E-SUPPLY APPLICATIONS: THE INAPPROPRIATENESS OF CERTAIN INTERNET SOLUTIONS FOR SMES

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Abstract

This paper will present the findings of a major survey of current practice in the use of the Internet by UK-based public and private sector organisations carried out by the authors.[i] In particular, it will focus on a number of critical issues relating to e-supply management by SMEs. The survey indicates that SMEs are lagging behind their larger counterparts in implementing an e-supply strategy and are much less likely to have an e-business strategy in place than larger organisations. In light of a discussion of the importance of IT for SMEs, the paper will present some suggestions on how SMEs can harness the Internet for their supply management purposes by developing an e-supply strategy that is 'fit for purpose'.

Keywords: E-Business, Procurement, Supply Chains

Introduction

The authors have recently carried out a major survey of the use of e-business applications in UK-based public and private sector organisations. The research was supported by the Institute of Management, the Institute of Logistics and Transport, and the Chartered Institute of Purchasing and Supply, and funded by Microsoft, Intel, Peoplesoft, Commerce One, SAP, Unisys and QP Group. The research assessed the key activities being undertaken by companies in e-marketing/sales[ii], e-organisation[iii] and e-supply[iv] initiatives.

A major finding of this research is that companies are experiencing a number of major problems with regard to implementing e-business projects. The root of these problems may be attributed to the fact that decisions are being made to implement solutions in haste, surrounded by considerable media and supplier hype. It is clear that many practitioners are making decisions without any theoretical means of determining which application is most appropriate for their business. Our current research demonstrates that many companies are innovating with Internet-based applications and processes, without fully understanding the impact of these technical choices on their competitive market position, their internal business processes, or their external (upstream and downstream) supply chain power relationships.

In particular, this paper will address a number of critical issues relating to e-supply management by SMEs. SMEs are lagging behind their larger counterparts in implementing e-supply applications and are much less likely to have an e-business strategy in place than larger

organisations. As a result, these companies are unsure about future direction and their employees are uncertain as to how to develop long-term purchasing strategies.

The paper is divided into three sections. The first highlights the growing importance of information technology (IT) in general and, specifically, for SMEs. The second section presents the key findings of the survey in relation to the use of the Internet for supply management and, in particular, its usage by SMEs. The final section will present some suggestions on how SMEs can harness the Internet for their supply management purposes by developing an e-supply strategy that is 'fit for purpose'.

The Strategic Importance of IT

Recent research has suggested that information and networking technologies are having a significant impact on business processes and industry structures. Significant literatures have evolved exploring:

- The impact of IT on the alteration of industry structures (Porter and Millar, 1985; Malone et al., 1987; Malone and Rockart, 1993; Benjamin and Wigand, 1995; Sarkar et al., 1995; Bloch et al., 1996; Daniel and Klimis, 1999);
- The opportunities afforded by IT to create new business opportunities (Porter and Millar, 1985; Rayport and Sviokla, 1994, 1995; Sarkar et al., 1996; Bailey and Bakos, 1997; Hagel and Rayport, 1997; Vandermerwe, 1998; Hagel and Singer, 1999); and,
- The role of IT as a source of competitive advantage (Porter and Millar, 1985; Bradley, 1993; Venkatraman, 1994).

For the purpose of this paper, a few points with regard to the role of information as a strategic resource are worthy of mention. As Casagranda, Ashill and Stevens (1998, p.260) comment: "the strategic use of IT can play a significant role in establishing a firm's competitive position by transforming the way in which value activities are performed or transforming the nature of the linkages between them". Furthermore, a number of researchers have suggested that the role of information as a strategic resource is as, if not more, important for SMEs than larger organisations, with investment in IT tending to increase the survival rates of SMEs (Agarwal, 1998).

However, many SMEs operate with resource constraints which impact their potential to develop an IT infrastructure and strategy in a number of interrelated ways. First, many SMEs have a lack of financial resources to dedicate to IT spend. Second, there may not be the manpower (in terms of time available and experience) to develop IT systems. As Tidd, Bessant and Pavitt (1997, p.56) point out, SMEs tend to place a greater reliance for strategy and competence development on the experience and qualifications of senior managers who may lack IT experience. Third, many SMEs tend to focus on second-order strategies—achieving operational efficiencies—and, therefore, can overlook the strategic potential of IT. As Levy and Powell, (2000, p.64) point out: "[o]ne reason for SMEs' limited view of planning is that most invest in IS incrementally usually in response to a specific identified need, particularly to improve basic administration and transaction processing".

