

IDENTIFICATION OF FACTORS AFFECTING THE E-SERVICE ADOPTION: AN EMPIRICAL
INVESTIGATION

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INVESTIGATION**

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ABSTRACT

IDENTIFICATION OF FACTORS AFFECTING THE E-SERVICE ADOPTION: AN EMPIRICAL INVESTIGATION

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E-service usage has become widespread and constitutes a significant place in the daily life of people. Despite the diversity of benefits offered by e-service, adoption problems cause reduced exploitation of e-services. In this regard, in order to extend the use of e-services it has become essential to determine the needs and expectations of users. The aim of this study is to develop and validate an e-service adoption model that comprises determinants of behavioral, normative and control belief structures. Actual users collaborated to the process of factor determination, and domain experts grouped each factor under the related belief types. The involvement of actual users and experts helped to obtain precise and efficient results. The proposed research model was validated with the partial least squares method based on 217 e-service users' data. Then, semi-structured interviews were conducted to confirm and comprehend the findings of the quantitative study. In addition, actual usage data were examined and compared with the findings of the task and interview analyses. The results show that affective factors (perceived enjoyment and value to incentive), functional factors (expected benefit and perceived usability), technological factors (perceived device mobility and perceived ubiquity) and perceived behavioral control have a significant effect on the intention to use e-services. Moreover, the intention to use e-services is found to be an essential driver of the e-service usage. The findings provide useful recommendations for the development of the application and the policymaking that are customer-oriented and e-service based.

Keywords: E-Service Adoption, Structural Equation Modeling, Mixed Method Research, Actual Users, Technology Characteristics

ÖZ

E-HİZMET BENİMSENMESİNİ ETKİLEYEN FAKTÖRLERİN BELİRLENMESİ: AMPİRİK BİR ARAŞTIRMA

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E-hizmet kullanımı yaygınlaşmakta ve insanların günlük hayatında önemli bir yer teşkil etmektedir. E-hizmetler çeşitli faydalar sunmalarına rağmen, benimseme sorunları kısıtlı olarak kullanılmalarına neden olmaktadır. Bu bağlamda, e-hizmetlerin kullanımını yaygınlaştırmak için kullanıcıların ihtiyaçlarını ve beklentilerini belirlemek önem kazanmaktadır. Bu çalışmanın amacı, davranışsal, normatif ve kontrol inanç yapılarının belirleyicilerini içeren bir e-hizmet benimseme modeli geliştirmek ve doğrulamaktır. Gerçek kullanıcılar faktör belirleme sürecine katılmış ve alan uzmanları her faktörü ilgili inanç türü altında gruplandırmıştır. Gerçek kullanıcıların ve uzmanların katılımı kesin ve etkili sonuçlar elde etmeye yardımcı olmuştur. Önerilen araştırma modeli, 217 e-hizmet kullanıcı verisini temel alan kısmi en küçük kareler yöntemi ile doğrulanmıştır. Ardından, nicel araştırmanın bulgularını teyit etmek ve kavramak için yarı-yapılandırılmış görüşmeler yapılmıştır. Ayrıca, gerçek kullanım verileri incelenmiş ve görev ve görüşme analizlerinin bulguları ile karşılaştırılmıştır. Sonuçlar duygusal faktörler (algılanan eğlence ve teşviğe değer verme), fonksiyonel faktörler (beklenen fayda ve algılanan kullanılabilirlik), teknolojik faktörler (algılanan cihaz taşınırılığı ve algılanan her yerden ve her zaman erişim) ve algılanan davranışsal kontrolün e-hizmet kullanım niyeti üzerinde anlamlı bir etkiye sahip olduğunu göstermektedir. Buna ek olarak, e-hizmet kullanım niyetinin e-hizmet kullanımının temel bir etmeni olduğu bulunmuştur. Bulgular müşteri odaklı ve e-hizmet tabanlı uygulama geliştirme ve politika oluşturma için yararlı öneriler sağlamaktadır.

