An Integrated Framework for E-Commerce Adoption in Small to Medium-Sized Enterprises

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ABSTRACT

The use of e-commerce is more and more becoming a strategic necessity. Unfortunately, small and medium-sized firms (SMEs) seem to fall behind their larger counterparts in the adoption of e-commerce. For this reason a number of projects, both national and the international, aiming at supporting e-commerce activities in SMEs are planned and initiated. It is fundamental that these projects are successful as a poor effort can complicate future initiatives. This requires thorough planning and knowledge about different aspects of the problem area. Unfortunately, research on e-commerce is often limited to drivers and barriers for adoption. This paper argues for a broader perspective and a conceptual framework is presented that integrates the context, content and process of e-commerce adoption.

1   INTRODUCTION

Internet and the web have changed the way people and organizations communicate and conduct their businesses. Some even claim that the change is so fundamental that all business will be electronic to some extent in the future (Laudon & Traver, 2002). Most e-commerce is business-to-business (B2B) and it is also in this sector that the fastest growth is expected (Timmer, 1999; Chaffey, 2002). Among the benefits of e-commerce are higher information quality, improved customer service, and increased efficiency in the administration of sales and purchase (Chaffey, 2002).

It is feared, however, that SMEs will be left out of this development due to various barriers. The use of e-commerce differs significantly between large and small firms. A Swedish study shows that 98 % of the firms with more than 500 employees had their own web site in 2002 (SIKA, 2003). The corresponding figure for firms with 10-19 employees was 72 %. The difference is even more substantial when looking at EDI adoption. During 2001 58 % of the largest firms had adopted EDI while only 13 % of the smallest (10-19 employees) (ibid.). As SMEs have an important role in generating employment and creating economic wealth (Hay & Kamshad, 1994) SMEs' ability to adopt innovations such as e-commerce is vital for the society.

Many governments and regional organizations are now acknowledging the matter of e-commerce adoption in SMEs (Poon, 2002). A number of national and regional (e.g. EU) projects on "SME awareness" are taking place or are about to start. An urgent question is whether these projects are designed to fulfill the purpose of facilitating SMEs' involvement in electronic commerce. Poorly managed projects could in fact increase the barriers for adoption. Buratti and Penco (2001), who studied a SME technology transfer project, found many firms to be disillusioned and frustrated after the project was completed. Such unsatisfactory experiences could increase the mistrust towards public actions and threaten future initiatives (ibid.). In the design of support projects several aspects have to be considered, for example SMEs' characteristics, needs and way of performing change processes. Furthermore, SMEs gave common features but are far from homogeneous. Therefore, also the context of the adopting firms needs to be studied. Unfortunately, little seems to be known about these aspects as research so far to a large extent has concentrated on drivers and barriers to adoption. Moreover, earlier research on e-commerce adoption has mainly focused on large organizations and EDI (Electronic Data Interchange). Too few studies have addressed e-commerce and Internet adoption in SMEs (Daniel et al., 2002). Particularly, the *process* of adoption needs further studies (Chan & Swatman, 2003). Blili and Raymond (1993) also claim that SMEs need other, more vigorous and flexible, methods and approaches than large firms.

In this study I propose a conceptual framework as a basis for studies of B2B adoption at the firm level. Different aspects of adoption are integrated, using additional research areas. The purpose of the framework is to broaden the perspective used in earlier research and thereby deepening the understanding of SMEs e-commerce adoption. E-commerce here refers to the exchange of electronic transactions in interorganizational systems (IOS) between a buyer and a seller. Adoption is defined as the commitment to invest necessary resources to make a change (Kwon & Zmud, 1987), i.e. to implement e-commerce technology and change business processes, as well as the decision to use e-commerce as a regular activity in the firm (Rogers, 1995).

