UNDERSTANDING E-BUSINESS COMPETENCIES IN SMES

a conceptual and operational approach

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Abstract: This paper reports on an ongoing project that aims to assist SMEs in the strategic use of e-business technology. We present the first stage of this project, where the goal is to identify critical types of competence that can enable or inhibit the successful use of e-business technologies. We start by describing the conceptual model of competencies and their relations to e-business success. Secondly, we describe the operationalization of this model into measures that are the basis for the subsequent survey used to identify critical types of competence related to e-business success for SMEs.

1. INTRODUCTION

One of the major characteristics of today's economy is the growth of e-business defined as business conducted over the Internet. All over the world both established companies and new ventures create new online businesses based on Internet technologies, which are therefore often referred to as e-business technologies, e-commerce solutions, etc. It is generally believed that e-business has the potential of increasing efficiency and effectiveness and hence generate substantial new value.

Research within the field of information systems (IS) economics show that the business value from IT investments in general is positive and highest in companies that not only invest in technology but also in organizational measures including training programs to leverage IT's potential (Brynjolfsson and Hitt, 1998). Most studies of the effects of IT-investments are done in the context of large firms, usually Fortune 500 companies, and there are very few studies of IT-value in smaller companies. In a recent study based on 441

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small and medium-sized enterprises (SMEs) in Spain Dans (2001) found that IT-investments also gave a significant and positive business value in SMEs.

Moreover, in a recent study Amit and Zott (2001) argue that amongst IT-investments in general Internet technologies have the highest potential for value-creation through linking companies, its suppliers and customers in new and innovative ways. Amit and Zott further argue that this value potential of e-business is poorly understood both theoretically and in practice. In a European survey among Internet experts and online traders it was found that most companies did not consider e-business as a priority (Forrester Research, 1999). Among the major obstacles were lack of trained staff and co-ordination between internal departments. Knowledge and competence are increasingly emphasized by businesses in general as the most important competitive factor. In particular, small and medium sized enterprises suffer from resource poverty. In a similar European survey among SME managers it was found that the main obstacles to increased competence were high costs of courses, problems of internal organization of the attendance to the courses, bad quality of the training supply as well as difficulties in identifying training needs (E/1224, 1997). With the knowledge of key competencies, SMEs may spend their limited resources on factors that contribute the most to business value.

The purpose of this paper is to contribute to the theoretical and practical understanding of the nature and role of competence in utilizing e-business technology for the benefit of the business. In exploring this we are particularly concerned with the small- and medium sized companies. To do this, we begin with a review of the literature describing the company value of e-business, and the nature and importance of competencies needed to successfully utilize information technology including e-business solutions. Based on this review, we develop a conceptual model of e-business competencies and their relations to e-business value. In the empirical part of the paper we test the relevance of this model for SMEs through interviews with selected managers. These interviews also guide the operationalization of the model into a survey instrument. The final section of the paper presents a summary and conclusion of the theoretical and empirical work in the paper.

2. THEORY

There is an increased focus on individual achievement and productivity in the workplace (Stewart, 1997). In today's competitive environment, maximizing the potential of information technology in general and Internet technology in particular presumes that the technology is used well and not

only adopted and used. Competence is a primary issue, as it enables employees to transform ideas into business value (Soh & Markus, 1995; Kanter, 1997), and as it leads to higher productivity (Higginbotham, 1997; Little, 1997).

Only a few studies have examined the relationship between information technology competence in general and business value. Also, the user competence construct is largely absent from prominent technology acceptance and fit models, poorly conceptualized, and inconsistently measured (Marcolin et al., 2000). Recent works show increased academic interest in this phenomenon.

