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## UNDERSTANDING E-COMPETENCES IN ADOPTION AND ASSIMILATION OF E-SERVICES

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**Keywords**—competences, adoption, assimilation, e-services.

**Abstract.** *This article investigates competences in adoption and assimilation of business-to-business e-services. An in depth case study of an e-service system, the e-service provider and e-service customers is conducted. The results show that two main competences, vision and control, are important at top management level for the adoption of e-service. At individual level, eleven competences categorized as technical, interpersonal and conceptual were found important for the successful assimilation of e-services.*

## I. INTRODUCTION

A number of studies have investigated competences (e.g. Nordhaug, 1998), IT competences (e.g. Van der Heijden, 2000) as well as technology adoption (e.g. Zaltman et al., 1973). After the advent of the World Wide Web e-services such as e-banking, web-based reservation systems and web-based library services are becoming daily routine in our daily lives. Also many corporations are starting to develop or adopt e-services in order to increase efficiency, save time, decrease costs. E-services are defined here as services that are provided and/or consumed through the use of Internet-based systems. Normally the consumption or the provision of a service requires the interaction between the service provider and the user of the service. Traditionally this has been based on personal interactions, most often face-to-face interactions. In e-services, the consumption and the provision of services takes place through the intermediation of an Internet based system and therefore they become separated in time and space. That is a user can consume an e-service without the provider being involved in the moment of consumption. Vice-versa the provider can update and adjust the service provision without the customer presence. That is the relationship between the provider and the consumer becomes virtual, mediated by the Internet-based system.

This opens up the need to investigate the competences required to adopt and successfully assimilate e-services in organizations. A considerable body of literature exists about competences, both at individual, organizational and industry level as well as a number of studies have particularly investigated IT-related competences (e.g. Lee and Trauth, 1995; Sambaburthy and Zmud, 2000). The purpose of this paper is therefore to contribute to the understanding of competences in e-services adoption and

assimilation in a business-to-business context. The basic research question to be investigated is: What are the competences required both at managerial and individual level for a successful adoption and assimilation of business-to-business e-services? To answer the research question an in-depth case study of an e-service system is conducted. The results show that two main competences, vision and control, are required at top management level, while a number of competences are found at individual level. The paper is structured as follows. This section presents the main purpose and motivation of the study. The second section discusses the concept of competence, while the third presents theories of adoption and assimilation. This is followed by the research method as well as the analysis and presentation of results. Finally the last section presents some concluding remarks.

## II. THE CONCEPT OF COMPETENCE

The concept of competence has been much discussed in different types of research such as psychology, management, human resources and information systems and much confusion there is regarding the definition of competence. Also the concept of competence has been used at different analytical levels: for example task-specific competences, firm specific competences or industry specific competences or similarly “competency”, “meta-competence” or “supra competence” (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, often mixing competence with performance implies mixing the outcome with the process. However a large amount of literature distinguishes between competence and performance and this is especially in relation to competence as a specific skill. Marcolin et al. (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, motive, trait, 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 of transferring 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.

However, according to Nordhaug (1998) this approach to study and conceptualize competences does not take into account the need for flexibility and change that characterize the modern organizations as well as such a narrow approach to competences does not take into consideration those competences related to organizational aspects of the firm such as organizational culture, interpersonal networks, that are therefore not task specific. Furthermore in the literature there are many different typologies of competences. For example Yukl (1989) develops a typology that consists of technical, conceptual and interpersonal competences. 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, ability to communicate, 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.

#### A. IT Competence

As with the concept of competence in general, also the concept of competence related to IT has been defined in different ways and has focused on different levels of analysis. The stream of literature focusing on organizational level (e.g. Feeny and Wilcocks, 1998; 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. Prahalad and Hamel, 1990; Barney, 1991). The other stream of research focuses on the individual level. For example Basselier et al. (2001) study IT competences in business managers and identify 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 they use the construct of experience and cognition. Experience represents the know how of managers, while cognition involves more than 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. Please refer to table 1 below for a summary of the studies of IT competence.

