Conceptualizing Competences in E-Services Adoption and Assimilation in SMEs

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Conceptualizing Competences in E-Services Adoption and Assimilation in SMES

Ada Scupola, Roskilde University, Denmark

ABSTRACT

This article investigates the competences deemed necessary both at top managerial and individual levels for the successful adoption and assimilation of business-to-business e-services in small and medium size enterprises. To this end, an in-depth case study of a business-to-business e-service system, a Web-based travel reservation system, was conducted. The results show that three main competences, namely vision, value and control, are important at top management level for the primary adoption of e-services. For secondary adoption and assimilation, three categories of competences were identified as being important either to have or to develop at the individual level, namely technical, interpersonal and conceptual skills.

Keywords: assimilation; adoption; e-services; competences; critical incident technique

INTRODUCTION

The aim of this study is to explore the competencies that are needed by small and medium size corporations (SMEs) in order to successfully adopt and assimilate e-services. SMEs are defined here as firms with up to 250 employees (OECD, 2000). An extensive body of literature has argued and investigated the importance of e-commerce technologies and e-services for the competitive advantage of the small and medium size firms (e.g., Grandon & Pearson, 2003; OECD, 2000). In addition, many studies have investigated the barriers to the adoption and diffusion of the Internet, e-commerce and e-business in small and medium size firms, as well as factors affecting the adoption and diffusion of these technologies in this type of firm (e.g., Mirchandani & Motwani , 2001; Scupola, 2003). Some of these studies have focused on competencies as it is thought that they might positively influence the firm's strategic commitment to the adoption and assimilation of technologies such as e-commerce or e-services (Chaston & Mangles, 2002; Eikebrokk & Olsen, 2002; McGowan, Durkin, Allen, Dougan, & Nixon, 2001; Wainwright, Green, Mitchell, & Yarrow, 2005).

In this article, e-services are defined as services that are provided or consumed through the use of Internet-based systems.

The consumption or the provision of a service requires the interaction between the service provider and the user. Traditionally, this has been based on personal interactions, most often face-to-face interactions. In e-services, the consumption and the provision take place through the intermediation of an Internet-based system and therefore are separated in time and space (Fuglsang & Sundbo, 2006). E-services can involve a number of different relations: business to consumer, business to business, government services offered on the Internet or e-government. E-services also include the selling of physical goods on the Internet such as an airline ticket that is purchased online, but delivered by surface mail. There are three main characteristics of e-services:

- The service is accessible via the Internet or other electronic networks,
- The service is consumed by a person via the Internet or other electronic networks, and
- There might be a fee that the consumer pays the provider for using the e-service, but that might not always be the case. For example, some e-services offered by the government are free (Scupola, 2008). The purpose of this article is to investigate the competences required for the successful adoption and assimilation of business-to-business e-services in small and medium size enterprises. The basic research question tackled here is: What are the competences required both at the top managerial and individual levels for the successful adoption and assimilation of business-to-business e-services in small and medium size corporations? To answer the research question, a theoretical model of e-service competencies is developed and a case study of an e-service system is conducted. The results show that three main competences, namely vision, value and control, are important at top management level, while a number of competences are important at the individual level.

The article is structured as follows. This section has presented the main purpose and motivation of the study. The next section discusses adoption and assimilation. This is followed by a literature review relating to the concepts of competence, IT competence, and the development of a model to investigate e-services competencies. It also discusses the methodology employed. The remaining part of the article presents the analysis, the discussion and the conclusions.