With their limited resources, if SMEs are going to invest in IT, they need to be sure that the desired benefits will be achieved. Although this may sound obvious, many IT projects in the past have been perceived as failures. A prime example of a technology that failed to live up to expectations is advanced manufacturing technology (AMT) in the 1980s. By 1989, the UK was spending around £2bn per year (around 20% of all manufacturing investment) on AMT. However, returns on investment were often poor, with failure rates of fifty percent (of planned gains) being reported (Tidd et al., p.11).

Information technology is a process innovation, that is to say, it changes the way products/services are created and delivered (Tidd et al., p.6). The problem with process innovations is that the new processes cannot simply be 'bolted-on' to existing processes, for as Tidd, Bessant and Pavitt (1997, p.39) comment:

> *many firms invested in robots during the 1980s but most surveys suggest that only half of these investments really paid off. For the other half the problem was an inability to match the 'gee whiz' nature of glamorous technology to their particular needs, and the result was what might be called 'technological jewellery—visually impressive but with little more than a decorative function.*

For process innovations to be successful they need to be 'fit for purpose'. Furthermore, Blili and Raymond (1993), whose work has identified the importance of IT for SMEs, point out that if information is to become a strategic resource, IT strategy needs to be integrated with the organisation's overall business strategy. However, as will be demonstrated in the next section, not only are most organisations failing to develop e-supply strategies, but they are failing to integrate them with their overall e-business strategies. This is particularly the case for SMEs.

Section Two: The Use of the Internet for Supply Management

The Current Use of the Internet for Supply Management

There are many claims made by pundits, academics, consultants and service and application providers about the benefits that the Internet will bring to procurement and supply chain management activities. Our survey research demonstrates, however, that the predominant use of the Internet is as an information gathering and communication tool, with 71% of the respondents using the Internet to obtain market information from suppliers, 65% using it to communicate internally, 57% communicating/sharing information with suppliers, 53% communicating with suppliers and 52% using it to obtain information about product/service developments.

Insert figure 1 here

In terms of more strategic usage of the Internet, our research demonstrates that only between a fifth and a quarter of respondents are using the Internet specifically for the logistical management and procurement of supply chain inputs. Of these, it is the larger organisations who appear to be more actively engaged than others, although the data does not demonstrate that the gap in adoption is particularly significant (see Figure 1).

The Current State of E-Supply Strategies

The survey found that the number of organisations using e-supply strategies is relatively low and strategy development is embryonic, with only 57 of the 250 respondents having an e-supply strategy. In terms of how organisational size affects e-supply strategy development, large organisations (70% by number of employees and 67% by revenue) also appear to have more developed strategies in place than medium-size (48% by number of employees and 44% by revenue) and small organisations (57% by number of employees and 63% by revenue). It is interesting to note that small organisations appear to have more developed strategies in place than medium-size organisations.

Despite this, the overall level of robustness of most e-supply strategies is alarmingly low, with only 11% of the organisations having a well-developed e-supply strategy (i.e. written, codified and being implemented). This figure did not vary significantly according to organisation size. Linked to the issue of the degree of development of an e-supply strategy is its integration into corporate strategy. It is one thing to have an e-supply strategy, it is altogether another thing to have this strategy fully integrated into the overall e-business strategy of the organisation. However, the survey demonstrated that there is a worrying lack of integration of e-supply strategies into organisation-wide e-business strategies. Overall, only 41% of respondents had an e-supply strategy that was fully integrated into an organisation-wide e-business strategy. Furthermore, the survey found that there was a lack of proper functional consultation taking place within many organisations when developing e-supply strategies.

