# Introductory Chapter

## UNDERSTANDING E-SERVICES, SELF SERVICES AND MOBILE COMMUNICATIONS: PAST RESEARCH AND FUTURE DIRECTIONS

As the introductory chapter to the first book of "*Advances in E-Services and Mobile Applications series*", this chapter provides a short overview of the e-service concept and discusses similarities and differences of the e-service concept in relation to other well established concepts such as services, goods, and self services. In addition the chapter provides a broad overview of the type of research conducted within the field of mobile applications and communications. Finally the chapter concludes with some directions for future research in these fields.

## Introduction

With the advent of information and communication technologies, many of the traditional face to face services have been transformed first into self services, then with the advent of the World Wide Web into e-services and more recently into m-services with the spreading of mobile networks. For example the payment for fuel at a gas station was earlier done by going to the cashier and paying there before or after the fuel was filled. Nowadays this has become a self service where the customer pays by using the credit card at a machine and often fills the fuel by himself/herself. Another classic example of self services is ATM machines. More recently other types of services such as filling of tax forms, searching for products information, comparing product types that also requested a face to face interaction between the service provider and the service customer have been automatized with the advent of the Worldwide Web. This type of e-services has gone even further by sometimes involving communities of users or customers to develop online services themselves as for example in the cases of online marketplaces or wikis or to even contribute to further development of goods or services produced by companies as for example in the case of ski equipment, the design of new products as for example in the case of t-shirts or simply contributing to service development as in the case of library services (e.g. Nicolajsen et al. 2009). As the editor of the book series entitled "*Advances in E-Services and Mobile Applications series,*" I am planning in this introductory chapter to the first book of the series to mainly give an overview of the e-service and mobile application research with some recommendations for future research.

As pointed out in the literature (e.g. Scupola et al., 2009; Stafford, 2003) there is still much disagreement as to what e-services are. There have been a number of empirical studies focussing on e-services spanning a range of fields and applications varying from government to business e-services or consumer-to-consumer e-services. This is also reflected in the range of articles' subjects that have been submitted

and accepted for publication in the *Journal of E-Services and Mobile Applications* (IJESMA), for which I am editor in chief. Over the last couple of years in fact the subjects of the accepted articles for IJESMA have been varying from e-health, to online auctions as e-services, to e-recruiting systems, Web-based IT support services, e-banking, as well as e-services used by accounting companies. Also by looking at the geographical regions where the articles submitted or accepted are coming from, it can be concluded that e-services is a phenomenon or concept that is increasingly gaining attention and investigation in all the continents and countries, including USA, Europe, Canada, Australia, Japan, Russia, or Jamaica to name a few. In this introductory chapter to the series, I will summarize what it is intended in the literature with e-services and how this concept differs from services, goods, and self services concepts. In addition I will touch upon the types of research conducted within mobile applications and will show some trends within these fields both from a theoretical and empirical perspective.

The chapter is structured as follows. In this introduction the background, the purpose, and the motivation of the chapter is given. The following section presents a short overview and definitions of e-services and the e-service concept. The next section discusses the self service concept and its similarities and differences with the e-service concept, and it is followed by a section presenting major trends within the mobile applications and communication field. Finally, the last section will provide some concluding remarks and suggestions for future research.

## Understanding E-Services

### E-Services Definitions

As already pointed out by many authors (e.g. Singh, 2002; de Ruyter et al., 2000) there is no clear and unique definition of e-services, and the definition often depends on the context in which e-services are studied, such as, for example, in the context of e-government field or business to consumer field. Based on an extensive literature review, Scupola et al. (2009) have categorized the definitions of e-services into two main groups as shown in Table 1: the first group focuses mainly on the delivery and infrastructure of e-services, while the other group focuses on the production, delivery, and outcome of e-services. For example, within the delivery and infrastructure view, e-services are seen as the "provision of services over electronic networks" (Rust, 2001; Rust and Kannan, 2003). Within the production, delivery, and outcome view instead, e-services are defined as "services that are produced, provided, and/or consumed through the use of ICT-networks such as Internet-based systems and mobile solutions" (Scupola, 2008).