Adoption and Assimilation of E-Services

For the purpose of this study, adoption is defined as "the decision to make full use of an innovation as the best course of action available" (Rogers, 1995, p. 21). According to Zaltman, Duncan, and Holbeck (1973) innovation adoption within organizations often occurs in two stages. The first is a firm-level decision to adopt the innovation also called primary adoption; the second is the actual implementation or individual adoption by users also called secondary adoption. At the first level, managers identify objectives to change some aspect of their business and look for innovations that fit their objectives. Then they make the primary adoption decision (Gallivan, 2001). Once the primary adoption decision has been made, the implementation and use of the innovation at the individual level takes place. According to Gallivan (2001), management may proceed by taking three fundamentally different paths to ensure secondary adoption: (1) they can mandate that the innovation be adopted throughout the organization at once; (2) they can provide the necessary infrastructure and support for users to adopt the innovation, while allowing it to diffuse voluntarily; or (3) they may target specific pilot projects within the firm, observe the processes and outcomes that unfold, and decide whether to introduce the innovation more widely later on. This two-stage adoption model has also been defined as a contingent adoption decision, meaning that employees cannot adopt the innovation until primary adoption has occurred at a higher level

of authority, often managerial or top management (Zaltman et al., 1973).

Assimilation is defined as the extent to which the use of a technology diffuses across organizational work processes and becomes routinized in the activities associated with those processes (Tornatzky & Klein, 1982). Moreover, it is important to look at assimilation because the adoption of a technology at a company level does not automatically lead to assimilation and use. Fichman and Kemerer (1999), for example, show that most information technologies exhibit an assimilation gap that is their rates of organizational assimilation and use lag behind their rates of organizational adoption.

The Concept of Technology Competence

The concept of competence has been much discussed in different types of research such as management, human resources and information systems and there is much confusion regarding the definition of competence. Furthermore, the concept of competence has been used at different analytical levels: for example, task-specific competences, firm specific competences or industry specific competences (Nordhaug, 1998). Competence has often also been identified with performance. But if performance has been used as a proxy for competence due to the difficulty of measuring competence, the mixing of competence with performance often implies mixing the outcome with the process. However, a large amount of literature distinguishes between competence and performance, especially in relation to competence as a specific skill. Marcolin, Compeau, Munro, and Huff (2000) define user competence as "the user's potential to apply technology to its fullest possible extent so as to maximize the users' performance on specific job tasks." Competence is also seen as a personality trait, and might include generic knowledge, motivation, social role, or skill of a person linked to superior performance on the job (Haynes, 1979). Competence has also been associated with knowledge, and in this view competence is not only task specific, but embodies the ability to transfer knowledge across tasks, thus becoming interactive and dynamic (Brown, 1994). In human capital theory, the concept of competence has been related to specific firm technologies and to the execution of tasks that are related to the technology and the routines required to use that technology. Furthermore, there are many different typologies of competences found in the literature. For example, Yukl (1989) develops a typology that consists of technical, conceptual and interpersonal competences.

IT COMPETENCE MODELS AND IT COMPETENCE

A number of models have been developed to investigate IT competencies in small firms. Wainwright et al. (2005) develop a competency based model to be used for comparing practice and performance with respect to ICT within small firms. They propose that an ICT competence and capability approach can be a viable research avenue for investigating IT performance in small firms. Chaston and Mangles (2002) propose that the resource-based view of competitive advantage may provide the basis for assessing the ability of an organization to exploit the Internet to enhance market performance. They develop a competency model to define the competencies and capabilities that may influence the execution of an Internet marketing strategy. Their results show that the proposed competencies such as positioning, innovation and so forth, are critical for small firms to achieve market performance.

Finally, as with the concept of technology competence, the concept of competence related to IT has been defined in different ways and has focused on different levels of analysis (Table 1 provides a summary of studies of IT competence).

The stream of literature focusing on the organizational level (e.g., Van der Heijden, 2000) is influenced by parallel studies in the management literature and especially by the resource based view of strategic advantage (e.g., Barney, 1991; Prahalad & Hamel, 1990). The other stream of research focuses on the individual level, for example, Basselier, Reich,

and Banbasat (2001) study IT competences in business managers, and identifies a concept of IT knowledge that is decomposed into explicit IT knowledge and tacit IT knowledge. Explicit IT knowledge is knowledge that can be read, taught or explained to others. Tacit IT knowledge is more difficult to explain and to do so Basselier et al. use the constructs of experience and cognition. Experience relates to the managers' know how, while cognition involves more then doing things, and refers to working models of the world that an individual forms, including acumen, beliefs and viewpoints. However, this kind of literature has not focused on other factors related to competences such as communication, social or leadership skills.