2   EXTENDING THE VIEW ON ADOPTION

Earlier research on e-commerce adoption has often focused on drivers and barriers for adoption (see for example Premkumar et al, 1997). This approach can be categorized as factor theory, explaining differences in outcome from differences in the independent factors, i.e. drivers and barriers. Despite strengths such as simple cause-effect-relations and statistically measurable results (Kurnia & Johnston, 2000) there are also obvious limitations with factor theory. Factor theory fails to increase the understanding for cases where a certain outcome sometimes occurs, sometimes not (Soh & Marcus, 1995) as is the case in adoption processes. Neither does it illustrate if drivers and barriers occurrs in a specific order (ibid.) nor if they changes during the adoption process.

Another weakness is that factor theory ignores the context where the change takes place (Pettigrew, 1985). Change in an organization often evolves over a long period of time, influenced by other change processes both inside and outside the organization. Therefore, to get a deeper understanding of why a change takes place, how it develops over time and what the result is, the context of change needs to be considered along with the change process (ibid.). This means that to be able to understand and support SMEs e-commerce adoption, studies ought to include analysis of the internal and external context, the adoption process and the content of change. I claim that each of these dimensions provides interesting contributions to the complex picture of e-commerce adoption. In the next section a conceptual framework that could serve as basis for studies of e-commerce adoption is presented. The framework is mainly built upon Pettigrew's (1985) contextual framework for strategic changes, thus looking at e-commerce adoption as a strategic change in the SMEs. 'Strategic change' does not necessary mean a change in business strategy, only that the change is extensive and has consequences for a long period. The framework consist of three dimensions of change: content, context and process and the relationship between these, see figure 1.

Figure 1: The contextual framework for strategic changes
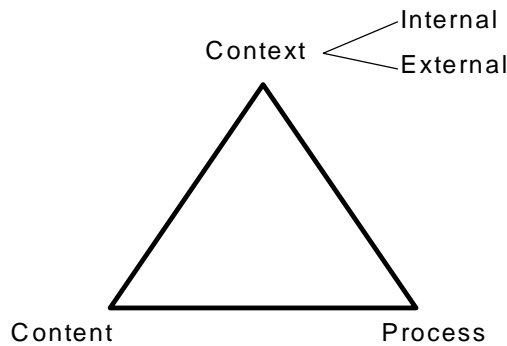
Next I will briefly review what kind of changes the adoption of e-commerce may result in (content), why it is adopted (context), and how the adoption process is carried our (process), followed by a short analysis of the interaction between these dimensions, especially focusing on influences from the context.

2.1   The content dimension – how will e-commerce change the firm?

The content dimension concerns the specific area of change, for example technology, workforce, products or organizational culture (Pettigrew, 1985). The adoption of e-commerce is likely to results in changes in business processes and IS/IT-support. In recent years also an increased awareness has evolved for the need to consider information systems (IS) development and processes development along with strategic development (Nilsson, 1999). This approach is often depicted as a three level model, see figure 2.

The strategic level concerns business goals and strategy while the process level handles changes in business processes, both internal and external. The IS/IT level finally, concerns changes in the organization's support level such as new hardware and software, external and internal system integration, security issues etc.

2.2   The contextual dimension –"the context rules it all"

The context dimension explains why a change is initiated or opposed (Pettigrew, 1985). Stakeholders, i.e. persons or groups internal and external to the firm that affect or are affected by the adoption, are also part of the context (Serafimidis & Smithson, 2000).

Pressure from customers and competitors have been identified as important driving forces in the external context (Premkumar et al., 1997). Others have mentioned the need for large firms to support their smaller counterparts (Iacovou et al., 1995; Poon, 2002). Furthermore, the need for a critical mass of users, and trading partners' readiness for e-commerce, is important for potential adopters to see the benefits (Premkumar et al., 1997). Still other factors affecting the adoption are lack of standards and security issues (Tuunainen, 1999). Among the external stakeholders are, except from customers and competitors, system suppliers, consultants, change agents and changes agencies, i.e. persons and organizations trying to promote the adoption.