In addition, Scupola et al. (2009) have distinguished 4 main categories of e-services summarized in Table 2: business to business (B-to-B), business to consumer (B-to-C), government to business and to consumer (G-to-B, G-to-C), and Customer to Customer (C-to-C). As Table 2 shows, B-to-B e-services are usually used in building collaboration and relationships between companies, while business to consumer e-services are mainly used to sell to the customer or to retain the customer through e-enabled customer support, provision of information about the products/services, implement user driven innovation, et cetera. Government-to-business and government-to-consumer are mainly targeted to reduce the digital divide among city and rural areas, empowerment of the citizens in their use of governmental services, or e-democracy. Finally the fourth category, consumer-to consumer e-services (C-to-C), are developed by citizens and are directed to citizens and include for example online communities, wikis such as Wikipidia (http://en.wikipedia.org/), or simply online markets as for example online markets for second hand objects and things.

*Table 1. A summary of e-services definitions*

| Delivery and infrastructure view | Production, delivery and outcome view |
|---|---|
| Those services that can be delivered electronically (Javalgi, Martin and Todd, 2004) | Any asset that is made available via the Internet to drive revenue streams or create new efficiencies (Piccinelli and Stammers, 2001) |
| Provision of services over electronic networks (Rust, 2001; Rust and Kannan, 2003) | An act or performance that creates and provides benefits for customers through a process that is stored as an algorithm and typically implemented by networked software (Hofacker et al., 2007) |
| Interactive services that are delivered on the Internet using advanced telecommunications, information, and multimedia technologies (Boyer, Hallowell and Roth, 2002) | E-services as Internet-based applications that fulfill service needs by seamlessly bringing together distributed, specialized resources to enable complex (often real-time) transactions (Tiwana and Balasubramaniam, 2001) |
| E-service is deeds, efforts or performance whose delivery is mediated by information technology (including Web, information kiosks and mobile devices). Such e-service includes the service element of e-tailing, customer support and service, and service delivery (Rowley, 2006) | E-services are defined as services that are produced, provided and/or consumed through the use of ICT-networks such as Internet-based systems and mobile solutions (Scupola, 2008) |

## E-Services, Services and Goods

As already said, a number of studies have tried to define and conceptualize the e-service concept (e.g. *Singh*, 2002; de Ruyter et al., 2000; Hofacker et al., 2007) and tried to position it in relation to established concepts such as goods, services, and self services. For example, Scupola et al. (2009) conducted a thorough literature review of e-services in an attempt to identify the strengths and the limitations of the e-service concept in relation to other concepts such as services and goods. They concluded that the e-service concept has features, relationships, and developments that differentiate it from and add something to other and already well-established concepts such as services or goods. Scupola et al. (2009) argue that the e-service concept in particular adds value when it is seen at the convergence of goods and services. They observe that services, which normally depend on face-to-face encounters, can increasingly be digitized and delivered on communication networks whereby the connection between the immediate service producer and the service provided is changed, turning the service into a good-like product. Conversely, some goods such as software or printing, which normally were sold to the customers as goods (for example in the form of a CD ROM) are increasingly delivered as service to customers for example as print on demand in the case of printing services.

Scupola et al. (2009) summarize the major characteristics of goods, e-services, and services as shown in Table 3 below. For example, goods are tangible and can be inventoried and patented. Their use usu-

*Table 2. E-Services Categories (Scupola et al., 2009)*

| Types of e-services | B-to-B | B-to-C | G-to-B and G-to-C | C-to-C |
|---|---|---|---|---|
| Characteristics/focus | Collaboration and relationship building | Selling to and retaining the customer | User/citizen empowerment, e-democracy, city/rural areas divide | Peer-to-peer value creation |
| Examples | Supply chain management in outsourced printing services and facilities, SaaS | E-retailing, e-customer relationship management, e-banking, e-newspapers, Web portals | Online tax returns, e-voting, e-libraries, telemedicine, remote social security services | Online auctions, consumer driven e-marketplaces, online gaming, online communities (newsgroups). wikis |