Amit and Zott (2001) have explored the theoretical foundations for value creation in e-business in a recent study. Their review suggests that no single theory available in the entrepreneurship or strategic management literature today can fully explain the value creation potential of e-business. Rather, they argue that an integration of theoretical perspectives on value creation is necessary. Their proposed model is based on the concept of a business model, which describes how one or several companies (e.g. a company and its suppliers and customers) in co-operation can exploit business opportunities through the design, structure and governance of transaction content. With this as the level of analysis, they describe the potential of value creation in e-business in four interrelated dimensions, which are efficiency, complementarities, lock-in, and novelty. Efficiency relates to potential of reducing transaction costs as a result of utilizing e-commerce technologies. Complementarities describe the value potential of companies that cooperate in an e-business strategy and combine their products and services, technologies and activities. This combination can create value to customers as a result of reduced costs related to finding and ordering products and services, and to business partners as a result of utilizing interconnectivity of markets and possibilities of process integration. The third dimension, lock-in, describes the value potential of e-business as a result of switching costs where customers are motivated to repeat their transactions, and where business partners extend their relationships and also improve their current associations. As the last dimension in Amit and Zott's model, novelty describes how e-businesses can create value through innovations in the way business is conducted. Examples of such innovations are new ways of structuring transactions like web-based auctions and reverse markets. In the latter form potential buyers indicate needs and preferred prices to sellers. These examples show that e-business combines previously unconnected parties by utilizing new transaction technologies and by creating new markets.

2.1 IT Competence

According to Marcolin et al. (2000) and Basselier et al. (2001) the proliferation of approaches to the concept of competence has hindered the creation of a cumulative body of knowledge. Research has been conducted from a variety of approaches and areas of research, including psychology, human resource management, management, education and information systems. Partly, this confusion in the understanding of competence results from the interchangeable use of competence and performance, which confuses the understanding of process and outcome. Problems related to understanding and measuring competencies have caused many researchers to use performance as a proxy. In this study we will view an organization's access to competencies as a necessary but not sufficient factor to the successful implementation of strategies involving new technologies. We will primarily base our discussion and inclusion of potentially important areas of competence on studies within the IS field that include some form of outcome in either general or specific terms. Furthermore, since several studies point to the importance of the business manager in achieving successful implementation of strategies and technologies (e.g. Luftman et al. 1999; Papke-Shields and Malhotra 2001), we will also include studies which focuses on the business manager. In the interviews and in the survey we will also focus on business managers and hence assume that information from these will give a representative reflection of both relevant and critical types of competence in SMEs. Since the literature on e-business is more influenced by studies of bigger companies, we base our approach on the assumption that we can gain more understanding of e-business in SMEs by applying theories based on studies of businesses in general and adjusting them to the SME context.

2.1.1 Definitions and types of competence

In this emergent field of IS research there is yet little general agreement on how competencies should be defined and measured. There are different views concerning which elements competence consist of, and at what level of analysis these could be observed. In the IS field two streams of research considering the nature and importance of competence can be identified. Firstly, one stream concerns competencies needed at the company level of analysis and is influenced by similar studies reported in the management literature (e.g. Prahalad and Hamel, 1990). In particular, this stream is heavily influenced by the resource-based view of the firm (e.g. Barney, 1991) where competencies are regarded as resources defined as fundamental drivers of superior company performance. In addition, a distinction is made

between resources and capabilities, where capabilities reflect the company's ability to combine resources in ways that stimulate performance. In general the goal of this research is to identify types of capabilities that are core in the sense that they can create a relative advantage to the company in its effort of taking advantage of technology in relation to business needs. A persistent issue in this research stream has been to identify which types of competence in terms of resources and capabilities that are core and non-core to the business.

The other stream concerns the competencies at the individual level. This perspective holds that competence at the individual level is required for the creation of competence at the organizational level, or focuses simply on the competence requirements that individuals will be subject to (Lee and Trauth, 1995; Basselier et al., 2000). There is incomplete research at the individual level as is also reported in organizational research (Nordhaug, 1998).

Table 1 shows the level of analysis and definition of competence of the most significant recent contributions to the conceptualization of IS competence.

	Level of analysis	Definition of competence
Van der Heijden (2000)	Organizational level and IT management	IT core capabilities: organization-specific routines, processes, skills and resources
Feeny and Willcocks (1998)	Organizational level and IT management	IS core capabilities: organization-specific routines, processes, skills and resources
Sambamurthy and Zmud (1994)	Organizational level and IT management	Capabilities, skills and tacit know-how
Bharadwaj, Sambamurthy and Zmud (2000)	Organizational level	Critical IT capabilities
Basselier et al. (2001)	Individual level and business managers	IT related explicit and tacit knowledge
Lee and Trauth (1995)	Individual level and IS professionals	Critical knowledge and skills

Table 1. Approaches to the study of IS competence

IT-competence in business managers can be defined as "the set of IT-related knowledge and experience that a business manager develops over time which enables him/her to contribute effectively to the deployment of IT in the organization" (Basselier et al., 2001). Basselier et al. identifies five areas of knowledge that a manager should possess: technology, applications, system development, management of IT and access to IT knowledge. In addition to this knowledge, business managers' level of competence is increased by experience both at the project level and in the management of

IT. At the management of IT level, such activities are creation of IT vision, strategies and policies, budget, priorities of development, and communication mechanisms between IT and business people.