In this study, being interested in the small firm's competencies deemed important for the successful adoption and assimilation of e-services both at primary and secondary levels, the focus is placed on top management and individual level competencies. Top management, through their beliefs and visions can offer guidelines to managers and employees about the opportunities and risks in assimilating technological innovations (Gallivan, 2001; Chatterie, Grewal, & Sambamurthy, 2002). For example, in firms where top managers believe that e-services offer a strategic opportunity, their beliefs serve as powerful signals to the rest of the firm's employees about the importance placed on e-services. This makes the employees and the managers use their time and energy in making sense of e-services or exploring ways in which the technology's functionality could be leveraged to improve the company's efficiency,

Table 1. A summary of studies of IT competences

Author	Definition of Competence	Individual/Organizational Level
Basselier et al. (2001)	IT related explicit and Tacit Knowledge	Individual level (Business Manger)
Lee & Trauth (1995)	Critical Knowledge and Skills	Individual level (IS professionals)
Bharadwaj, Sambamurthy & Zmud (2000)	Critical IT Capabilities	Organizational Level
Van der Hejiden (2000)	IT core capabilities; organization specific routines, skills, resources and processes	Organizational Level and IT management)
Sambamurthy & Zmud (1994)	Capabilities, skills and tacit know-how	Organizational Level and IT management
Chaston & Mangles (2002)	Internet related capabilities; organization specific routines, resources and processes	Organizational Level
Wainwright et al. (2005)	ICT related competence; Organizational ICT performance and practice	Organizational Level

routines or business value.

In this study, therefore, managerial competences become the basis for the firms' vision, norms, beliefs and strategies in adopting and assimilating e-services (Durkin & McGowan, 2001; Middleton & Long, 1990). Individual competences are relevant in relation to the specific task of adopting and using an e-service system (Brown, 1994; Haynes, 1979).

A MODEL OF COMPETENCY FOR E-SERVICE ADOPTION AND ASSIMILATION

Theoretical Background of the Model

Durkin and McGowan (2001) develop an Internet competency model to investigate which competencies the manager of a small firm must have in order to decide the extent to which the Internet is adopted in marketing activities. They argue that the extent to which the Internet is adopted and offers a fundamental advantage for the marketing activity is contingent upon the development at the managerial level of four main competencies: vision, value, technical ability and control. These competencies are not independent of each other, but are interrelated. For example, at management level there is sequentiality in the sense that first the company has to develop a vision, then develop the value competency, the technical ability and finally control (Durkin & McGowan, 2001).

Chatterie et al. (2002) describe how the structuration theory of technology assimilation states that firms act as institutions in shaping the behaviours and cognitions of the individuals in the corporation in facilitating or preventing them from assimilating a technology. This can be done in three ways:

1. Structures of signification, where prevailing institutional structures yield meaning and understanding. Individuals apply these structures as guides to understanding how they should behave/act with respect to the assimilation of new technology.
2. Structures of legitimization, where prevailing institutional structures validate specific behaviours as being appropriate in the organization and consistent with the goals and values of the organization. Individuals draw upon these structures as normative templates to reassure themselves about the organizational legitimacy of their assimilation actions.
3. Structures of domination, where institutional structures regulate individual actions and behaviours. Individuals draw upon these structures to ensure that their acts of assimilation do not violate institutional rules and to avoid being the target of organizational sanctions (Chatterie et al., 2002, p. 68).