Anahtar Kelimeler: E-Hizmet Benimsenmesi, Yapısal Eşitlik Modeli, Karma Yöntemli Araştırma, Gerçek Kullanıcılar, Teknoloji Karakteristikleri

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LIST OF ABBREVIATIONS AND ACRONYMS

AM	: Perceived Application Mobility
AVE	: Average Variance Extracted
CR	: Composite Reliability
C-TAM-TPB	: Combined Technology Acceptance Model and Theory of Planned Behavior
DM	: Perceived Device Mobility
DOI	: Diffusion of Innovation
EB	: Expected Benefit
E-Service	: Electronic Service
EU	: European Union
GPS	: Global Positioning System
GUI	: Graphical User Interface
ICT	: Information and Communication Technology
II	: Informational Influence
INT	: Intention to Use E-Service
IS	: Information Systems
ITU	: International Telecommunication Union
MCSDS	: Marlow Crowne Social Desirability Scale
METU	: Middle East Technical University
M-Service	: Mobile Service

MS	: Microsoft
PBC	: Perceived Behavioral Control
PE	: Perceived Enjoyment
PLS	: Partial Least Square
PR	: Value to Personalization
PU	: Perceived Usability
Sec	: Second
SEM	: Structural Equation Modeling
SQRT	: Square root
T	: Trust to the e-Service
TAM	: Technology Acceptance Model
TPB	: Theory of Planned Behavior
UB	: Perceived Ubiquity
UTAUT	: Uniform Theory of Acceptance and Use of Technology
VE	: Value Expressiveness
VINC	: Value to Incentive

CHAPTER 1

INTRODUCTION

In parallel with the rapid advancements in the information and communications technology (ICT), technological products, for instance, computer, tablet PC, and smart phone, play an essential role in people's daily lives. According to ICT development report of International Telecommunication Union (ITU), mobile and fixed broadband subscription has been increasing in the world (ITU, 2013). As seen in Figure 1, active mobile-broadband subscription has nearly tripled from 2010 to 2013. Moreover, ITU (2013) reports that percentage of the internet users reached almost 40 per cent by the end of 2013. These technologies provide several time and cost benefits. Consequently, organizations and governments that offer services to the users reshaped their businesses concordantly with these technological advances. Thereby, e-service or providing service over electronic networks such as the internet, emerged (Rust & Kannan, 2002).

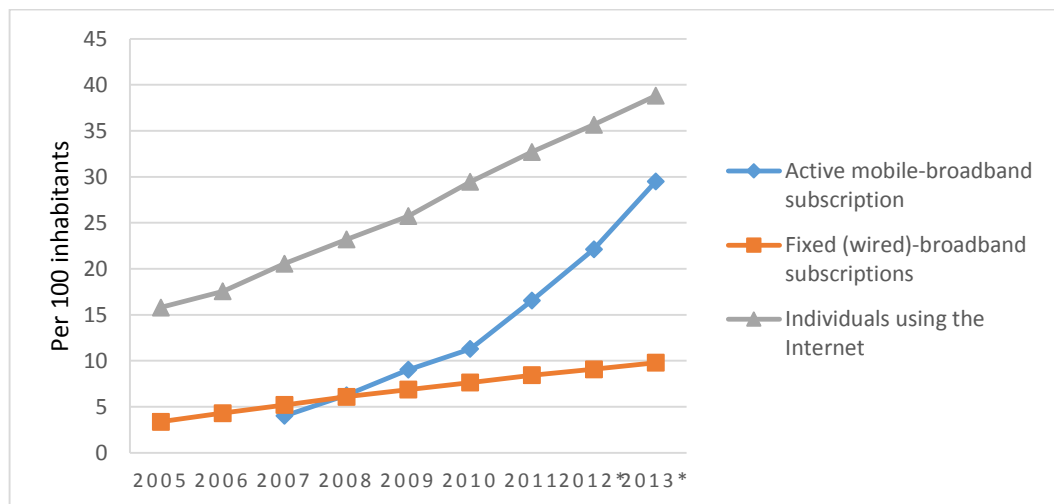


Figure 1 Global ICT Development ¹

¹Source: ITU World Telecommunication/ ICT Indicators database.