This area is perhaps most examined in the IT and related literature. In a literature review, Marcolin et al. (2000) observed three factors differentiating the measures of competence: Conceptualizations of competence, measurement methods and knowledge domains. The different conceptualizations identified by Marcolin et al. are associated with three outcomes from learning: cognitive outcomes, skill-based outcomes and affective outcomes (Kraiger, Ford and Salas, 1993). These outcomes represent different conceptualizations of competence, and can be used to understand differences in the effectiveness of the employment of technology (Marcolin et al., 2000).

What are less studied are the non-IT aspects of technology. It is generally accepted that such meta-skills as communication, social and leadership skills are necessary for successful IT professionals. To what extent such competence is needed in different organizational roles is a rich potential area of study. A growing body of research investigating the importance of alignment between business and technology has documented that having competencies in business strategy and IS strategies per se is not enough to successfully take advantage of new technologies (e.g. Luftman et al., 1999). Alignment which is defined as applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs (King, 1995; Henderson and Venkatraman, 1993) can be viewed as one type of competence involving such meta-skills not related to technology it self. Thus, alignment as a competence involves combining and using the available competencies inside or outside of the organization in a way that realizes the strategic potential of new technologies in the company's business domain. Henderson & Venkatraman (1993) describes the process of alignment as a managerial role where the task primarily is to create a strategic fit between the external position of the organization in the competitive product-market arena and the internal design of an appropriate administrative structure that supports its execution. In achieving this alignment the organization must combine its available competencies on strategy and strategy formulation with competencies on technologies and internal operations. Alone, sophisticated technologies have no value without the competence that makes the organization capable of organizing its processes in a way that realizes the potential of the new technology and hence differentiate the organization from its competitors.

Knowing how to stimulate the active use and combination of relevant competencies is therefore important, but not straightforward. In an extensive longitudinal study of more than 500 companies in 15 industries, Luftman et

al. (1999) identified factors that enables or hinders the successful alignment between business and IT strategies. Based on interviews with both business and IT managers, the results showed that one of the most important enablers of alignment was a business manager that recognized the potential value of IT, defined and communicated visions and strategies which included IT, as well as actively sponsored IT projects.

In a study of the manufacturing executive's role on business performance through strategic alignment, Papke-Shields and Malhotra (2001) found that both active involvement and influence from the business executive were important determinants of alignment which again had a significant influence on business performance.

2.1.2 Theoretical synthesis

There is general agreement in the literature that the successful use of IT assumes organizational and individual capabilities. There are different approaches to conceptualizing this phenomenon in the literature. Many terms are used in the IS field to describe organizations' capabilities. Some researchers describe this with terms like core capability (Feeny and Willcocks, 1998; Amit and Schoemaker, 1993; Penrose, 1959; Teece et al. 1997). Others use core competence (Sambamurthy and Zmud, 1994), explicit and tacit knowledge (Basselier et al., 2000) or distinguishes between cognitive, skill-based and affective dimensions of competence (Marcolin et al., 2000; Kraiger et al., 1993). We base our conceptualization on the integrative terms of Sambamurthy and Zmud (1994) that integrate organizational level concepts with individual level concepts. They view these dimensions as *organizational competencies* that exist of *organizational capabilities* (e.g. supportive organizational culture), *individual skills* (e.g. IT personnel skill base) and *tacit know-how* (e.g. individual experience in reorganization of work processes).

The literature on competence is so far more influenced by studies of IT-investments related to traditional business rather than e-business that highlights new and technology based interactions between companies. As a result, several models do not include competence on whether activities should be sourced within the company or within the e-business network. Such competence in sourcing and also in alignment can be viewed as secondary types of competence, where sourcing relates to obtaining and alignment relates to combining and use primary types of competence.