Finally, Yukl (1989) states that three sets of competences or skills are relevant at the individual level in explicating a specific task or activity: technical, interpersonal and conceptual skills. Technical skills or competences represent knowledge about methods, techniques and processes required to conduct a specific activity and the ability to use the tools and equipment necessary to explicate that activity. Interpersonal skills include knowledge about social skills, the ability to communicate, and the ability to cooperate, as well as empathy. Finally, conceptual skills include creativity, efficiency in problem solving, analytical capability and capacity to understand opportunities and problems.

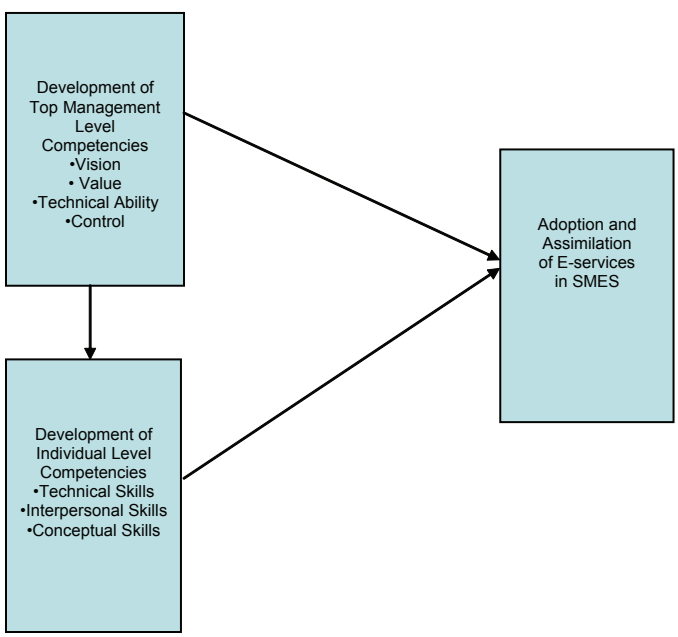
The Research Model

By drawing on the literature review above and on the work by Durkin and McGowan (2001), Chatterie et al. (2002) and Yukl (1989), a model of competencies for e-service adoption and assimilation is proposed. In accordance with McGowan et al. (2001) it is argued that the faster primary adoption of e-services in the small and medium size firm is contingent upon the development of management level competencies such as vision, value, technical ability, and control. By drawing on Yukl (1989), it is argued that faster secondary e-services adoption and assimilation, by contrast, is contingent upon the

development of individual level competencies related to the specific task that has to be performed (in this case the use of e-services) such as technical, interpersonal and conceptual skills (Figure 1). Finally, after the firm has made the decision for primary adoption, it can enforce secondary adoption by developing structures of signification, legitimization and domination as is asserted by the structuration theory of technology assimilation (Chatterie et al., 2002). This is shown in Figure 1 by the arrow between the two boxes representing the development of competencies. Like Durkin and McGowan (2001) vision is defined as the managerial capability to see what contribution e-services can make to the general business level. The value competency requires that top management clearly understand what the business value of e-services is. Value competency requires more proactivity and implies that the manager goes a step further and contextualizes the initial awareness and general vision of his own company by evaluating appropriateness and receptivity (McGowan et al., 2001). Technical ability implies that the manager is comfortable with new technology and its operation, even though he/she is not a real expert in the technology. It is possible that he/she could attend courses to learn how to use the technology. By developing the "control" competency, the manager enforces rules and policies to ensure that e-services are adopted at the individual level. In fact, as the structuration theory of technology assimilation states, firms act as institutions in shaping the behaviours and cognitions of the individuals in the corporation in facilitating or preventing them from assimilating a technology (Chatterie et al., 2002, p. 68).