The Major Drivers Behind E-Supply Strategies

Whatever the level of e-supply strategy development and integration, there are clearly defined reasons why organisations wish to develop the use of the Internet for their management of procurement and supply chain activities. Organisations of all sizes (whether by turnover or number of employees), see an improvement in operational efficiency as the major driver behind e-supply initiatives. Of these, medium-size and larger organisations tend to see more opportunities than smaller organisations. The reduction of input costs is seen by all sizes of organisation as the second most important benefit of e-supply initiatives. Again, it is medium-size and large organisations that tend to see more opportunities than smaller organisations. Respondents also see benefits arising in the area of improving market differentiation. Here the pattern is reversed, with small organisations being more optimistic about the benefits than medium-size and large organisations. The latter appear to be most sceptical about market differentiation benefits.

The fact that small organisations anticipate that the Internet will allow for significant improvements in market differentiation is unsurprising, at one level, because small organisations may believe that the Internet will provide them with a way of taking on larger organisations and developing a global presence that was previously denied to them. However, the recent failure of many B2C dot-coms may well cause smaller organisations to rethink this driver in the next year. Furthermore, smaller organisations may obtain fewer benefits from e-supply strategies than they anticipate because larger organisations have begun to learn from early adopters about the new technology and can link it to more complementary resources than their smaller competitors.

In addition, improvements in relationship management are expected by about half of the respondents from medium-size and large organisations, with smaller organisations being much less optimistic of benefits occurring in this regard. Therefore, the only category in which smaller organisations perceive there to be more benefits from e-supply strategies than medium and large organisations is in the area of improvements in market differentiation. In all other categories, large and medium-size organisations appear to see more benefits arising than their smaller counterparts.

The Current Use of E-Marketplaces and Other B2B Applications

There are many different Internet applications that can be used to improve procurement and supply chain management activities. One of the most visible applications currently being offered to organisations is e-marketplaces.[v] Despite the current media hype about the supposed benefits of e-marketplaces, the reality appears to be very different from the rhetoric. Of the organisations that stated that they used the Internet to procure external supply chain resources only a third (32%) are currently using an e-marketplace. In terms of differences in uptake according to organisation size, large organisations (37% by revenue and number of employees) appear to be the most prone to be the early adopters of this application, with little difference in adoption rates between small (25% by revenue and 29% by number of employees) and medium-size (28% by revenue and 26% by number of employees) organisations.

Although this is an interesting finding, it is not too surprising. It is clearly the larger organisations that have the market power and entrenched position with suppliers that have the greater ability to innovate with this type of application. Clearly, small and medium-size organisations are sitting on the fence and waiting to see what the larger organisations, who are in a position to take the risks, can achieve before they rush to adopt this relatively new and untried way of conducting supply business.

Insert figure 2 here

Other than e-marketplaces, there is a range of B2B applications that can be used as part of an e-business strategy, in particular buy-side software and supply chain software.[vi] The survey found that these other B2B applications are widely used by early adopters of e-supply strategies, with 84% of respondents stating that they used other B2B applications. There was no appreciable difference between organisations when disaggregating by organisational size. All have well over 70% of respondents using other B2B applications, although smaller organisations tend to use supply chain software applications more than medium and large organisations, whilst medium-size and large organisations appear to be the most active in the use of buy-side software (especially with supplier-maintained catalogues).

Barriers to the Development of an E-Supply Strategy

Much of the above discussion has focused on the experiences of early adopters using e-supply strategies. It is clear, however, that the majority (77%) of the respondents to the survey are not developing e-supply strategies to use the Internet for procurement and supply chain activities. Given this, it is important to understand what are the barriers limiting early adoption. For many organisations this is because the topic of e-business may only just be

coming onto the agenda and because there is a lack of senior management support to put such strategies in place.

In particular, smaller organisations are experiencing the most barriers to implementation, especially with a lack of an e-business strategy, a lack of suitable IT infrastructure and an absence of IT expertise. Smaller organisations also point to unsuitability for their products and/or services more than their larger counterparts. Medium-size and large organisations tend to experience problems in the same ways. They do not have as many problems as smaller organisations but report problems with a lack of an e-business strategy and unsuitable IT infrastructure.

This is not a surprising conclusion since many of the barriers to early adoption—lack of IT infrastructure compatibility and lack of internal IT expertise—are associated with resource constraints. These constraints obviously impact more on smaller organisations than they do on larger organisations.