	Tacit Knowledge	
Lee and Trauth (1995)	Critical Knowledge and Skills	Individual level (IS professionals)
Bharadwaj, Sambamurthy and Zmud (2000)	Critical IT Capabilities	Organizational Level
Van der Heijden (2000)	IT core capabilities; organization specific routines, skills, resources and processes	Organizational Level and IT management)
Sambamurthy and Zmud (1994)	Capabilities, skills and tacit know-how	Organizational Level and IT management
Feeny and Willcocks	IS core capabilities; organization specific routines, skills, resources and processes	Organizational Level and IT management

Table 1: A summary of studies of IT competences

#### B. The approach to competence used in this paper

In this study competence is both managerial as well as individual. Managerial competences become the basis for the firms' norms, values, beliefs and strategies in adopting e-commerce. Individual competence is considered in relation to the specific task of adopting and using an e-service system. Competence is therefore the ability to act in situations (cf. Docherty and Marking 1997, Ellström 1992). Thus not only includes knowledge and expertise, but also the capability to solve problems in concrete situations. Further, competencies include social abilities. These are important, for example, when taking into consideration the consequences of one's action on other people in the organization, which again requires knowledge about others' situations. More specifically in this study I will draw on the broad taxonomy developed by Yukl (1989) in the identification of groups of competences.

Author	Definition of Competence	Individual/Organizational Level
Basselier et al. (2001)	IT related explicit and	Individual level (Business Manager)

### III. ADOPTION AND ASSIMILATION OF E-SERVICES

Adoption is defined here as "the decision to make full use of an innovation as the best course of action available" (Rogers, 1995, p. 21). According to a study conducted by Zaltman et al. (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 that is the 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 individual level occurs. According to Gallivan (2001), management may proceed by 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 implement the innovation more broadly 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 level (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 and 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 structuration theory of technology assimilation describes how 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. According to Chatterie et al. (2002) institutional theory identifies three ways in which the organizations influence individual cognition and behaviours:

1. Structures of signification, where prevailing institutional structures yield meaning and understanding. Individuals apply these structures as guides to understand how they should behave/act with respect to new technology assimilation.
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 assimilation actions do not violate institutional rules and to avoid being the target of organizational sanctions. (Chatterie et al., p. 68)

Furthermore, according to Pervis et al. (2001) two sets of actions characterize the dynamics of technology use and assimilation in organizations: individual structuring actions and meta-structuring actions. Individual structuring actions refer to the individuals' use of the institutional structures of signification, legitimization, and domination to make sense of the technology, gain the resources and competencies needed to infuse it into work processes, business strategies and undertake the improvisational actions needed to assimilate the technology.

Meta-structuring actions refer to the possibility that senior management has to manipulate the institutional structures of signification, legitimization, and domination to influence or motivate individual structuring actions. These organizational actions are called meta-structuring actions because they either reinforce the existing institutional structures or alter those structures to create conditions more conducive to technology assimilation. Examples of meta-structuring actions include senior management incentives, rewards, and explicitly articulated visions and mandates for technology use (Orlikowski et al., 1995; Purvis et al., 2001). For example senior management can develop a new organizational vision to highlight the strategic importance of information technology or mandate rules and policies about the assimilation of a technology. In so doing senior management can either encourage or discourage individual structuring actions.

The goal of this paper is to investigate the competences required at top management level and individual level to successfully adopt and assimilate e-services both at primary and secondary level. This paper does not consider other types of adoptions as for example where technological innovation adoption occurs due to employees' involvement or the product champion. Top management is the institutional enabler of the structuring actions of individuals in assimilation of e-services. Through their beliefs, top management can offer visions and guidelines to managers and employees in the companies about the opportunities and risks in assimilating technological innovations. 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 employees about the importance placed on the e-services. This makes them to 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 efficiency, routines, business value or simply decrease costs.

## IV. METHODOLOGY

*A. The Research Method*

To investigate the competences required for the adoption and assimilation of e-services, a case study was conducted where the object of analysis was the e-service (Yin, 1989). Specifically, the case has been a web-based travel reservation system developed by the travel agency TQ3. TQ3 is a travel agency selling business-to-business travel solutions. Recently they have developed a web-based system that can be used by the client companies to make the reservations and buy their travel tickets by bypassing

