramatic and positive effect on both the customer and supplier business in terms of transforming the business strategy, re-defining business relationships and providing first-movers with competitive advantage (Keogh *et al.*, 1998). In contrast, the research does not support this and is more in line with Whiteley (2000), Smyth and Ibboston (2001) and Quayle (2002), who have suggested that despite the technology many SMEs are not taking advantage of Internet commerce.

The hi-tech companies in the sample have used the Internet as an integral part of their business strategy since before it became a popular buzzword. In others, any first-mover-advantage has been inhibited because it could

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not be translated widely in the supply chain, traditional buying rather than progressive practices being emphasised. There was little to be gained from being more advanced than customers whose lack of strategic vision not only affected themselves but others in the supply chain (see also Bovel and Martha, 2000). At the same time uncertainty regarding the impact of e-business on marketing and supply strategies was inhibiting.

This, coupled with a dearth of e-business skills and competencies, may be an influencing factor in the apparent reluctance to adopt e-business in a serious manner, and an SME has little time or resources to detract from daily business activities. Ricknell (1998) also suggests that many SMEs do not have the time or skill to implement all applications necessary to conduct e-business. Employees and customers and suppliers all have to be educated and trained. This takes time and money, and many small businesses do not have the time or financial capabilities.

All companies in the sample possessed a high level of awareness of the reported potential of e-business, and although most were in the very early stages of implementation, for example developing a Web site profile, one small company had very quickly entered the global marketplace (Christopher, 1992; Cross, 2000).

Efficiency gains and cost savings seem to be very small in companies that deal with few large customers and handle very little information or invoices, but it is difficult to understand why the larger customers do not realise advantages and potential savings.

In some cases the promise of e-business to increase the market and give access to new customers was seen as a threat rather than an opportunity, with increased e-business increasing price pressure. SMEs might perceive their positions and margins being undermined, as buyers become more powerful and demanding. This is already happening in the retail industry; retailers have finely tuned management and operations of their supply chains and achieved reduced costs while at the same time improving processes (Doherty *et al.*, 1999; Holmes and Srivastava, 1999).

A sudden increase in business may also be seen as a threat to the SME that cannot fulfill its commitment to new customer demand. The importance of the potential impact of e-business and its consequences on business structure and internal processes needs to be fully understood. Field (2000) also emphasises that implementation is so complex and bewildering and involves major organisational change.

Internet adoption has so far not demonstrated any benefits in terms of reduced transaction costs or improved supply chain efficiency. This corroborates other studies (Cox *et al.*, 2001) that the Internet is mostly being used to gather information and communicate with suppliers.

Face-to-face contact between customers and suppliers is still seen as the most appropriate means to conduct supply strategy and therefore a barrier to adoption. Considerable importance was put on the quality of business relations, the amount of information sharing and openness being reflected in the level of trust between trading partners.

The evidence suggests that early adopters are hi-tech companies and are more compelled to use Internet technologies, whereas there is a "wait and see" mood in the older industries especially if there is no pressure by customers. These findings are similar to those of Cross (2000), Adshead (2000) and Cox *et al.* (2001).

The literature emphasises the need for an integrated supply chain management approach, and there is no evidence in our study that this is happening, indeed there is virtually no internal integration of e-supply strategies, never mind extension into the wider supply chain.

Major barriers were funding and expertise beyond the initial Web page design. Even the companies which claimed to be early adopters were only able to develop so far and were then inhibited by constraints beyond their control. Government support in terms of grants and consultants were offered up to this point. Thereafter it was up to the SME to retain the consultant to further implement the internal strategy within the organisation and oversee supply chain integration. This would involve long-term change management within the business, requiring extensive funding and management time. There appears to be a short-term outlook on the part of the government agencies as well as a dearth of e-business competencies within the agencies themselves. SMEs can be supported up to a