Developing an 'Appropriate' E-Supply Strategy

Given the time and competence constraints imposed on senior managers in smaller organisations, it is not surprising that they have not yet found the time to develop integrated e-business strategies. However, from the above discussion it should be apparent that it is important to have a way of thinking so that practitioners can recognise and anticipate the key problems and potential opportunities that may present themselves. This way of thinking will require the development of robust e-supply strategies. However, the survey research has indicated that, whilst early adopters do have e-supply strategies in place, these have not always been robustly developed. Indeed, only 11% of our respondent organisations had an e-supply strategy that was well-developed (i.e. written, codified and being implemented). This lack of robust e-business strategies may mean that buyers are developing and implementing inappropriate e-business solutions for their particular business circumstances.

The first step towards developing an appropriate e-supply strategy is to recognise where the opportunities the Internet has to offer lie. Indeed, the Internet can impact upon procurement and supply chain management in two principle ways: (1) improve operational efficiencies; and/or, (2) alter the power structure between buyers and suppliers.

Whilst the media has focused on how the Internet has provided a mechanism to transform the relationship between suppliers and consumers, it is now becoming apparent that the real benefits from Internet applications may well arise from operational processes and practices *between* businesses that are more efficient. Indeed, many companies are expecting to obtain significant benefits from the creation of a seamless order placement, fulfilment and payments process that offers a vision of a truly paperless office where companies can concentrate on the more effective management of all of their internal processes. In addition to the reduction in transaction costs, the simplification of the procedures also contributes to the increased control that exists over *ad hoc* and uncoordinated maverick purchasing. However, these process changes will tend to provide only shorter-term benefits, with many of these being quickly eroded by benchmarking and competitive replication of any new Internet applications.

The Internet also has the potential to fundamentally alter the buyer-supplier relationship. Under certain circumstances, Internet applications may provide the buyer with an opportunity to lower the costs of inputs to their organisation through increased supply leverage. As such, buyers need to be aware of the supply and demand characteristics of the markets in which they are operating in order to ascertain just what *is possible* from adopting an e-supply strategy. Furthermore, early adopters can create competitive advantage for themselves by achieving cost reduction and quality improvements that their competitors cannot quickly replicate, thus giving a sustained procurement advantage.

When understanding the impact of the Internet on buyer-supplier relationships one needs to consider the effect on the relative power that each party has in the exchange. It is therefore, important to start any thinking about procurement and supply management from what we have called the power perspective (Cox, 2001). This is for a number of reasons.

Recently, a view about what 'best practice' is in procurement and supply management has developed. This involves the rejection of a historic focus on adversarial buyer-supplier relationships in favour of more collaborative long-term approaches based on trust. However, this growing belief seems contrary to the view that the best position for the buyer to be in (and one that ensures that suppliers innovate and pass value to buyers) is the maintenance of perfectly competitive supply markets, with low barriers to entry, low switching costs and limited information asymmetries.

The power perspective has shown to be of utility in developing appropriate relational management strategies. According to this perspective, supply chains can be conceived as analytical structures of power which are based on the resources that buyers and suppliers bring to the exchange relationship. These resources may be structural or regulatory, and are critically influenced by the flow of information and knowledge management (see Cox et al., 1999a; Cox et al., 1999b; Cox et al., 2001b). It is, therefore, imperative that practitioners have a clear understanding of the power resources held by actors within the supply chains in which they operate, what is achievable under those particular circumstances and how the various Internet applications will impact upon the structures of power.

On the demand-side, power within the supply chain is primarily a function of the utility of the resource in question. This is dependent upon a number of factors, including:

- The type of product – operating/secondary inputs or primary inputs;
- Frequency of purchase;
- Importance to business;
- Volume;
- Geographical focus; and,
- Substitutability.

Thus, for instance, an Internet application that allows for aggregation with other buyers and/or consolidation of external spend may alter the power structure in a number of ways.
The buyer's purchasing power may be enhanced by the increase in the relative volume and salience of the spend to the supplier. Aggregation and consolidation may also enable the buyer to engineer a regular and predictable spend that can incentivise the supplier to offer improved purchasing terms.