*Table 3. Distinguishing features of goods, e-services and services*

| Goods | E-services | Services |
|---|---|---|
| Tangible | Intangible, but need tangible media | Intangible |
| Can be inventoried | Can be inventoried | Cannot be inventoried |
| Separable consumption | Separable consumption | Inseparable consumption |
| Can be patented | Can be copyrighted, patented | Cannot be patented |
| Homogeneous | Homogeneous | Heterogeneous |
| Easy to price | Hard to price | Hard to price |
| Can't be copied | Can be copied | Can't be copied |
| Can be shared | Can be shared | Can't be shared |
| Use equals consumption | Use does not equal consumption | Use equals consumption |
| Based on atoms | Based on bits | Based on atoms |

Source: Scupola et al. (2009): adopted from Charles F. Hofacker et al. (2007): E-services: A synthesis and research agenda, Journal of Value Chain Management 1(1/2).

ally implies consumption and their consumption can be shared among different consumers. In addition they are homogenous and are easy to price. On the contrary, services are intangible and it is impossible to inventory them, to copy or patent them; they are heterogeneous and hard to price. E-services on the other hand are intangible, but need tangible media such as a computer, can be inventoried and patented, and they can be shared and copied. Their use does not necessarily imply consumption.

Therefore, as can be seen in Table 3, e-services share some of the characteristics of services, such as intangibility, or difficulty of pricing, while simultaneously sharing some of the characteristics of goods, such as the possibility to be inventoried and the possibility to be copyrighted. However, e-services have also some characteristics that are unique and not common either to goods or services: e-services are based on bits, and the use of an e-service does not equal consumption of the e-service.

Furthermore, Scupola et al. (2009) pointed out that when the e-service concept is defined as the convergence of some types of services as for example knowledge services (e.g. customer service) and goods, codification of the production or the content of the service becomes essential. Such codification can be obtained either by codifying the service content or by developing ICT-based tools through which knowledge, or at least some type of knowledge, can be stored and thus provided to the customer.

However, Scupola et al. (2009) also raise the question to what degree the knowledge embedded in the service provision can be codified, entered on ICT, and sold on markets as informational goods. Based on the theories of knowledge creation, storage, and interpretation (e.g. Polanyi, 1958; Nonaka, 1994; Davenport and Pruzak, 1998) they conclude that even for services with a great amount of codified knowledge, it is not certain that this service can be fully sold digitally or as a stand-alone e-service. They state that all the knowledge that can be codified and put on a piece of paper can be entered on digital media. However, this does not mean that it can be sold as an all-digitized service or e-service. For example legal services or real estate services are based on laws and other information that can be easily put in digital forms, but need the right competences for interpretation. For example in the case of real estate, many legal documents and other kinds of information related to the buying and selling of real estate can be codified and digitized. However, real estate agents still exist as intermediaries of these processes, mainly due to the fact that a lot of specialized knowledge is required in handling real estate, knowledge that not all customers feel confident to possess. The implication is that the production

and marketing of knowledge services is limited to contexts in which there is a match of interpretation. Therefore many core knowledge-intensive services might not easily lend themselves to become e-services (Scupola et al., 2009). This applies, for example, to services that are not easily or fully codifiable because the knowledge is too complex, too situational, or dependent on experiences or trust.

## Conceptualization of Self-Services vs. E-Services

Having conceptualized e-services in relation to goods and services, the question remains: what are self services and how do they differentiate themselves from our conceptualization of e-services? The concept "self service" has, similarly to the concept of e-services, a lot of connotations and definitions and a lot of confusion exists in the literature regarding the meaning of the concept. Like e-services concept, the self service concept primarily has its roots in the service marketing literature. For example Meuter et al. (2000) states that the strategic importance of self service technologies (SSTs) is due to the radical changes in service delivery that it has brought to many industries such as airline, banking, travel, hotel, financial, and retailing. Meuter et al. (2000) define self service technologies as technological interfaces that allow customers to produce services independent of direct service employee involvement. The use of self service technologies (SSTs) implies primarily the elimination (or at least a significant reduction in involvement) of a service representative and the empowerment of the customer in the service delivery. As for e-services, self service technologies (SSTs) are a cost-effective way of providing a greater level of customer service for corporations. In fact, convenience, ubiquitous availability, and time and money savings, are some of the benefits provided by the use of self services for consumers. Cunningham et al. (2009) state that Parasuraman regards this radical progression from traditional interpersonal service encounters to self service technologies, replacing human-to-human contact with human-machine interaction, as a fundamental shift in the nature of services. In their study comparing consumer views of traditional services and self-service technologies, Cunningham et al. (2009) concentrate on the following services that can be provided with the use of self service technologies: online banking, distance education, airline reservations, tax software, retail self-scanning, online auctions, pay at the pump, ATMs, online brokerage, interactive phone, Internet search, and online car buying. According to e-services literature, many of the above are services that can be transformed into e-services or mobile services by using internet and mobile communications.