By drawing on Yukl (1989), three sets of competence or skills are defined to be relevant at individual level in e-service adoption and assimilation: technical, interpersonal and conceptual skills. Technical skills are mainly identified here with knowledge competency, including the capability to transfer knowledge from one situation to another (Brown, 1994). Following Basselier et al. (2001), e-service knowledge is divided into two components: tacit

Figure 1. A model of competencies for e-service adoption and assimilation



knowledge and explicit knowledge. Explicit knowledge is formal knowledge that can be acquired through formal training, and can be read or explained. Tacit knowledge by contrast is gained through experience and experiential training. Furthermore, experience increases the memory of how to undertake an activity, which in turn increases competency levels in relation to that experience. The combination and variety of experiences influence the level of tacit knowledge. In this study interpersonal skills include knowledge about social skills, the ability to communicate, the ability to cooperate as well as empathy and judgement. In common with McGowan et al. (2001), it can be argued that judgement is a function of both tacit and explicit knowledge. Finally, conceptual skills include creativity, efficiency in problem solving, analytical capability and the capacity to understand opportunities and problems.

Methodology

To investigate the competences required for the adoption and assimilation of e-services in small and medium size companies, a case study was conducted where the object of analysis was the e-service (Yin, 1989). The e-service was/is a Web-based travel reservation system developed by the travel agency TQ3 which sells business-to-business travel solutions. In the last few years, they have developed a Web-based system, called Webbuster, which can be used by the client companies to make the reservations and buy the travel tickets by themselves, thus bypassing the employees at TQ3. To understand the e-service in question and the competences required for its successful adoption and assimilation in the SMEs, interviews were conducted both with the e-service provider and with the customer companies or adopters of the e-service. Face-to-face qualitative semistructured interviews were used to collect the data. These interviews were complemented by the critical incident technique (see below). The sampling was purposeful. Interviewees were chosen in small firms that had been successful in assimilating e-services. Retrospectively, the study tried to understand the competencies deemed important in both primary and secondary adoption and assimilation. The respondents had to be involved in the adoption process at managerial level or had to be users of the e-services at individual level. Managers and travel bookers at TQ3 were interviewed because they could provide useful information about their customers' competences in the adoption and assimilation of the e-service. A total of 14 interviews were conducted in a total of six companies. The interviews lasted between 60 and 90 minutes, and were tape recorded and fully transcribed by a research assistant. Table 2 provides a brief overview of the companies interviewed.

Table 2.Companies interviewed

Company/ Information	Type of Business	Number of Employees
A (TQ3)	Provider of Web-based Travel Solutions	12,000 Worldwide
B	Paint and Varnish Business	No Data
C	Research and Development of Human and Animal Medical Products	140 in Denmark
D	Producer of Cleaning Equipment	No Data
E	Engineering consulting	100
F	Production and service of plastic card products	150 in Denmark

The semistructured interviews were based on a guide aimed at collecting information both about the managerial level and the individual level competences. The second part of the interview specifically applied the critical incident technique to elicit critical incidents aimed at highlighting the competences required to successfully adopt and assimilate the e-service in the companies. By relying on Yin (2003), the data were analyzed by following the "general strategy of relying on theoretical orientation" of the case study. Following Miles and Huberman (1994, p. 58), a provisional "start list" of codes based on the conceptual framework was created prior to the field work to guide the analysis. The coding was manual. Specific analytic techniques included making matrixes of categories and placing evidence within such categories (Yin, 2003; Miles & Huberman, 1994) and finding relevant critical incidents (Flanagan, 1954; Fuglsang, 2007).

The Critical Incident Technique (CIT)

The critical incident technique is a research method used to collect data specifically related to competences. This technique was first developed by the U.S. Air Force to select competent pilots (Flanagan, 1954) and has been used in many studies investigating competencies (e.g., Fuglsang & Sundbo, 2006). The critical incident technique gives a detailed description of what happened, why it happened and what specific actions were taken to solve the problem. Here CIT has been used to collect, organize and structure data about e-services related competences. According to Flanagan (1954):

By critical incident is meant any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act. To be critical, an incident must occur in a situation where the purpose or intent of the act seems fairly clear to the observer and where its consequences are sufficiently definite to leave little doubt concerning its effects. (Flanagan, 1954, p. 327)

Following Flanagan, in this study concrete incidents with a positive or negative impact with respect to e-services adoption and assimilation (the aim of the situation) have been identified. The incidents that were found were then analyzed and grouped according to the competency model developed above and reported in the analysis where appropriate to illustrate the point.