On the supply-side, the nature of the supply market will have a direct bearing on what can be achieved through employing an e-supply strategy. The primary factor to be taken into consideration is the relative scarcity of supply. This, like utility, is dependent upon a number of factors (see Cox et al. 2000) including:

- information asymmetry;
- buyer switching costs;
- reputation effects;
- buyer search costs; and,
- economies of scale.

The preferred position for the buyer is to not only have an external spend that is valued by suppliers (in terms of volume and regularity) but also to be sourcing these external resources from a highly contested supply market. The Internet can alter the dynamics of the supply market to the buyer's advantage by increasing the number of potential suppliers available to the buyer. In particular, the reduction of search costs and information asymmetry that are made possible by the Internet, provide the buyer with a greater opportunity to better understand the supply market and select the supplier who provides the best value for money (defined in terms of quality and cost).

However, under certain circumstances, the power resources held by the supplier will mean that the adoption of an Internet application by a buying organisation will have a very limited impact on the nature of the supply market. It is conceivable, for instance, that in situations where buyers are faced with having to deal with a monopoly supplier, Internet applications will have very little impact. Similarly, if a supplier's power, relative to that of the buyer is based on intellectual property rights, it is difficult to envisage how the Internet will be able to change the balance of power.

Conclusions

It is too early to tell whether many of the claims about the use of the Internet for supply management will achieve the benefits claimed for it, or whether it is really only marketing hype. There is evidence on both sides of the argument. We may be witnessing the early adopters' learning curve that will lead on to general and widespread use. Conversely, it could be that many of the early adopters in B2B will eventually start to experience similar problems to those experienced by B2C early adopters, and the currently expected levels of take up in the future will not materialise.

Furthermore, it is essential that practitioners recognise the importance of understanding the power circumstance that they are in. This is particularly the case for SMEs as they seek to understand how IT and the Internet can improve their supply management practices to compete with their larger counterparts. SMEs need to develop the appropriate sourcing strategies to change their current power circumstance to one that is more conducive to the buyer. Failing this, when it is not possible to transform their power circumstance, it is essential that buyers from SMEs manage the power circumstances that prevail appropriately.

From the research discussed within the paper, it is apparent that many practitioners within SMEs do not fully understand the power circumstance that they are in, and they fail therefore to mange exchange relationships appropriately. The discussion in this paper will hopefully have highlighted a number of important issues that will enable buyers from SMEs to understand the power circumstances that they are in when using the Internet for procurement and supply management.

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[i] For a full description and analysis of the survey results see Cox, Chicksand and Ireland, 2001a.

[ii] E-marketing refers to initiatives whereby an organisation adopts Internet software applications to assist with the management of marketing and sales

[iii] E-organisation refers to initiatives whereby an organsiation adopts Internet software applications to assist with the internal management of the organisation. This may encompass initiatives included within an e-marketing or e-supply strategy.