Most of the literature on competence is based on studies of relatively large companies. We need to adjust these models to fit smaller companies. It is very likely that smaller companies have fewer resources and as a result experience constraints to strategies and actions relevant to bigger companies.

The literature is not clear as to what these differences are. It is therefore necessary to test the conceptual model for its relevance to SMEs, which will be done in the next section.

3. THE CONCEPTUAL MODEL

The next step was to create a competence model that would work in our context. We performed a process of contrasting the dimensions of competence from the literature review in order to identify a common framework. The items of each dimension were clustered into appropriate dimensions for our study. We discussed the clusters and the items in terms of the significance for SMEs and e-business. Discussion with colleagues and open-ended interviews with SME leaders were used in this process. This process resulted in a model with six dimensions of competence as shown in figure 1. Our dimensions are elaborated below. Table 2 shows how our dimensions of competence relate to the dimensions in the literature review. Appendix 1 shows how our competence dimensions relate to the items of the most significant sources.

Figure 1. The conceptual model

	Strategy and vision	IT-Business process integration	IT management	Systems and Infrastructure	Sourcing and Alignment
Bharadwaj, Sambamurthy and Zmud, 2000					
IT business partnerships		x			X
External IT linkages				x	X
Business IT strategic thinking	X	X			x
IT business process integration		X			
IT management			X		
IT Infrastructure			x	X	
Basselier, Reich and Benbasat, 2001					
Explicit IT Knowledge					
Technology	x			X	X
Applications		x		X	X
Systems Development			X		X
Management of IT			X		x
Access to IT knowledge			X		x
Tacit IT Knowledge					
Experience			X	X	x
Cognition	X	X			
Feeny and Willcoks, 1998, van der Heijden, 2000					
Business IT Strategic Thinking(BIS)	X	x			x
IT management(ITM)			X		
Business Systems Thinking(BST)		X			
Relationship Building(RB)					X
Architecture Planning(AP)				X	
Making Technology Work(MTW)			X		
Informed Buying(IB)				X	
Contract Facilitation(CF)			X		
Contract Monitoring(CM)			X		
Vendor Development(VD)			X		
Sambamurthy and Zmud, 1994					
Business Development		X	X		X
External Networks					X
Line Technology Leadership		x			X
Process Adaptiveness		X		X	
IT Planning	X	x	X		X
IT Infrastructure			X		
Data Center Utility				X	
Lee and Trauth, 1995					
Technical Specialties				X	

Knowledge				
Technology Management		X		
Knowledge				
Business Functional	X			X
Knowledge				
Interpersonal and Management		X		X
Skills				

Table 2. The relation between the conceptual model and the major sources.

3.1 Strategy and Vision

This dimension describes the company's ability to envision the strategic potential of new e-business or e-commerce technology in its marketplace. The dimension both involves understanding the concept of e-business and how related new technology for e-commerce can represent threats and opportunities to the company. Included here is also the ability to understand and use strategic planning methods needed to develop an e-business strategy.

Strategy and vision as a variable will reflect the maturity of the enterprise in both understanding the e-business domain and what it means in terms of new possibilities and threats in the business domain. The variable will also reflect the organizational capability to develop plans, which describes how e-business will be put into action.

The importance of this variable was supported by our interviews with eight SME managers and two consultants specializing in IT and business issues in SMEs. The most important issues, according to these managers and consultants, were the visions and strategies related to the utilization of e-business and the implications of e-business on the work processes both within the SMEs and their business partners.

3.2 Sourcing and Alignment

Sourcing and alignment describes activities related to the company's ability to involve and take advantage of competencies inside or outside of the company in order to develop and implement strategies related to e-business. The importance of these variables is well documented in the literature. Sourcing refers to whether competencies will be build up internally or accessed from external sources, either through insourcing of competencies or outsourcing of activities where competencies are needed. When competencies are not sufficiently represented internally, the company must decide what strategy it will utilize to close this gap. Identified competencies could be build up internally through education programs or

through recruitment of new personnel. Alternatively, the activity where competencies are needed could also be partly or totally outsourced to partners in the business network. The company could also implement some combination of these strategies. Sourcing of competence describes the process of gaining access to competencies inside or outside of the company.