Figure 2: Three levels of change (Nilsson, 1999: 219)
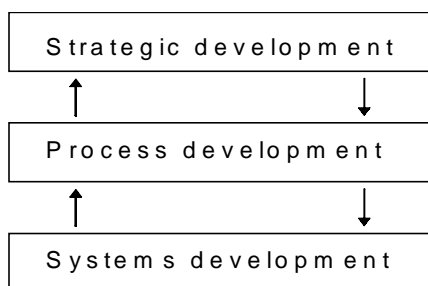
While large firms have financial advantages, smaller firms have behavioural advantages (Rothwell & Dodgson, 1991). Informal and efficient internal communication, together with few decision-levels, enables flexible and fast adaptation to changes in the external and internal context. The internal context of SMEs is otherwise often described as problematic as the human and financial resources often are scarce (Welsh & White, 1981). Lack of time, knowledge and financial means could hinder the adoption. Daniel et al. (2002) on the other hand, did not find internal factors like turnover, number of employees and company age to affect the adoption of e-commerce. Another factor worth examining is the firm's business strategy and whether this mainly focuses on efficient business transactions – cost efficiency, or customer service – the long term relationship. Also type of product (Poon & Swatman, 1999) and transactions volumes (Tuunainen, 1998) have been found to affect the adoption. Moreover, top management support was found essential to the adoption (Levy & Powell, 2002). In SMEs the owner/manger is often the only person who has the authority and responsibility for planning the strategic use of IT-systems (Blili & Raymond, 1993). Finally, the existence of a product champion has proved to be an important factor in the internal context (Premkumar et al., 1997; Iacovou et al., 1995).

Also the specific innovation represents the context of adoption (Tornatzky & Fleischer, 1990). According to Rogers (1995) the adopter's perception of innovation characteristics such as its relative advantages over existing or competing techniques, compatibility with firm values and needs, complexity and cost, affects the decision to adopt or not.

### 2.3   The process dimension – performing the adoption process

The process dimension describes how a change is carried out. The process dimension consists of activities, reactions and interactions between stakeholders (Pettigrew, 1985) but also methods and techniques employed to perform the process (Serafimidis & Smithson, 2000). Few studies have examined the process of adoption of e-commerce. The process dimension will therefore mainly build upon theories of strategic decision-making and decision-making for innovations. Common for most descriptions of decision processes are the division into phases or core behaviours (Mintzberg et al., 1976; Simon, 1977; Tornatzky & Fleischer, 1990; Rogers, 1995). The execution of phases is however not a linear process. Rather the process iterates in cycles, often interrupted several times before the final decision is made (Mintzberg et al., 1976). The description of phases is to a large extent similar between Simon's (1977) classical model over decision processes consisting of three phases: *Intelligence*, *Design* and *Choice* and Mintzberg et al's (1976) model with the phases: *Identification*, *Development* and *Selection*.

The adoption process does not consist of a single decision but several, where certain are invisible for some of the stakeholders (Tornatzky & Fleischer, 1990). During this process several activities are performed by different stakeholders (Tornatzky & Fleischer, 1990). Stakeholders active in the process also influence the choice of methods and evaluation criteria (Serafimidis & Smithson, 2000). Further, they affect the adoption by their mere participation as the adoption decision largely is based on attitudes that are formed in interaction with others (Rogers, 1995). Therefore, to understand a certain decision one also needs to study the interaction between stakeholders and their roles during the adoption process. Also the relationships between the adoption process for e-commerce and other change processes, external and internal to the firm, which might affect the adoption, need to be analyzed. Moreover, the time of adoption in connection to the overall diffusion cycle of the innovation is interesting to study.

3   TOWARDS A HOLISTIC VIEW OF ADOPTION

In this section a brief analysis of the interactions between the three dimensions of the framework will be presented, putting emphasis on contextual influences, see figure 3.