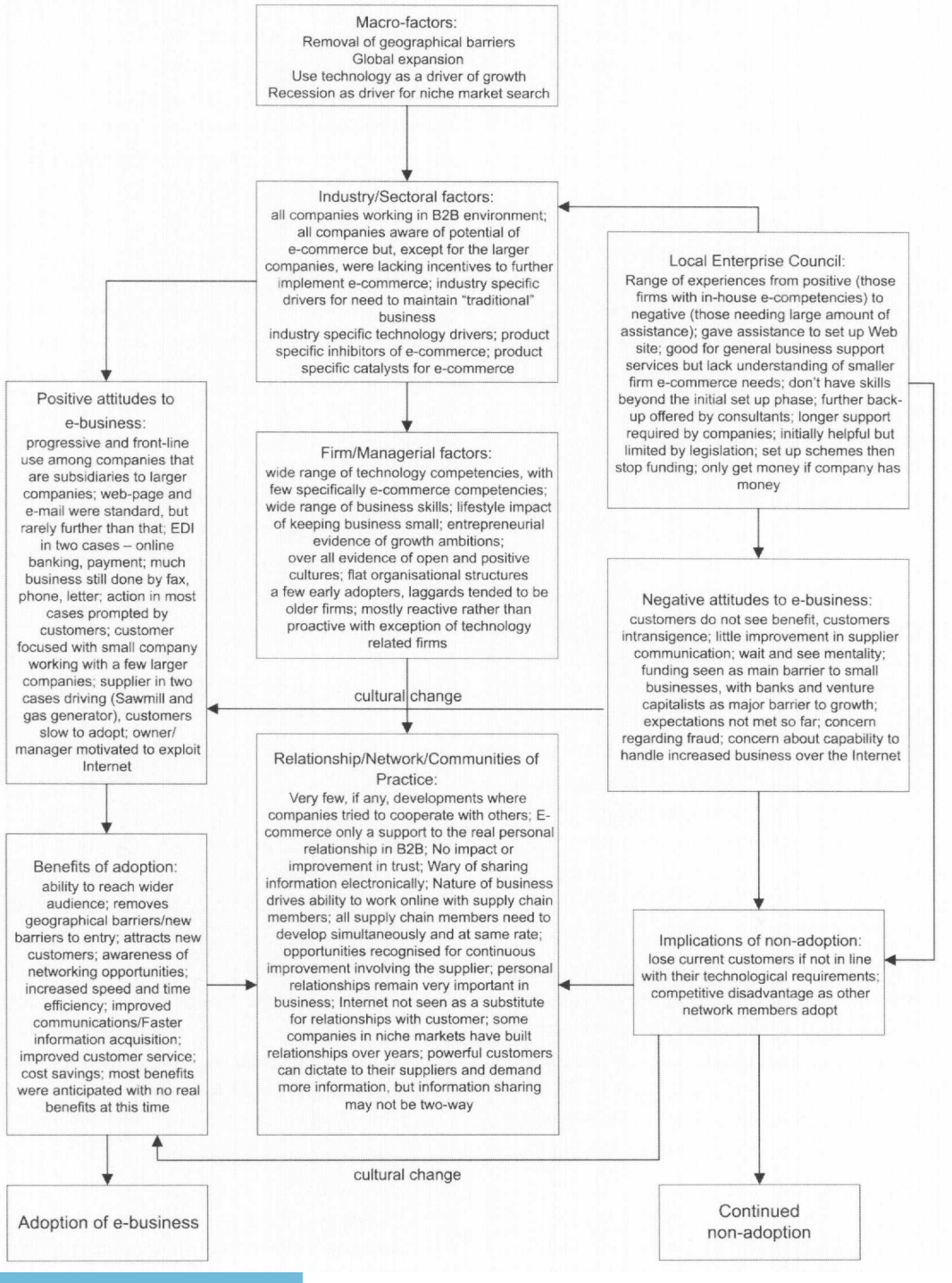
point, after which they are on their own. Fundamentally, if the government wishes to succeed in its targets for e-business implementation it may be advised to radically rethink its strategy to support these companies.

Figure 3 presents a revised conceptual framework by drawing on the findings from this exploratory study. Broadly the research supports the early conceptual framework; however, it is important to bear in mind that the sample used was very small and that the research was conducted in a limited geographic area. Nevertheless, this study does seem to follow patterns identified by much larger surveys (Cox *et al.*, 2002; Quayle, 2002; Peet *et al.*, 2002).