Analysis and Results

Top Management Level

The findings mainly support the model of competencies developed in Figure 1. As suggested by the model, vision was the first competency deemed necessary in order for the company to take into consideration the possibility of adopting e-services and making a proactive effort to understand their value (McGowan et al., 2001). In all the companies interviewed, vision involved an understanding of how a Web based travel booking system could add value to the company and contribute to the company's business and strategy. A critical incident illustrating the importance of vision is as follows (TQ3):

Interviewer. What do you think it is important at your customer?
Interviewee. There I believe vision. I am happy when people (top management) say "It is that way we have to go" and then you have to be realistic. ....You need to know if you are geared, but vision, that I like. When people are visionary and can see possibilities, it is nice. I also visit clients that simply work like we did 100 years ago, and they never go forward...

Value competency mainly consisted of finding out what value the Web-based reservation system could bring to the company. This value consisted mainly of decreases in operational expenses, including travelling expenses. In fact, the main idea of TQ3 Web-based reservation system is that it should create value both for the producer and the consumer as it should reduce costs for both. For TQ3, the Web-based system

should decrease personnel costs and allow the company to concentrate on the customers with special needs. For the e-service users it should reduce the company's total travel costs as the company can get a discount when they book their travel directly through Webbuster, bypassing TQ3. This was clearly pointed out by the respondents at TQ3, as well as by employees interviewed in the customer companies. A critical incident reported by an employee at TQ3 was as follows:

Interviewee. So many of our things are developed with the purpose of saving money, where we can save money at our company is one of the things, do something new, and where we can save money for our customers is the other thing.

Once the competencies of vision and value have been developed and the decision to adopt an e-service has been made, senior management started developing a new competency to encourage and enforce assimilation at individual level: the "control competency" (Durkin & McGowan, 2001). This competency manifested itself in the development of a company policy to enforce the use of the e-service at the individual level. This included both the person that is in charge of making the travel reservation and the employees that had to travel. The following critical incident illustrates this point (Company D):

Interviewee: But there is a little back and forth sometimes that they prefer one solution, and then you say "Yes, that is possible, but it is so expensive, but ..... we have a travel policy in the company....

In addition, all the respondents that were also users of the e-service in the small companies said that they had to use the Web-based reservation system due to the wishes of top management to reduce travel costs and the company policy of cutting costs. This was also justified by the fact that employees in the companies interviewed were travelling a lot. A critical incident illustrating this point is as follows (company C):

Interviewer. We talked about policy, why has the company introduced that policy?
Interviewee. Simply to save money. Because at TQ3, there you get 5% saving circa per ticket you reserve on the Internet. And if you have a budget of millions crowns, then it is a lot of money that you can save in one year. And then you have a total online solution, so it saves time both for us and TQ3.

The analysis shows that the top management competency "technical ability" was not important for primary adoption. However the study shows that the technical ability and capacity of the whole corporation was important in order to be able to initiate primary adoption. This is shown by the following critical incident (TQ3):

Interviewee. Yes, it is clear, technical they also have to be, and have the right IT equipment and be updated on the IT-side, that they almost must have to be to be able to consider Webbuster.

After the decision to adopt e-services at top management level had been made and the competencies were developed at management level to ensure adoption and assimilation at the individual level, a set of competences at the individual level were deemed necessary to ensure secondary adoption and to make the e-service become an integral part of the company's routines and culture (assimilation). These are presented in the following section and are based on the model of Figure 1.