Figure 3: An integrated framework for e-commerce adoption
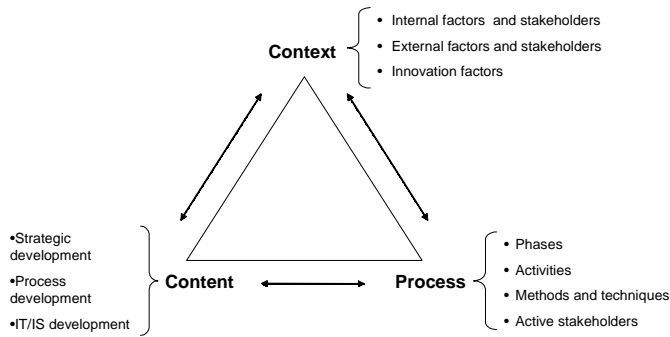
The interaction between context and process

Are there reasons to believe that the adoption process of e-commerce in SMEs differs from more general decision processes? An important difference is that an e-commerce decision is not a single firm's decision. For e-commerce to take place at least one business partner need to make the same decision. This enlightens the need for cooperation and negotiation with business partners. Fredriksson and Vilgon (1996) found that a frequent interaction between business partners had taken place during the development of an IOS while the customers in Cavaye's (1995) study only participated in the development of systems that was initiated from external pressure. The adoption process of e-commerce could hence in some cases be expected to comprise joint activities with business partners and in others be a pure internal matter.

Further, it is also reasonable to expect that adoption processes carried out in small and medium-sized firms differs from similar processes in large organizations. The organizational structure in SMEs, with the owner/manager managing the business with a firm hand (Levy & Powell, 2002), indicates that decision-making in SMEs has a larger dependency on the owner/manger then in large organizations. Also the high adaptability and organizational flexibility in SMEs might affect the process. Saunders and Clark (1992) who studied EDI adoption, claim that small businesses have a relatively short adoption process once they perceive the advantages or experience customer pressure.

The interaction between context and content

The context of adoption may influence also the content of change in several ways. If for example, the adoption takes place after pressure from trading partners (most often customers), changes will occur first in the process and IS/IT-levels (O'Callaghan, 1998). Eventually, changes in strategy may take place. If the organization instead is the initiator of adoption changes are likely to start with the strategic changes, moving on to the other levels.

The context, in form of business strategy, also affects what kind of system that is adopted. Organizations focusing on lowering costs adopt standard connections to many trading partners while organizations focusing on customer service create specific solutions that integrate information systems and business processes between buyer and seller (Tuunaninen, 1999). The content of an IOS may also change the context. Systems that are highly integrated results in high switching costs, lock-in effects and often closer bounds between the organizations.

The interaction between process and content

This analysis focus on how the context of adoption affects both the process and the content of adoption. Also relationships between the process and the content exist, however. For one thing it is known that user involvement in change processes affects not only the focus and content of change, but also how the result is accepted (see for example Goldkuhl & Röstlinger, 1988).

4   SUMMARY AND CONCLUSIONS

In this paper a conceptual framework is presented. Some brief examples are given that illustrate how the interaction between context,

process and content affects the adoption. I believe that the holistic approach of the framework will result in a deeper understanding of SMEs' e-commerce adoption. Nevertheless, it also has weaknesses. Besides the complexity of dealing with three dimensions and their interaction simultaneously, the use of the framework in research calls for longitudinal studies. These are often time-consuming and result in a lot of data. However, when refined and validated by empirical studies the framework should be able to contribute to the planning and design of training and support initiatives directed to SMEs.

The presented framework applies to firms of different industry branches and diverse types of IOS. Possibly, contexts with common characteristics will crystallize from empirical studies. The identification of such "adoption contexts" would enable persons and organizations performing support actions to adapt the content and working procedures to different contexts. This would increase the possibility for successful support and training in the SME community. Fully developed the framework could serve as a checklist for essential issues that support projects and similar ventures need to consider, as for example how to support the development phase in different contexts. Further, to improve SMEs' ability to derive benefits from e-commerce also the phases following the adoption, such as implementation and expansion/spread of the system, ought to be taken into account. Finally, it is important to acknowledge that not all SMEs may benefit from e-commerce. Hopefully, knowledge on different adoption context also facilitates the selection of firms to support.

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