Conclusions

The study sought to explore the level of e-business and e-supply implementation in

Figure 3 Revised framework



SME firms in the Scottish central belt. This was an exploratory study using a small sample with possible geographic biases. The creation of an e-business strategy is seen as prerequisite prior to implementation and integration. Firms in this study were at different stages of implementation, those with limited e-business experience being less advanced than the small, high technology firm. Those in the later category had more in-house skills to support Internet adoption. Others relied heavily on assistance from outside agencies such as Scottish Enterprise and independent consultants. The role of government agencies and support services is clearly critical. SMEs do not have the means to conduct detailed analysis, nor do they have the time or resources to take away from day-to-day business. It may be that some of the SMEs in our sample did not understand the full implications of e-business to their firms, in terms of long-term growth and profit.

The next stage of this research will be to use the results from this study to design a questionnaire and extend the sample throughout Scotland. It is also our intention to conduct a cross-border survey in Sweden and in Northern Ireland in the first instance.

References

Angeles, R. (2000), "Revisiting the role of Internet – EDI in the current electronic scene", *Logistics Information Management*, Vol. 13 No. 1, pp. 45-57.

Adshead, A. (2000), "The e-supply chain is only as strong as its weakest link", *Computer Weekly*, 2 November, pp. 42-6.

Adshead, A. (2001), "E-supply chain savings are more that just dotcom hype", *Computer Weekly*, 3 May, pp. 20-4.

Boddy, D., Cahill, C., Charles, M., Fraser-Kraus, H. and Macbeth, D.K. (1998), "Success and failure in implementing supply chain partnering: an empirical study", *European Journal of Purchasing and Supply Management*, Vol. 4, pp. 143-51.

Bovel, D. and Martha, J. (2000), "From supply chain to value net", *Journal of Business Strategy*, Vol. 21 No. 3, July, pp. 25-36.

Bridge, S., O'Neill, K. and Cromie, S. (1998), *Understanding Enterprise, Entrepreneurship and Small Business*, Macmillan, London.

Brorson, B. (1998), "From the trenches", *PC Week*, pp. 103-7.

Christopher, M. (1992), *Logistics and Supply Chain Management: Strategies for Reducing Costs and Improving Services*, Pitman Publishing, London.

Cox, A., Chicksand, L. and Ireland, P. (2001), *The E-business Report. CIPS, ILT, IOM*, Earlsgate Press, Boston, MA.

Cross, G.J. (2000), "How e-business is transforming supply chain management", *Journal of Business Strategy*, Vol. 21 No. 2, March, pp. 36-43.

Daniel, E., Wilson, H. and Myers, A. (2002), "Adoption of e-business by SMEs in the UK: towards a stage model", *International Journal of Small Business*, Vol. 20 No. 3, pp. 253-69.

Doherty, N.F., Ellis-Chadwick, F. and Hart, C.A. (1999), "Cyber retailing in the UK: the potential of the Internet as a retail channel", *International Journal of Retailing & Distribution Management*, Vol. 27 No. 1, pp. 22-36.

DTI (2000), *International Benchmarking Study*, DTI, London.

Durkin, M. and McGowan, P. (2001a), "'Net effect' – views from the periphery: exploring the role and importance of the Internet on marketing activity in entrepreneurial firms", *Irish Marketing Review*, special issue, Spring.

Durkin, M. and McGowan, P. (2001b), "Exploring a more complete competency spectrum in entrepreneurial small firm Internet marketing", paper presented at the Marketing and Entrepreneurial Track at the AMA Summer Educators Conference, Washington, DC.

Feller, A. (2000), "E-business strategy and the integrated supply chain", *Transportation and Distribution*, Vol. 41 No. 5, May, pp. 127-30.

Field, C. (2000), "Handing over the goods", *Computer Weekly*, 18 May, pp. 48-56.

Fillis, I. (2000), "An examination of the internationalisation process of the smaller craft firm in the UK and the Republic of Ireland", unpublished doctoral thesis, University of Stirling, Stirling.

Fillis, I., Johansson, U. and Wagner, B. (forthcoming a), "E-business development : a conceptual model of the smaller firm", *Journal of Small Business and Enterprise Development*.

Fillis, I., Johansson, U. and Wagner, B. (forthcoming b), "From macro to micro: factors impacting on e-business adoption and development in the smaller firm", *International Journal of Entrepreneurial Behaviour & Research*, Vol. 10 No. 2.

Fraser, J., Fraser, N. and McDonald, F. (2000), "Insight from industry: the strategic challenge of electronic commerce", *Supply Chain Management: An International Journal*, Vol. 5 No. 1, pp. 7-14.