In addition, Fitzsimmons (2003) in a short article published under "The guru's view" of the journal *Managing Service Quality* states that services have migrated from human interaction to substitution of machines for service employees or, where feasible, to anywhere-anytime electronic service. According to Fitzsimmons (2003),

*This trajectory is similar to the past experience in the agricultural and manufacturing sectors of the economy where human labor has been driven out of the production process relentlessly ...The initial targets of SST were service transactions that did not add value or have revenue-enhancing opportunity because the substitution of technology for employee labor achieved cost savings. For example, the introduction of ATMs by banks a quarter of a century ago saved teller costs but also provided customers with place-and-time convenience. However, services that can be digitized and delivered via the Internet such as entertainment, information, and training represent new opportunities for SST (Fitzsimmons, 2003, p. 444).*

He then summarizes what he calls the evolution of self- services in some key service industry, demonstrating that there is an evolution from services to machine assisted services such as vending machine, check in kiosks, et cetera to electronic services (e-services) according to the definition and understanding of this chapter, which is online banking, online shopping, or online ordering.

In addition, Fitzsimmons (2003) states that high touch services such as healthcare, fire fighting, dentistry, et cetera should be not so impacted by self services, even though this might not be entirely true for healthcare. In fact, nowadays e-health is becoming a more and more important field for e-services as it is showed by the flourishing literature on e-health and telemedicine within the e-services literature (e.g. Gogia, 2008).

So one may wonder: what is the difference between e-services and self services? Are they the same thing or are there differences between them? The self service technology concept has been initially introduced when the advancement in technology, and especially Information Technology replaced conventional face-to-face services with innovative self-service technology (SST) such as ATM. Later, as the technology has evolved, in the marketing literature, the term has been extended to include into self service technologies, and also technologies such as Internet banking (e.g. Hensmans *et al.,* 2001). In reality, as I see it, Internet banking has followed self service technologies such as telephone banking and ATMs. From our brief discussion here about self services and what has been discussed in the previous session about e-services, it can be concluded that both e-services and self services try to substitute human interaction with machines or computers, but self services do not necessarily need to be Web based as e-services (as in the case of an ATM machine or kiosk ticketing.

Therefore, self services can be seen as the first era of substitution of humans with machines in service provisions, while e-services and mobile services are the most advanced arena therein, offering something more than self services (interactivity between the service provider and the customer) as e-services can use chats. This interactivity aspect of e-services has been also emphasized by Rust and Lemon (2001), who stated that in the service provisions, three main changes have been possible due to the Internet: true interactivity with the consumer, customer specific, situational personalization, and the opportunity for real-time adjustments to a firm's offering to customers. Self services instead have the main aim of substituting humans with machines and give little possibility of transferring knowledge. This is possible with e-services as in the case of news as e-services (Ihlstrom et al., 2008) or software transmitted online. It can therefore be concluded that e-services can be conceptualized as a natural, more complex form and evolution of self services technologies. However, establishing the right relationship between self services and e-services might require an in-depth and thorough literature review of the e-service and self service research. Therefore this might be subject for future research as the purpose of this chapter is mainly to focus on e-services and mobile applications and shortly describe its relation to goods, services, and self services.

## Mobile Applications and Communication

Lately, a new generation of e-services is taking place due to the wireless revolution and the explosion of mobile commerce, implying that mobile devices, including mobile phones, are becoming a critical component of the new digital economy. The transactions over electronic networks are therefore transformed from fixed locations to anytime, anywhere, and anyone transactions. New forms of mobile technologies are rapidly transforming the marketplace and the e-services landscape as mobile applications and wireless networks are enabling and transforming many of the standard e-services into m-services.