Having access to sources of competence per se both inside or outside of the company is not enough for the successful use of competence. Work processes whether they are located inside or outside of the company, can be intertwined and dependent on each other. In the effort of designing new processes, or improving existing processes, the company must make competencies work together in order to realize the potential of information technology. The concept of alignment describes both the process of how different competencies represented in different sources are brought together and put into action, and the outcome of this process as a resulting level of alignment. Previous work on the alignment between business and IT shows that departments, business and IT experts must be brought together and involved in the effort of combining IT possibilities with business needs and opportunities. Relationships must be built between IT professionals and business unit managers. Research on both alignment and sourcing has documented that both the choices of alignment strategy and sourcing strategy are related to company performance.

In our model, sourcing and alignment represent meta or secondary competence that involve using and combining the primary types of e-business competence that the company possesses. The rationale behind this variable is that primary types of e-business competence are necessary but not sufficient for the successful use of these competencies. The company must also have secondary types of competence in terms of the ability to combine competencies in a relevant way in support of their visions and strategies.

3.3 IT-Business Process Integration

This variable describes the organization's capability of envisioning and implementing work processes made possible by new technologies. New business or IT work processes can be designed or old processes can be restructured in order to leverage the opportunities of new technology. Independent of which strategy is chosen, the company must have the necessary capability to identify and implement changes in business processes in order to increase process efficiency to the relevant level according to the technology chosen.

The notion that one must organize in order to leverage the potential of new technology has been wide spread in the IS literature. Empirical studies in the area of IS economics have also documented that productivity gains in

Fortune 500 companies from utilizing new technologies are higher in companies that organize themselves in ways that leverage the potential of the new technology (e.g. Brynjolfsson and Hitt, 1998). In a European study of 441 Spanish SMEs, Dans (2001) found a similar correlation between IT-investments and productivity for SMEs that can partly be attributed to organizational redesign. This means that companies must look for new and powerful ways of both organizing and managing their work processes. To do this, competencies are both needed in developing the new business model and in the subsequent implementation of this model in the organization. We describe these types of competence as IT-business process integration.

3.4 IT Management

IT management is activities related to the management of the IT function. This is activities such as IS planning and design, IS application delivery, IT project management, and planning for controls and standards (Bharadwaj et al., 2000; DeLone, 1988). Research on SMEs shows that these companies seldom have a defined IT budget or an explicit IT plan or strategy, and investments in technology are often driven by the owner, rather by any formal cost-benefit or strategic analysis (Ballantine et al., 1998; Dans, 2001). This was also supported in our interviews with eight managers from SMEs and two consultants working with IT- and business issues in SMEs, where IT management in general and the specific activities like formal and specific IT plans mentioned above, were perceived as less important in relation to e-business. As a result of this we do not define specific activities in IT management, but keep this at a more general level.

3.5 Systems and Infrastructure

This dimension refers to the foundation for enterprise applications and services, and is comprised of data, network, and processing architectures. Systems and infrastructure influence the reach and range of business opportunities available to firms in applying IT in their business strategies.

Successful use of e-business technologies involves both finding the right technology with a strategic potential to implement and having a technological and managerial infrastructure that can support it. This involves competence on available e-business solutions as well as on the importance of having or creating internal structures that can utilize the new solutions.

SMEs generally are dependent on a small number of customers to whom they sell a limited number of products. SMEs will thus often be heavily influenced by the e-business strategy of the dominant actor in the value chain, and be forced to conform to their solutions and technology (Ballantine

et al., 1998), and thus the competence requirements defined by this. We have therefore reduced the level of detail in the specific competencies related to systems and infrastructure, and to a more general level. Our choice here was also supported by the interviews with SME managers and consultants who perceived competencies related to systems and infrastructure as of much less importance than competencies in vision and strategy along with competencies in integrating work process between business and IT. Furthermore, the interviews also revealed that several SMEs had experienced lack of control and autonomy regarding IT decisions that involved an important customer or business partner.

3.6 E-business Success

We define e-business success in line with Amit and Zott (2001) who describe the potential of value creation in e-business in four interrelated dimensions, which are efficiency, complementarities, lock-in, and novelty. Efficiency relates to possible reduction in transaction costs, whereas complementarities describe the value potential from combining products and services, technologies and activities with an e-business partner. The third dimension, lock-in, describes the potential value in creating switching costs from arrangements that motivate customers and business partners to repeat and improve transactions and relationships. The last dimension, novelty, describes value as a result of innovations in the way business is conducted (e.g. web based auctions, etc.).