Individual Level

Technical Skills. The main competence found relevant within this category was knowledge competency both tacit and explicit. The users of the TQ3 e-service system interviewed in this study were all first time users of such an e-service system, and therefore the acquisition of both explicit and tacit knowledge in learning how to use the e-service system was extremely

important. Explicit knowledge was acquired through a formal one day training seminar organized by TQ3 after the system was installed at the customer site. Tacit knowledge was acquired through learning by doing, once the user came back to the company and started to use the e-service system. This is shown by the following critical incident (company D):

Interviewee: You do by trying it, when you for ten times have been sitting and writing your user name, then you become tired of it. Then you ask yourself whether it is possible to make it easier. (Secretary, Company D)

As suggested by Brown (1994), knowledge competency also includes a component relating to the transfer of the skills learned and knowledge acquired in a given context to a new context. For example, in this study this was shown by a transfer of general Internet skills to the specific e-service system in question, the transfer of previous expertise in the travel sector and IT to online travel booking. A critical incident in company B illustrates this:

Interviewer: Are you more used (then your colleagues not willing to use Webbuster) to use this type of technology?
Interviewee: Yes. And it is also that, I believe, that make the difference. I do not believe it is a problem to sit and reserve a flight on the Internet, where others believe that it is difficult.... I use also net bank at home and everything, whatever I have to book as ferry tickets or what we do...concert tickets, that I do often on the Internet. All those kind of things...and then I use it also here in all possible contexts (Secretary, Company B).

Interpersonal Skills

The main competencies in this category were communication and empathy. Communication competency manifested itself as the capability to communicate with others. Examples include the ability to understand what other people say and make oneself understood, to negotiate with the travel agency as to what to do with the ticket if the system breaks down during the reservation process, or calling the help desk or the local travel agency for help. A critical incident illustrating this is the following (company D):

Interviewer... I think that they were very good at speaking so that we could understand that.
Interviewee. So they could understand what your problem was and you could understand, what they said?
Resp. Yes, exactly.

Another example of how it might not be easy to communicate is provided by the following critical incident (company F):

Interviewer. ...That means that you have to communicate with them, that have to travel, when you go into the system, and say, what possibilities there are.
Interviewee… the best for me is to make them to stay behind the computer monitor, so they can see what possibilities there are....so I have the communication immediately.

Other examples can be calling the help desk or the local travel agency for help as shown by the following critical incident (Company E):

Interviewee Then I call this number (help desk) and say who I am ..in the process of doing something on Webbuster and I cannot go further…..And I can also contact our own travel agency if I have a problem ...

In our study empathy manifested itself as the capability to understand and take into consideration other colleagues' needs and wants with regard to travel and economic restrictions. In fact, the travel booker found herself in the dilemma of accommodating the travel wishes of the colleagues, for example travelling at specific times and dates, have specific seats, minimize travel time, as well as taking into consideration the company's policy with regard to reducing travel expenses. Sometimes this can be difficult. The following critical incident

illustrates the capability to take into consideration colleagues' preferences (company F):

Interviewee. It is very different what people believe it is good. I try to find it out what they prefer. That makes it also easier for me…

Conceptual Skills

In this category two main competencies were found relevant: creativity and judgement.

Creativity manifested itself as the capability to search for new information, to use and understand other sources, the capability to navigate and relate to the IT system, to understand when the information and the knowledge at hand is not enough, and the capability to handle multiple sources at the same time. Clearly this requires a certain degree of reflection, whether conscious or unconscious, about what is known and how to go to get further information or knowledge. An example of looking for more information in the system manual to solve a certain task is given by the following critical incident (company C):

Interviewer: Had you tried, before calling them (help desk), to look at the manual or other sources?
Interviewee. Yes, I had been in the system and looked at what I have printed here (the manual).

The following critical incident (company B) illustrates the capability to look for different solutions:

Interviewee. …the system could simply not find that out, it comes back and says, that there are some problems with the number, so I try some different ways.