1.1 Statement of the Problem

ICT allows users to work more efficiently and display higher performance; nevertheless, several systems are not used properly and adequately due to the users' adoption problems, because they are not aware of the technology or not ready to use it. Unless the system is used, it does not offer any advantage to the users (Money & Turner, 2004).

Although the broadband and mobile phone subscriptions increase, e-service usage rate is not reaching a sufficient level. Figure 2 represents the ICT usage of the individuals aged 16 to 74 in European Union (EU) countries (28 countries). Both internet and e-service usage increased from 2007 to 2013. However, individuals mostly use internet for the information gathering. Nearly half of Internet users use e-services such as e-government, e-banking and ordering services, and goods.

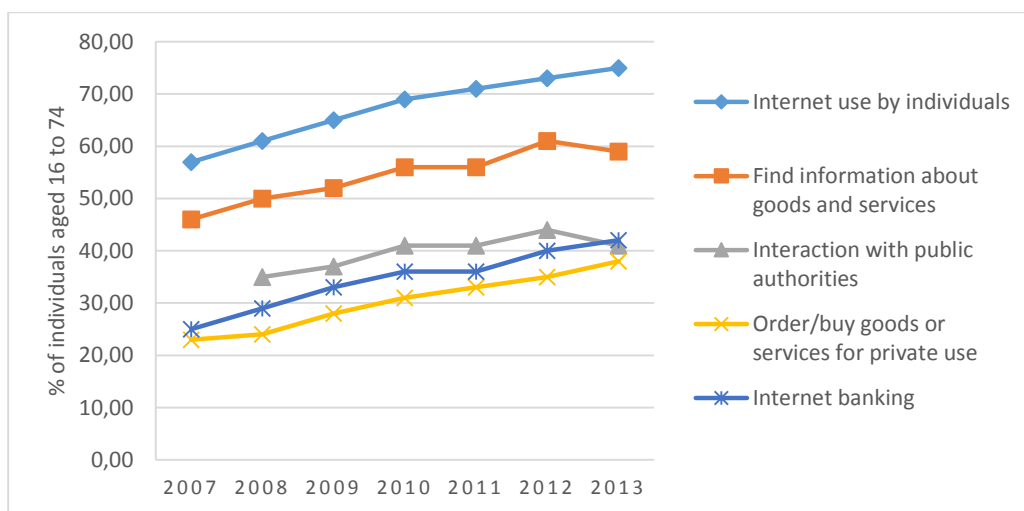


Figure 2 ICT Usage by Individuals Including 28 EU Countries ²

Even though the support of the organization is a crucial success factor, there is another dimension of the e-service that is customers. In order to extend the use of e-service, it is necessary to determine the needs and expectations of users with convenient methods. However, many organizations make great effort and spend money to implement e-service systems without giving significant attention to the user side. They consider that if a well working e-service system is developed, users will immediately start using the system and benefit from it. There is no way to increase the use of e-service without the awareness and acceptance of the users towards the e-services (Carter & Belanger, 2004). Therefore, agencies should determine the factors that affect the users' behaviors about ICT while transforming from traditional services to the electronic.

² Data were obtained from EuroStat, Information Society Statistics (2014)
http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/main_tables

There are various research studies in the technology adoption field. Some of them serve as a base model such as Technology Acceptance Model (TAM) (Davis, 1989) and Diffusion of Innovation (DOI) (Rogers, 1995), whereas others are decomposed versions (i.e. Uniform Theory of Acceptance and Use of Technology (UTAUT) (V Venkatesh, Morris, Davis, & Davis, 2003), TAM2 (V. Venkatesh & Davis, 2000) or combined versions of existing models (i.e. Combined TAM and TPB Model (C-TAM-TPB) (S. Taylor & P. A. Todd, 1995)). These models are mostly used in e-service adoption studies (Featherman, Miyazaki, & Spratt, 2010; Hsu & Chiu, 2004).