Such applications include mobile financial services, user and location specific mobile advertising, and mobile inventory management. Ngai and Gunasekaran (2007) conduct a thorough literature review of mobile commerce research and applications published from 2000 through 2003. On the base of research conducted previously by Varshney and Vetter (2002) and Mennecke and Strader (2003) they develop a classification framework to classify the articles dealing with m-commerce research. Their classification framework categorizes m-commerce research into five levels that they describe as follows:

1. M-commerce theory and research. This is the lowest level of the framework. The articles included here deal with issues or subjects such as the development of m-commerce applications and guidelines, behavioural issues such as consumer behaviour, the acceptance of technology, and the diffusion of m-commerce applications and services, as well as m-commerce economics, strategy, and business models. Legal and ethical issues such as privacy, regulations, and the legal environment when using m-commerce are also included in this level of the framework by Ngai and Gunasekaran (2007). Articles dealing with a general introduction to m-commerce, foundational concepts of m-commerce, and so forth were also included into this level.

The model then presents 3 pillars that include research articles addressing more technical characteristics of the wireless infrastructure that enables mobile commerce, and subsequently, m-services. These 3 pillars are: wireless network infrastructure, mobile middleware, and wireless user infrastructure, and they are described below, mainly based on Ngai and Gunasekaran (2007).

2. Wireless network infrastructure is the first of the three pillar technologies of m-commerce that supports the development of m-commerce applications, including m-services. According to Ngai and Gunasekaran (2007),

*Wireless network infrastructure plays an important role in m-commerce as this is the core part of m-commerce technology. It provides wireless networks and network standards such as the Global System for Mobile Communication (GSM), Bluetooth, the wireless local area network (WLAN), radio frequency identification (RFID), the Third- generation (3G) network, et cetera. In order to ensure the reliability and efficiency of the m-commerce applications and services running in a mobile environment, it is necessary for various networking requirements to be implemented in the wireless and mobile networks (p. 6).*

Articles on the wireless infrastructure requirements of m-commerce, such as location management, multicast support, network dependability, quality-of-service, and roaming across multiple networks are also included under this pillar.

3. Mobile middleware refers to the software layer between the wireless networks and the operating systems of the mobile devices to connect the m-commerce applications. Based on previous literature, Ngai and Gunasekaran (2007) identified four research issues for mobile middleware. The first issue is called "agent technologies" and includes publications dealing with the use of software agents or mobile agents to support m-commerce activities as for example searching for products. The second is called "database management" and includes articles dealing with mobile database management. The third deals with "security issues" and includes articles that discuss the security issues in m-commerce. An example is the design of a secure wireless network infrastructure for

m-commerce applications using public key infrastructure or other techniques. The fourth is "wireless and mobile communication systems" that deal with techniques and methods to connect and manage m-commerce applications.

4. Wireless user infrastructure consists of two parts, i.e., software and hardware. Ngai and Gunasekaran (2007) state that software refers to the operating systems and their interfaces, while hardware deals with the mobile devices needed to communicate with the m-commerce applications, such as PDAs and mobile phones. An important research sub-theme identified in this category deals with mobile interfaces since these are very important in a mobile environment due to the fact that mobile applications normally run on small and portable mobile hand-held devices.

5. Mobile commerce applications and cases include literature that focuses on specific applications or cases. In categorizing such a literature Ngai and Gunasekaran (2007) used classes of mobile applications that had been earlier developed by Varshney and Vetter (2002). They include mobile financial applications, mobile advertising, mobile inventory management, locating and shopping for products, proactive service management, wireless re-engineering, mobile auctions or reverse auctions, mobile entertainment services and games, mobile offices, mobile distance education, and wireless data centres.

The *International Journal of E-Services and Mobile Applications* (IJESMA), for which I am editor in chief, has published and is in the process of publishing several articles and special issues addressing mainly category 1 and 2 of the research framework proposed by Ngai and Gunasekaran (2007): M-commerce theory and research and Mobile commerce applications and cases. For example, Kushchu (2010) edited a special issue on mobile government, and in his editorial, he states that a mobile life "emerges from communications via mobile technologies in our personal, family, and business (public or private) interactions, and influences, in a positive or negative way, all aspects of life on earth" (p. i). In addition he mentions a number of positive and negative influences that mobility may have on society as a whole. For example based on a study that the Mobile Government Consortium International (mGCI – www.mgovernment.org) has made about the contributions of mobile phones to our lives, Kushchu (2010) states that the positive contributions can be seen at least at four different levels:

1. Contributions to personal and primary relations
2. Contributions to the society in general,
3. Contributions to public and private sector organisation, and
4. Contributions to the economies (especially developing economies).