4. DEVELOPMENT OF SURVEY INSTRUMENT

The conceptual model was developed in order to establish the dimensions of the survey instrument. This survey will later be used in identifying types of competence that are critical in realizing e-business value in SMEs in five European countries. Figure 2 depicts the phases in the development of the survey instrument. The initial conceptual model was developed on the basis of the literature review. The integration and relation of the major contributing articles to our initial conceptual model is organized in a matrix in appendix 1. The initial model was discussed with colleagues in a research seminar. This spurred some minor adjustments and a further literature review, which led to the final conceptual model. This served as input to the development of an operational model with the initial list of survey indicators.

We then conducted open-ended interviews with eight executives of Norwegian SMEs and two related consultants, as an additional reality check

of this model, and as a guide to the further elaboration of our dimensions and specific indicators. Since small businesses most likely have different characteristics from large companies, the purpose of the interviews was also to include factors relevant to the context of small businesses. These interviews started open-ended to obtain possible fundamental changes or additions to our conceptual model. We then gradually narrowed the focus in the interviews to elicit more specific information. The outcome of this process led to an improved final conceptual model, which is assumed to be relevant for SMEs.

Figure 2. Phases in the development of a conceptual model and survey instrument

The list of indicators was turned into a preliminary list of survey questions. This list was subject to further refinement through pre-testing in a new sample of SMEs. The national partners of the ANTRA project subsequently translated the survey into Norwegian, Finnish, and Spanish, and surveys are currently being carried out in 3 industries in each partner country.

5. RESULTS AND DISCUSSION

Our review of the literature suggests that e-business competence can be conceptualized into the six dimensions of our conceptual model. The

relationships between these dimensions and the major contributing articles are shown in the matrix in appendix 1. The review of the literature and the interviews with SMEs indicate that the general conceptual model is relevant also to SMEs. The survey instrument is presented in appendix 2.

The interviews also indicated that some types of competence are perceived by SMEs as more relevant than others in the context of e-business. SME managers and consultants considered competencies in strategy and vision, IT-business process integration, and sourcing as most important. Competencies in IT management, systems and infrastructure and alignment were considered relevant but less prioritized in relation to the other types of competence. Competence in sourcing was described as particularly important since this is strongly related to the importance of the local network to SMEs in general. Both managers and consultants described the local network of business partners as an important relationship since it is characterized by higher trust and less costs than partners outside of the local area. As a result of this, SMEs rest heavily on local partners and associates when issues of importance to their business are discussed.

The interviews also pointed to the influence of significantly bigger business partners. SMEs generally have small market shares. They are typically dependent on a small number of customers to whom they sell a limited number of products (Ballantine et al., 1998). SMEs will therefore most likely be influenced by the e-business strategy of the dominant actor in the value chain. In this case, SMEs will experience less autonomy in both choosing the appropriate technology and the related competencies. We have some support for this argument in our interviews with SMEs, and it should be investigated further. We have included control variables in the survey instrument to address this situation.

In this research we assume that developing and implementing an e-business strategy is an ongoing process in most SMEs. One interview, however, revealed that e-business was not perceived as a new issue. This SME had already and long ago implemented electronic communication and transactions with its major business partners. The technology used was not originally based on Internet but gradually this technology had been replaced by Internet solutions. This replacement was regarded as a pure technical issue and was now almost completed. As a result of this, the manager did not perceive e-business competence as relevant because the process of utilizing information technology to assist business transactions was close to its end. This interview show that some companies might perceive the issue of competence as irrelevant since the process of implementing e-business is ended. To control for this situation we have included items to measure this process in the survey instrument.

Our interviews and some studies in the reviewed literature suggest that SMEs experience a different reality than large companies. Some studies suggest that resources in general are much scarcer in SMEs, and managers or other personnel fill many roles at the same time. The use of formal planning methods and strategic plans per se is often limited. It is not clear in the literature how and when size of a company leads to specialization and formal structures. To more fully understand the differences between big and small companies we need more research into this issue. More research will increase our knowledge of what and when important conditions are in place and to what extent they can stimulate business development in general and e-business success in particular.