However, all domains have idiosyncratic features and user profiles. Consequently, identifying the domain specific constructs and considering the requests and needs of actual users play a crucial role in efficient model development. Furthermore, most of these previous models are for business settings, and mandatory applications and technologies. However, e-service has a customer oriented structure and mostly voluntary settings. In that regard, a model that bears in mind domain specific features and user profiles is needed in order to thoroughly comprehend the e-service usage. The Theory of Planned Behavior (TPB) is a frequently used model in behavioral research (Ajzen, 1991). The TPB that examines the behavior in a primary manner is simple-structured and open for improvement. Therefore, the present research is grounded on the TPB.

1.2 Purpose of the Study

The primary purpose of this study was to identify the factors that affect e-service usage adoption. With this aim, a research model that predicts and explains the e-service usage behavior of the users was developed. The research model that covers all belief types (behavioral, normative and control beliefs) was progressively developed with the inclusion of the actual users and domain experts in the process. Then, the research model was evaluated with the two phases mixed methods research design. In Phase1, the instrument was developed, and the research model was validated. In Phase2, the semi-structured interviews were conducted to understand the findings in detail, and the e-service usage of the participants was examined.

Thus, thesis sought to address the following research questions:

- (1) What are the factors that affect e-service usage adoption?
- (2) What are the relationships between these factors?
- (3) What is the weight of each factor on the e-service usage behavior?
- (4) What are the e-service users' perceptions about these factors influencing their e-service usage?

1.3 Design of the Study

This study was performed in four steps. Detailed explanation of each step was presented in Figure 3. First step started with the proposed theoretical model. Then, target and expert group studies were conducted, and the research model was built.

In second step, an instrument that comprises of the constructs of the model was developed, and the research model was validated. Firstly, an item pool was generated, and it was examined via expert review and cognitive interview. Secondly, a pilot study was conducted and the instrument was finalized. Thirdly, data were collected via the instrument, and reliability, validity, and path analyses were conducted.

Third step includes data collection and analyses steps of task analysis, interview, and actual usage data. In the last step, the findings of the Phase 1 and Phase 2 were integrated. The results of the interview, task, and actual usage analyses were compared. Then, PLS-SEM and interview results were integrated and similarities and differences were discussed.

1.4 Significance of the Study

This research provides several contributions to the e-service domain in many aspects. Firstly, this research contributes to the e-service adoption literature by identifying the factors that influence the e-service usage for behavioral, normative and control beliefs. Mobile medium (i.e. mobile phone) usage has been increasing, and there are 6.8 billion mobile-cellular subscriptions in the world (ITU, 2013). Furthermore, mobile broadband subscription continues to rise (between 2010 and 2013 on average by around 40 per cent annually)(ITU, 2013), and e-services have an important place in everyday life. However, there are many alternative services for each domain, and convincing customers to decide to use a service and ensuring continuous use is important. Therefore, success of these services depends on the adoption and usage rate. Moreover, commercial advertisements are published in m-services and applications, and the number of users and the frequency of use hold an important place in advertisement revenue (Becker & Arnold, 2010). Hence, drawing the attention of the potential users and persuading them to use the e-service have become essential. Consequently, it is crucial to identify the drivers of e-service usage. The findings of this study provide valuable implications for the e-service developers and providers.

Secondly, the research model was systematically developed. We have made use of the actual users and domain experts when developing the model, it was iterative and we also took into account the behavioral, normative and control beliefs when establishing the constructs of the model. This approach provides more accurate and efficient results. Furthermore, we considered the limitations of the TPB and tried to overcome them in this research. In order to eliminate the lack of emotions in TPB based studies (Benbasat & Barki, 2007), we integrated the perceived enjoyment as a behavioral belief into the research model. Moreover, it is criticized that TPB only contains social norm construct for a normative belief (Jay Zeal, Smith, & Scheepers, 2010), and we included two constructs namely informational influence and value expressiveness to enrich the normative belief.