Among the negative influence of mobile phone use the Mobile Government Consortium International Study found that:

1. Members of the society do not have a strict love and hate relationship with mobile phones. Rather, there are ranges of negative feelings and the negative feelings may change from one circumstance to another and from one person to another.
2. Members of the society feel negative and unpleased under various situations, but the following top three circumstances of mobile use seem to be critical:
   ◦ When mobile use may lead to a danger.
   ◦ When mobile phones are intrusive or imposing on others.

- ◦ When mobile phones start to change our lives in the way we do not wish to and when we become so dependent on them.
3. It has been also observed that being in a particular age group does not necessarily lead to a dislike of mobile phones but older members of society seems to be more sensitive to bad manners when mobile phones are being used.

Another special issue of the *International Journal of E-Services and Mobile Applications* (IJESMA) focused on mobile services. In this special issue, Salo (2009) collects four papers focusing on different aspects of mobile services and on different types of mobile service applications. Westerlund et al. (2009) focus on the mobile advertising field and suggest that attractive content and trust in advertisers are key predictors of mobile deviser users´ behavioural intention towards mobile advertising. Cruz et al. (2009) explore resistance to mobile banking in Portugal with extensive empirical data. Their results indicate that functional barriers are more severe than traditional psychological barriers. Their research theoretically extends the multidisciplinary approach to explaining resistance of technology in different contexts, while practically, the study emphasizes the importance of decreasing functional barriers relating to mobile banking as services provided should be easily usable and provide high value-for-money. Finally, the studies by de Vos et al. (2009) and Almasri et al. (2009) focus both on a specific application: Location Based Mobile Services. De Vos et al. (2009) examine consumer perceived value of mobile services that are context aware and location sensitive. The study shows that mobile services that are context aware, do not provide added value to customers, and that utilitarian elements have higher perceived value than hedonic elements. Almasri et al. (2009)'s study investigates micro-scale navigation issues relating to GPS systems by especially focussing on pedestrian navigation. The study provides insights about how to improve both wireless networks and devices to improve services provided.

## Conclusion and Recommendations for Further Research

As the introductory chapter to the first book of "*Advances in E-Services and Mobile Applications series,*" this chapter provides a short overview of the e-service concept and discusses similarities and differences of the e-service concept in relation to other well established concepts such as services, goods, and self services. In addition, the chapter provides an overview of the research focusing on mobile applications and highlights how important research in this field as well as in the e-services field is published in the International Journal of E-Services and Mobile Applications. This chapter deals with all these concepts in a theoretical way by summarizing and analyzing important literature in these fields. However, the issues dealt with in this chapter are only the most general issues and are provided and discussed here to understand at a general level the most recent trends and the concepts within e-services and mobile communication field.

There are however a number of issues that are important within this field and that can be subject for further research. Two aspects worth mentioning here are: e-service quality and technologies for e-services and self services. In the service field, there has been a lot of literature addressing service quality and trying to find dimensions to measure the quality of a service. One of the most used and valid instruments that has been developed to measure the service quality has been the SERVQUAL instrument developed by Parasuraman et al. (2008). Similarly, in the last few years some studies have also tried to understand and study e-services quality. According to *Tsikriktsis* (2002) three major studies within the service marketing field have tried to establish some dimensions of e-service quality: the study conducted by Zeithaml et

al. (2000), the one conducted by Voss (2000), and the one conducted by Loiacono et al. (2000). It could be interesting to conduct an in depth literature review of the e-service quality research in order to understand what we mean by e-service quality and the dimensions that can be used to implement it. Another important field for future research is the investigation of the technologies for e-services, self services, and mobile communication. Some studies exist about this, as pointed out by Singh (2002) and Ngai and Gunasekaran (2007), however it could be interesting to conduct an updated literature review. In addition more cases are needed to understand and explain these phenomena. Finally, further research could also focus on how e-services, self services, and mobile communication can be used to drive innovation and company strategy as already done by some companies, such as Starbucks, that make uses of social media in order to involve users in the innovation process and to make company's and innovation strategies.

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