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Appendix 1. The relation between the conceptual model and the major sources.

	Strategy and vision	IT-Business process integration	IT manage- ment	Systems and Infrastructure	Sourcing and Alignment
Bharadwaj, Sambamurthy and Zmud, 2000					
IT business partnerships					
IBP1					X
IBP2					X
IBP3					X
IBP4			x		X
IBP5			x		X
IBP6					X
External IT linkages					
EIT1				x	X
EIT2				x	X
EIT3					X
EIT4					X
Business IT strategic thinking					
BIT1	X	X			x
BIT2	X	X			x
BIT3	X	X			x
BIT4	x	X	x		x
BIT5	x	X	x		
IT business process integration					
BPI1		X			
BPI2		X			
BPI3		X			
IT management					
ITM1			X		
ITM2			X		
ITM3			X		
ITM4			X		
ITM5			X		
ITM6			X		
ITM7			X		
IT Infrastructure					
INF1				X	

INF2				X	
INF3				X	
INF4			x	X	
INF5				X	
Basselier, Reich and Benbasat, 2001					
Explicit IT Knowledge					
Technology					
ET1				X	X
ET2				X	X
ET3	x			X	X
Applications					
EA1		x		X	X
EA2				X	X
Systems Development					
ES1			X		X
ES2			X		X
Management of IT					
EM1			X		x
EM2			X		x
Access to IT knowledge					
EK1			X		x
EK2			X		
Tacit IT Knowledge					
Experience					
TE1				X	
TE2			X		x
TE3			X		x
Cognition					
TC1		X			
TC2	X	X			
Feeny and Willcocks, 1998, van der Heijden, 2000					
Business IT Strategic Thinking	X	x			x
BIS					
IT management			X		
ITM					

Business Systems Thinking BST		X			
Relationship Building RB					X
Architecture Planning AP				X	
Making Technology Work MTW			X		
Informed Buying IB				X	
Contract Facilitation CF			X		
Contract Monitoring CM			X		
Vendor Development VD			X		
Sambamurthy and Zmud,1994					
Business Development					
BD1		X			
BD2		X			X
BD3					X
BD4		X			X
BD5					X
BD6					X
BD7			X		
BD8			X		
BD9			X		
External Networks					
EN1					X
EN2					X
EN3					X
Line Technology Leadership					
LT1		x			X
LT2					X
Process Adaptiveness					
PA1				X	
PA2		X			
PA3		X			
IT Planning					
IP1	X	x			x

IP2				X
IP3		X		x
IP4		X		
IT Infrastructure				
II1		X		
II2		X		
II3		X		
II4		X		
II5		X		
II6		X		
Data Center Utility				
DC1			X	
DC2			X	
Lee and Trauth, 1995				
Technical Specialties Knowledge				
TS1-18			X	
Technology Management Knowledge				
TM1		X		
TM2		X		
TM3		X		
Business Functional Knowledge				
BF1	X			X
BF2	X			X
BF3				X
BF4				X
Interpersonal and Management Skills				
IM1		X		
IM2		X		
IM3		X		
IM4		X		X
IM5		X		
IM6		X		
IM7		X		
IM8		X		
IM9		X		

IM10			X		
IM11			X		X

Appendix 2. The Survey Instrument

Country

- ☐ Finland ☐ Norway
☐ Germany ☐ Scotland
☐ Spain

INTRODUCTION TO RESPONDENT

This interview is part of a project that investigates the use of e-commerce or e-business in small and medium-sized companies in Europe. In this interview you will be presented with questions about e-business, which can be defined as utilizing technologies for conducting business over the Internet. This implies all types of business interactions over the Internet with suppliers, customers and other business partners.

We ask you to answer as correct as possible based on the knowledge you have of your company. This survey is anonymous and we guarantee that it will not be possible to trace any of the answers back to you and your company.