Company/Information	Type of Business	Number of Employees In Denmark	Number of persons interviewed and relative position
TQ3	Provider of Web-based Travel Solutions	12,000 Worldwide	(8) Director of the Danish Office, Account Manager, Online System Administrator
B	Paint and Varnish Business		(1) Secretary and responsible of travel reservations and expenses
C	Research and Development of Human and Animal Medical Products	140 in Denmark	(1) Full Time Travel Manager (Responsible for all travel reservations and expenses)
D	Producer of Cleaning Equipment		(1) Secretary and responsible of travel reservations and expenses
E	Engineering consulting	100	(1) Secretary and responsible

			of travel reservations and expenses
F	Production and service of plastic card products	150? in DK	(1) Secretary and responsible of travel reservations and expenses

Table 2: Companies Interviewed

the employees at TQ3. To understand the e-service in question and the competences required for its successful adoption and assimilation, interviews have been conducted both with the e-service provider and with the customer companies or adopters of the e-service. The research design is thus composed of two phases: the first step is to understand the e-service and the e-service system and the second to understand the competencies required to successfully adopt e-service in the customer companies. Face-to-face qualitative interviews were used to collect the data, which were primarily of a subjective kind. In both phases, the main data collection method was qualitative interviews. The e-service provider has given information about the property of the e-service system, the way it is used both by TQ3 and by the customers as well as information about the customers' motivation and reasons to adopt the e-service. Also a temporary password to the e-service was provided to the researcher to get acquainted and understand the system. The director of TQ3 has suggested the people to interview within the company, while the system administrator had suggested the customer companies and established the first contact. The sampling was purposeful. All the customers suggested had been successful in adopting and assimilating the e-service. The customer companies provided information about competences and strategy and policies regarding the adoption and assimilation of the system. Please refer to Table 2 for detailed information about the people interviewed at the service provider and the customer firms.

The bookers at TQ3 were interviewed with the intention of getting information about the problems that the customers had with the e-service. A total of five customer companies were interviewed. The person making the booking was interviewed in each firm. The interviews lasted between 45 and 90 minutes, were tape recorded and fully transcribed by a research assistant.

In the customer firms, the qualitative interviews consisted of two parts. The first part was based on a semi-structured interview guide aimed at collecting information about the institutional enablers of the e-service adoption and assimilation and their competences. The semi-structured interview guide was only a checklist and the interviewees were allowed to formulate their own statements and stories.

The second part of the interview specifically aimed at understanding the competences required to successfully use and assimilate the e-service at an individual level. This was done by applying the critical incident technique. Interview results have been analyzed with intuitive text analysis.

#### 1) *The Critical Incident Technique*

The critical incident technique is a research method used to collect data specifically related to competences. This technique was first developed by the US air force to select competent pilots (Flanagan 1954) and has been used in a great number of studies investigating competencies. Critical incidents are defined as episodes or behaviours deemed to have a special positive or negative impact in a situation. The critical incident technique gives a detailed description of what happened, why it happened and what specific actions were taken to solve the problem. In this project the critical incident technique has been applied by asking the interviewee to tell about a very specific situation where he/she had experienced problems while using the e-service or a positive situation where someone had learned something. Normally the interviewees talked about a situation where they themselves faced problems or had a positive learning experience. Sometimes they told about how another person faced such a situation. The critical incident technique is a way to explore critical requirements in a specific situation. 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).

This method begins by defining specific situations and aims connected to such situations. The classical example is a flight crew performance during difficult bombing expeditions (where the aim is to be able to respond adequately to certain typical problems during such an expedition so that the whole expedition becomes successful), but it could also be a secretary performance in using e-services.

By following Flanagan (1954) in this research concrete incidents with a positive or negative impact with respect to make a reservation by using the e-service (the aim of the situation) have been identified. The incidents that were found were then grouped into fewer themes that can be interpreted as general requirements of action or “competencies” that have a positive or negative impact on the users’ ability to use an e-service.

The analysis suggests a number of competences both at top management and individual level required for the successful adoption and assimilation of e-services in the customer companies.