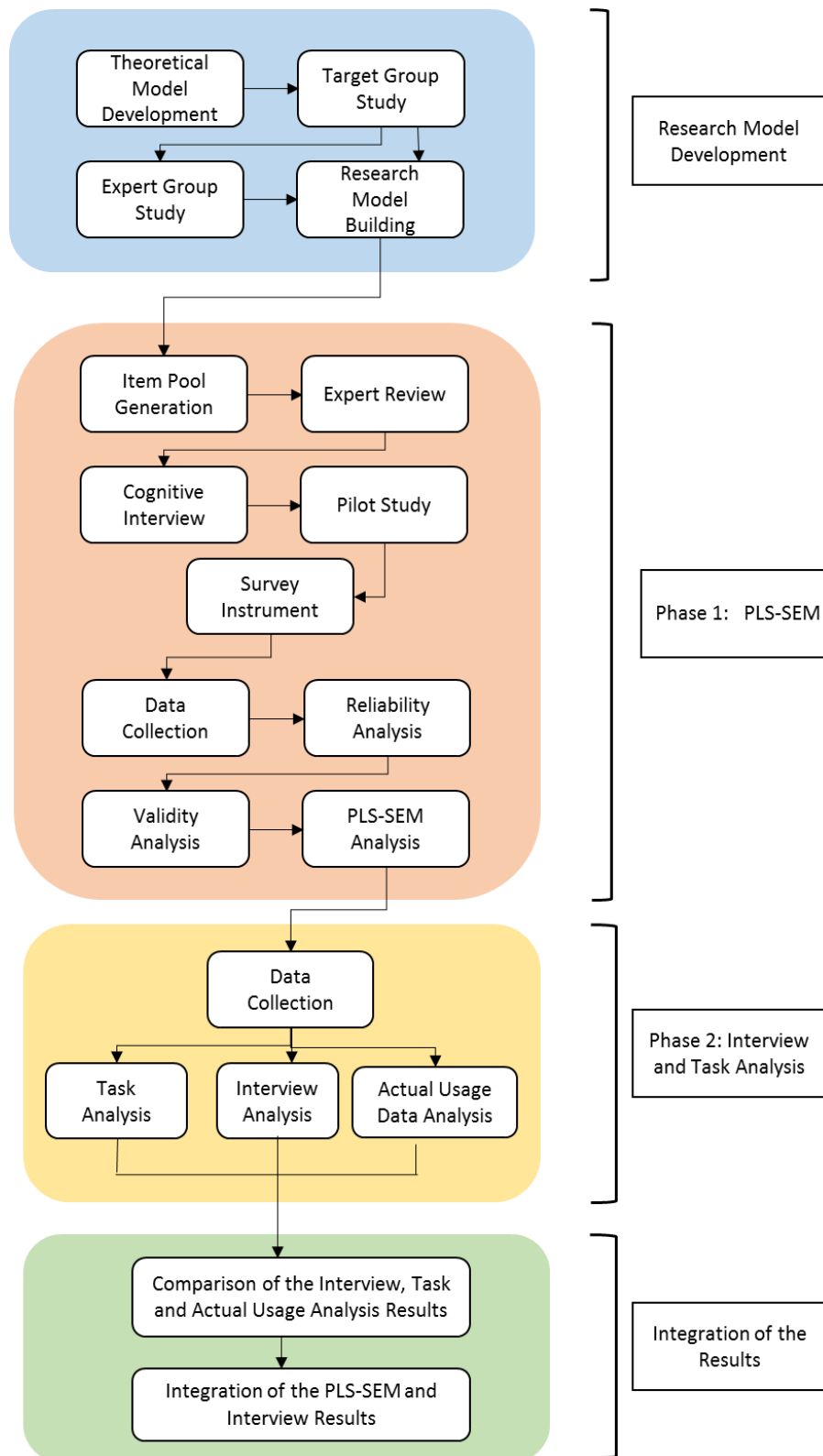


Figure 3 Design of the Study

Thirdly, the usage behavior was measured with the actual usage data in this study. One of the main drawbacks of the technology adoption studies is the lack of objective measure for usage behavior (Benbasat & Barki, 2007). The self-reported questionnaires were used to measure the actual usage behavior. According to Straub and Burtons-Jones (2007), objective measures such as computer logs for usage behavior provides more precise results. In order to overcome this shortcoming, we measured the actual service use with the actual service usage data obtained from the log files.