[iv] Whenever an organisation adopts an Internet software application to assist with the management of procurement or supply chain activities, the catch-all phrase—"e-supply"—is used to refer to this type of initiative.
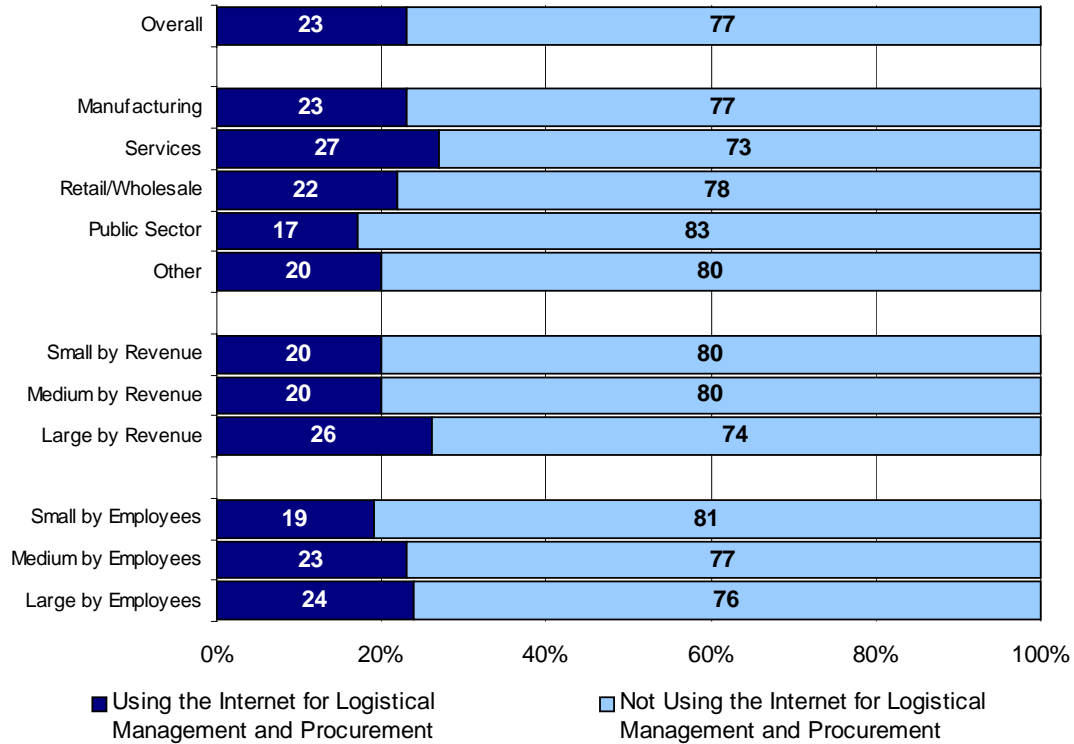
Figure 1: The Current Use of the Internet for Logistical and Procurement Management
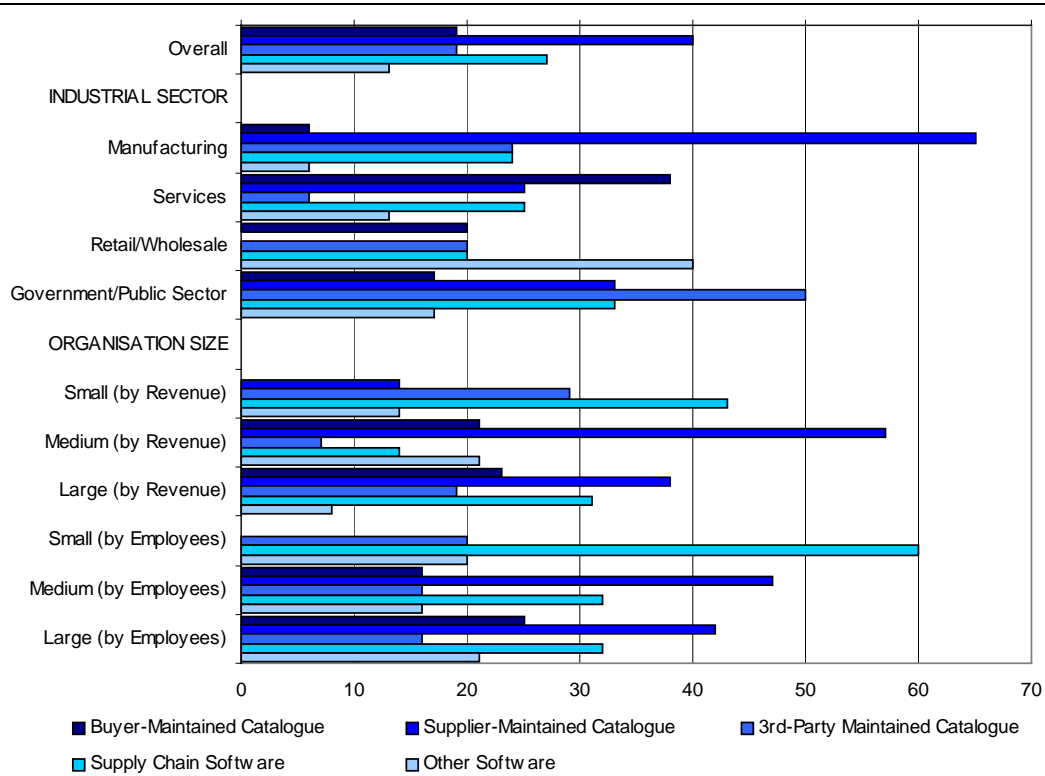Source: Cox et al. (2001a)

Figure 2: The Use of Other B2B Internet Applications
Source: Cox et al. (2001a)