A critical incident illustrating the capability to handle multiple sources simultaneously is as follows (Company C):

Interviewee. So it has also something to do with being able to keep many bolds in the air, certainly….Because you have so many tickets running at the same time. And you have so many arrangements.

Judgement competency manifested itself as the capability to judge different kinds of situations and make a decision. Examples of this is include knowing when to stop trying to solve a problem by oneself and ask others instead. To judge when it is good to use the online system to book a trip and when it is better to do it manually. To judge when it is the system that has made a mistake or when it is the user making a mistake. To judge the validity of the information the user gets from the system. An example of the capability to question the validity of the information the user gets from the system is provided by the following critical incident (company F):

Interviewee. ….Yes, I believe that they make it look nicer then it is (talking about the hotel information that she can find in the system), some hotels do, for sure..they exaggerate.

DISCUSSION

The analysis has shown that for a successful adoption and assimilation of e-services in small and medium size companies it is important to develop appropriate competencies both at top management and individual levels. In this study three competences were deemed important at top management level: vision, value and control. Through vision and value top management can understand and highlight the strategic importance of e-services and take a proactive approach to creating the condition for its primary adoption. Through control, top management can create the conditions for employees to adopt the e-service (secondary adoption), thus reducing the assimilation gap. In fact according to Chatterije et al. (2002) top management can either encourage or discourage individual adoption by mandating rules and policies about the assimilation of a technology. In all the companies interviewed in this study this was achieved by formulating a company policy to reduce travel expenses. This policy consisted of the follow-

ing: first the Web-based system had to be used for all the trips as this allowed for a discount in respect to the price charged by the travel agency; second the employees had to travel as cheaply as possible; third all the travel reservations had to be undertaken by one person. The company travel policy functions as structures of domination by regulating the individual actions and behaviours. The travel booker draws upon this policy to ensure that his/her assimilation actions in using the Web-based travel system do not violate the institutional rules. Contrary to the model described in Figure 1, this study found that the "technical ability" competence was thought unimportant for the adoption of e-services at managerial level. In the companies interviewed top managers were not necessarily acquainted with e-service technology, neither were they interested in or took a proactive approach to learning it. They were mostly interested in the value that it could create for the company and then they delegated the technical tasks to the individuals that had to use it, while developing rules to enforce such use at individual level. However, the analysis shows that the IT capability of the firm is important for primary adoption (Bharadwaj et al., 2000).

In order to use and assimilate the e-service, a number of individual level competences have been identified in this study. These competences can be technical as, for example, knowledge regarding how to use the e-service system, interpersonal such as the capability to communicate, or conceptual such as judgement and creativity competences.

CONCLUSION AND LIMITATIONS

This study is important because it has shown that both top management and individual level competences are important in e-services adoption and assimilation in small and medium size enterprise. This has been done by developing a competency model and by applying it to a specific e-service system: a Web-based travel reservation system. The empirical findings mainly confirm the validity of the model. Furthermore, this study has identified a number of competences at top management and individual levels that are necessary for the successful adoption of e-services. Competences at top management level are important in order to make the initial decision to adopt the technology and enforce or facilitate its use in the company. Competences at the individual level are important for the successful assimilation of e-services in the company. Some can be acquired through formal training, others have to be acquired by experiential learning.

Finally, this study presents a number of limitations. First of all, the number of interviews is too small to be able to make any generalization regarding competencies in e-services adoption and assimilation in SMEs. Further research could extend this study to a larger sample of companies for the same e-service system or could test the model in other types of e-services. The companies participating in the study were all successful adopters of the Web-based travel system. Further research could focus, for example, on companies that did not succeed in adopting the e-service, to understand major reasons for failure. Finally, there might be other approaches to understanding and conceptualizing competences than the one used in this study. Nevertheless, this study gives some good insights into the competences required at top management and individual levels to adopt and successfully assimilate e-services in small and medium size companies. These results might be of interest to other researchers as well as corporations' managers interested in adopting e-services as a strategic or value adding technology.

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