First of all a competence called “vision” was present at top management level. This envisioned how a web based travel booking system could add value to the company and contribute to the company business and strategy such as decreasing operational expenses, including travelling expenses. The main idea of TQ3 web based reservation system is that it should create value both to 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 total travelling costs as they get a discount when they book their travel themselves, without contacting TQ3. It is argued here that vision was the first necessary competence to be in place in order to take at all into consideration the possibility of adopting e-services. This was clearly pointed out by the account manager at TQ3, as well as by the single employees interviewed in each customer company. Other authors (e.g. McGowan et al. 2001) have advocated for the competency of “vision” in order for management to be able to understand the opportunities and the value that technology contributes to the company and thus make a proactive effort to adopt it. Once the vision has been developed and the decision to adopt e-service has been made, senior management has developed a new competency to encourage and enforce assimilation at individual level. Similarly to Durkin and McGowan (2001) I will call this competence “control competence”. It includes not only the development of the rule or policy to induce the use of the e-service, but also its enforcement in the company. For example all the 5 companies interviewed said that they had to use the web-based reservation system due to the wishes of top management to decrease travel costs and the company policy of cutting costs. The company policy consisted not only in the fact that the company had to make the reservation themselves thus bypassing the company and getting the discount on the travels, but also that the employees should travel as cheap as possible. These companies were characterized by the fact that employees were travelling a lot. After e-service adoption at top management level has taken place, a set of competences at individual level are required for the e-service to become integral part of the company’s routines and culture. In this study by drawing upon Yukl (1989) the competences at individual level have been grouped into the three main categories of technical, conceptual and interpersonal competences.

#### A. *Technical skills*

Two competences were found as belonging to this category: knowledge competency and transfer competency. *Knowledge competency.* According to Basselier et al (2001) IT knowledge can be divided into two components: tacit knowledge and explicit knowledge. Explicit knowledge is

formal knowledge that can be acquired through formal training, can be read or explained. Examples of IT knowledge related to e-services could be web related skills and knowledge about how to use the system. Tacit knowledge is instead gained through experience and experiential training. Furthermore experience increases 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 our study both components of knowledge are present. The users of the TQ3 reservation system interviewed in this study were all first time users of such an online reservation system. Four of them are employed as secretaries in their daily job and one of them had been employed as travel manager for circa 7 months at the time of the interview. The one employed as travel manager had experience in the tourism sector, but more from the software development point of view (implementing web pages). Given that they were all new to the use of e-service systems, it could be expected that knowledge regarding the use of the system could be very important. As a matter of fact, this competence has been expressed by all five interviews. In all five companies 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 learning session constituting of a 1 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 e-service user came back to the company and started to use the system. This for example is showed by the following statement by the person interviewed at company D:

*Resp: 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..*

*Transfer Competency.* This competence is defined here as the capability to transfer the skills learned and knowledge acquired in a given context to a new context. This can be for example transfer of general Internet skills to the specific e-service system in question, transfer of previous expertise in the travel sector and IT to online booking. An example of citation from company B is:

*Int: Are you more used (then your colleagues not willing to use Webbuster) to use this type of technology.*

*Resp. 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...*

*Int. Do you use generally Internet a lot also in your private life..*

*Resp. Yes, I do. I use also netbank 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.*

Competence Category	Competence	Individual or Managerial
	<i>Vision</i>	Top Management
	<i>Control</i>	Top Management
<b>Technical Skills</b>	<i>Knowledge competency</i>  <i>Transfer Competency</i>	Individual
<b>Interpersonal skills</b>	Social Competence (2)  Empathy  Communication Competence	Individual
<b>Conceptual skills</b>	Logic Competence Judgement Competence Creativity Competence Straddle Competence	Individual

Table 2. List of Competencies and corresponding companies

#### *B. Interpersonal skills*

*Social Competence.* This competence is defined as the capability to use other people competences when insecure or facing problems in solving a specific task. This for example can be the capability to negotiate with the travel agency what to do with the ticket if the system goes down during the reservation process. Other examples can be calling the help desk or the local travel agency for help. For example the person in company E uses often TQ3 help desk or the local travel agency when unable to solve the problem by herself. This is showed by the following statement:

*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 ...*

*Empathy.* This is the capability to understand and take into consideration other colleagues needs and wants with regard to travel and economic restrictions. The following citation from company F illustrates the capability to take into consideration colleagues' preferences:

*Resp. 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...*

On the other hand the travel bookers find themselves 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. This can be sometimes difficult. The following citation from company D points out the capability to take into consideration people preferences in relation to the economic restrictions imposed by the company's travel policy:

*Resp: 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...."*

*Communication competency.* This is here defined as the capability to communicate with others. This distinguishes itself from social competency because the focus here lies in the ability to understand what other people say and make yourself understood, for example discuss things with colleagues or help desk at TQ3. An example that illustrates this is the following citation from company D:

*Resp... I think that they were very good at speaking so that we could understand that.*  
*Int. 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 from company F is:

*Int. ...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.*  
*Resp... 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.*

### C. Conceptual skills

*Logic Competence.* This is defined as the capability to understand and follow the instructions from others. For example to follow the instructions provided by the help desk in solving a problem. This competence is different from the social competence because some people can call for help, but they are not able to follow the instructions to solve the problems. A citation from company B is:

*Resp. ..Then I got a good help (from help desk) that guided me through....Then I do what they say ..and that is it...or they do it for me*

*Creativity Competence.* This is the capability to search for new information, to use and understand other sources, capability to navigate and relate to the IT system, to understand when the information and the knowledge at hand is not enough and need to find more. 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 citation from company C:

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

*Judgement Competence.* This can be defined as the capability to judge different kinds of situations and make a decision as for example when to stop trying to solve a problem by yourself and when to ask others instead. To judge when it is good to use the online system to book a travel 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 us making a mistake. To judge when it is not possible to use the system from the information at hand. To judge the validity of the information you get from the system. An example of the capability to question the validity of the information you get from the system is the following citation from company F:

*Resp. ....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.*

*Flexibility competency.* This can be defined as the capability to solve and find solutions to unforeseen problems, being able to spring out of routine work, getting used to new ways of doing a job or task. For example a citation from company B illustrates the capability to solve unforeseen problems:

*Resp. ...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.*

*Straddle competency.* This is defined as the capability to handle multiple sources at the same time, for example dealing with different people at different call centres simultaneously, or handle multiple tasks at once as for example the capability to do other things while waiting for the system to respond. This can be illustrated by the following statement of company C:

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



*you have so many arrangements. ....I would say that my memory has become sharper after I have come here.*

## VI. DISCUSSION

The analysis has showed that for a successful adoption and assimilation of e-services within a company it is important to develop appropriate competences both at top management and individual level. In this study two competences at top management level were found: vision and control. Through vision top management can understand and highlight the strategic importance of e-services and create 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 by mandating rules and policies about the assimilation of a technology can either encourage or discourage individual structuring actions. In all the companies interviewed in this study this was achieved by formulating a company policy to reduce travelling expenses. This had to be achieved in three ways: first the web based system had to be used for all the travels as this allowed for a discount respect to the price charged by the travel agency; second the employees had to travel as cheap as possible; third all the travel reservations had to be centralized in one person, the one designated as responsible to make travel arrangements in the company. This had therefore created the conditions for the e-service adoption in the companies at individual level: all employees had to respect the policy of centralization of travel arrangements in one person and the employee responsible for such travel arrangements had to respect the policy of using the e-service as much as possible and make the cheapest possible reservation by keeping into consideration the travellers' wishes. 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. The company travel policy functions in this case as structures of domination according to structuration theory, 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. Finally a number of psychological reactions were identified that were also important in adopting the e-service at individual level: for example the capability to understand personal limitations and delegate a task when necessary; the capability to be patient when the system is slow; the capability to be enthusiastic about new things, new situations or the capability to get over a feeling of insecurity.

## VI. CONCLUSION

This study is important because it has showed that both top management and individual level competences are important in e-services adoption and assimilation. Furthermore this study has identified a number of competences at top management and individual level 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 individual level are important for the successful assimilation of e-services in the company. The main managerial implications of the study can be summarized as follows: 1) for the successful adoption and assimilation of e-services it is important to develop a competence called "vision" at top management level for how such e-service has to contribute to the company's strategy or business value; 2) once the vision has been developed, it is important to develop a "control" competence to ensure that the e-service is adopted at individual level; 3) a number of competences have to be in possess or have to be developed by the individuals responsible for the use of the e-service. 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 study of five customer companies is very limited to be able to make any generalization regarding e-services adoption and assimilation in other companies. Further research could extend this study to a larger sample of companies having adopted this web-based reservation system. The e-service in question is a web based reservation system, so it might be difficult to generalize to other type of e-services such as for example e-banking. Also the companies participating to 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 level to adopt and successfully assimilate e-services within a corporation. These results might be of interest to other researchers as well as corporations' managers interested to adopt e-services as a strategic or value adding technology.

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