Graham, G. and Hardaker, G. (2000), "Supply-chain management across the Internet", *International Journal of Physical Distribution & Logistics Management*, Vol. 30 No. 34, pp. 286-96.

Hickins, M. (2000), "Allies", *Marketing Review*, January. pp. 54-61.

Holmes, T.L. and Srivastava, R. (1999), "Effects of relationalism and readiness on EDI collaboration and outcomes", *Journal of Business and Industrial Marketing*, Vol. 14 No. 5-6. pp. 390-402.

Keogh, W., Jack, S.L., Bower, J. and Crabtree, E. (1998), "Small, technology-based firms in the UK oil and gas industry: innovation and internationalisation strategies", *International Small Business Journal*, Vol. 17 No. 1, October, pp. 57-68.

Kotzab, H. (1999), "Improving supply chain performance by efficient consumer response: a critical comparison of existing ECR approaches", *Journal of Business and Industrial Marketing*, Vol. 14 No. 5-6, pp. 364-77.

Loughlin, P. (1999), "Viewpoint. e-business strengthens supplier's position", *International Journal of Retail & Distribution Management*, Vol. 27 No. 2, pp. 69-71.

McIvor, R. and McHugh, M. (2000), "Partnership sourcing: an organizational change management perspective", *Journal of Supply Chain Management*, Vol. 36 No. 3, Summer, pp. 12-31.

Peet, S., Brindley, C. and Ritchie, B. (2002), "The European Commission and SME support mechanisms for e-business", *European Business Review*, Vol. 14 No. 5, pp. 335-41.

Reedy, J., Schullo, S. and Zimmerman, K. (2000), *Electronic Marketing: Integrating Electronic Resources into the Marketing Process*, Harcourt College Publishers, Orlando, FL.

Quayle, M. (2002), "E-business: the challenge for UK SMEs in the twentyfirst century", *International Journal of Operations & Production Management*, Vol. 22 No. 10, pp. 1148-61.

Reynolds, J. (2000), "E-business: a critical review", *International Journal of Retail Distribution Management*, Vol. 28 No. 10, pp. 417-44.

Ricknell, D. (1998), "Strengthening links in the supply chain", *Computer Weekly*, June 18, pp. 10-34.

Rowley, J. (2002), "Strategy and synergy in e-business", *Marketing Intelligence & Planning*, Vol. 20 No. 4, pp. 215-22.

Smyth, M. and Ibbotson, P. (2001), "Internet connectivity in Ireland, a joint report by the Bank of Ireland and the University of Ulster", available at: www.bbankofireland/whats_new/item.php?whatsnew_id=8

Sparks, L. and Wagner, B.A. (forthcoming), "Retail exchanges: a research agenda", *Journal of Supply Chain Management: An International Journal*, Vol. 8.

Stokes, D. (2000), "Marketing and the small firm", in Carter, S. and Jones Eves, D. (Eds), *Enterprise and Small Business: Principles, Practice and Policy*, Pearson Education Ltd, London.

Strauss, A. and Corbin, J. (1998), *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 2nd ed., Sage, Thousand Oaks, CA.

Tucker, D. and Jones, L. (2000), "Leveraging the power of the Internet for optimal supplier sourcing", *International Journal of Physical Distribution Management*, Vol. 30 No. 3-4, pp. 255-67.

Watson, R.T., Berthon, P., Pitt, L.F. and Zinnkhan, G.M. (2000), *Electronic Commerce the Strategic Perspective*, The Dryden Press, Orlando, FL.

Whiteley, D. (2000), *E-business: Strategy, Technologies and Applications*, McGraw-Hill, London.

Further reading

Brockman, B.K. and Morgan, R.M. (1999), "The evolution of managerial innovations in distribution: what prospects for ECR", *International Journal of Retail & Distribution Management*, Vol. 27 No. 10, pp. 397-408

Coviello, N. and McAuley, A. (1999), "Internationalisation and the smaller firm: a review of contemporary empirical research", *Management International Review*, Vol. 39 No. 3, July, pp. 223-40.

Management Today (2001), "Realise your e-potential", January, pp. 4-8.

Porter, M. (2001), "Strategy and the Internet", *Harvard Business Review*, March, pp. 63-78.