First some introductory questions:

BACKGROUND INFORMATION

1. Approximately, how many employees are there in your company? _____ employees
2. In what type of industry is your company?
☐ Tourism ☐ Transport ☐ Food & Beverages
3. Does your company use web pages, e-mail or e-commerce systems for business purposes?
☐ Yes ☐ No
4. What types of e-business systems does your company use? (multiple responses possible)
 - ☐ web pages with information to individual customers about products or services
 - ☐ web pages where individual customers can make orders
 - ☐ web pages where companies can find information about products or services
 - ☐ systems for electronic sales of products and services to other companies

The concept of e-business

9. Our company has a high level of knowledge of how e-business technologies can be of value to our business 1 2 3 4 5 6 7 ☐
10. Our company has a high level of knowledge of how our main competitor(s) use IT to support similar business areas 1 2 3 4 5 6 7 ☐
11. In general, e-business is well understood by my company 1 2 3 4 5 6 7 ☐

Strategic planning

12. Our company has a high level of knowledge of strategic planning 1 2 3 4 5 6 7 ☐
13. Our company has a well developed set of strategic planning techniques 1 2 3 4 5 6 7 ☐
14. In general, strategic planning is well understood by our company 1 2 3 4 5 6 7 ☐

SOURCING AND ALIGNMENT**Sourcing competencies**

15. Our company has a high level of knowledge on outsourcing of activities to other companies 1 2 3 4 5 6 7 ☐
16. Our company has a high level of knowledge on how to use competencies in our business partners 1 2 3 4 5 6 7 ☐

Alignment competencies

17. In my company business and IT managers very much agree on how IT contributes to business value 1 2 3 4 5 6 7 ☐
18. In my company there is effective exchange of

ideas between business people and IT people 1 2 3 4 5 6 7 ☐

19. In general, my company is good at using the competencies it already has 1 2 3 4 5 6 7 ☐

20. In general, my company is good at using competencies represented in our business partners 1 2 3 4 5 6 7 ☐

IT-BUSINESS PROCESS INTEGRATION

Competence in Process Integration

21. My company is actively working with the impact of e-business on its business processes 1 2 3 4 5 6 7 ☐

22. In general, my company is good at reorganizing work to utilize new information technology 1 2 3 4 5 6 7 ☐

MANAGEMENT OF IT

23. My company's IT resources are effectively managed 1 2 3 4 5 6 7 ☐

24. My company is good at achieving the anticipated benefits from IT investments 1 2 3 4 5 6 7 ☐

SYSTEMS AND INFRASTRUCTURE

25. The systems infrastructure is very flexible in relation to my company's future needs 1 2 3 4 5 6 7 ☐

26. The IT systems make it possible for my company to effectively cooperate electronically with

business partners**1 2 3 4 5 6 7 □**

In the last section we would like you to assess your company's experiences with the effects of its e-business efforts. We ask you to give your evaluation of what you feel has come out of your company's e-business efforts.

E-BUSINESS SUCCESS**Efficiency**

Our e-business efforts have reduced costs by electronic order taking over the Internet

1 2 3 4 5 6 7 □

27. Our e-business efforts have made us able to deliver faster

1 2 3 4 5 6 7 □

28. Our e-business efforts have reduced costs in communication with suppliers and customers

1 2 3 4 5 6 7 □**Complementarities**

29. As a result of our e-business efforts our products or services complement products or services from other suppliers

1 2 3 4 5 6 7 □

30. Our business efforts make it possible for other suppliers to complement our products or services

1 2 3 4 5 6 7 □

31. Our e-business efforts have made our supply chain strongly integrated to our partners' supply chains

1 2 3 4 5 6 7 □**Lock-in**

Our e-business efforts make it more expensive for our customers or suppliers to replace us

1 2 3 4 5 6 7 □

32. Our e-business efforts have made our products and services more tailored to our customers' needs

1 2 3 4 5 6 7 □

Novelty

**33. Our e-business efforts have made
our company a pioneer in utilizing
e-commerce solutions** 1 2 3 4 5 6 7 ☐

**34. Our e-business efforts have made us cooperating
with our customers or suppliers in new and
innovative ways** 1 2 3 4 5 6 7 ☐

General

**35. In general, my company has experienced very
positive effects from its e-business efforts** 1 2 3 4 5 6 7 ☐

OTHER/CONTROL

Leader vs. Follower

**There is a dominating customer or
supplier who dictates our e-business
efforts** 1 2 3 4 5 6 7 ☐

**36. Our company is good at implementing
changes in its organization** 1 2 3 4 5 6 7 ☐

**37. Overall, my company has a high level of
competence for utilizing e-business
technology** 1 2 3 4 5 6 7 ☐