Finally, a sequential mixed methods research design provides gain rich insight about the e-service usage intention. The quantitative method enables us to examine the structural relationships related to the adoption of the e-service. However, the quantitative data alone might not be adequate to gain a complete comprehension of the e-service adoption. Therefore, we need to combine the quantitative and qualitative data to understand the adoption of e-services deeply. The qualitative data help us to understand the phenomenon from the viewpoint of the subjects (Creswell & Clark, 2011). Moreover, the qualitative data allow us to obtain a comprehensive and detailed understanding about the beliefs (behavioral, normative and control beliefs) of users related with the adoption of the e-service. In this regard, the qualitative data collection and analysis complemented the findings of the quantitative study (Creswell & Clark, 2011; Johnson & Turner, 2003).

1.5 Thesis Outline

The remainder of the thesis is organized as follows. Chapter 2 presents a theoretical background. In this chapter e-service, and technology adoption models are presented. Then, an overview of previous studies on e-service adoption is given. Finally, limitations of existing studies are discussed.

We dedicated the Chapter 3 for the research model. In this chapter, the proposed theoretical model is presented. Then, the external salient beliefs and belief type of the constructs are determined with target and expert group studies. Finally, the process of research model building is given.

In Chapter 4, research design of the study is presented. Instrument development process is given, and the data collection and analysis steps of the Phase1 are presented. Then, participant selection and data collection procedure, and data analysis of Phase2 are given.

The findings of this thesis are given in Chapter 5. First, the results of the quantitative analysis are presented. Then, results of the interview and task analysis are given. Second, the results of quantitative and qualitative analyses are integrated and similarities and differences are discussed. Finally, the findings of this study are discussed and compared with the existing studies in the technology adoption domain.

Chapter 6 outlines the summary and the implications of the findings for researcher and practice. Limitations and recommendations for future works are also discussed in this chapter.

CHAPTER 2

LITERATURE

This chapter provides a review of literature related to this study. The literature review is explained in six main sections: (1) e-service: definition, components, and types (2) adoption of new technologies (3) technology adoption models and theories (4) user satisfaction (5) an overview of previous studies on e-service adoption, (6) limitations of existing studies.

2.1 Electronic Service: Definition, Components and Types

Electronic Service (E-Service) was defined as the “provision of a service over electronic networks” by Rust and Kannan (2002, p. 4). These electronic networks include internet, wireless network, and electronic environment (ATM, kiosk, smart card network). However, this definition only emphasizes the delivery.

Hofacker, Goldsmith, Bridges, and Swilley (2007) included the process, outcome and delivery aspects of e-service, and defined an e-service as “an act or performance that creates value and provides benefits for customers through a process that is stored as an algorithm and typically implemented by networked software” (p. 16).

Moreover, Jian, Liu, and Mingins (2012) investigated the existing definitions of e-service in literature, and extended the definition of Hofacker et al. (2007) as

An e-service is an act or performance that creates value and provides benefits for customers through a process that integrates stored algorithms and other (manual) processes, normally in an interactive manner and significant portions of the e-service typically implemented by networked software. (p. 214)

In addition to process, outcome, and delivery, the definition of Jian et al. (2012) covers the properties of e-service, and the role of the ICT.

E-service is a customer-centric term, and meeting the needs of customer is an essential success factor of an e-service. In addition, the revenue of e-service is mainly based on profit from customer relationships and service enhancement (Rust & Kannan, 2003).

As depicted in Figure 4, an e-service consists of three main components: a service supplier, a service delivery channel, and service receivers (Rowley, 2006). Service supplier is an organization that may be private or public, and provides a service through a channel (such as internet, mobile phone, public kiosk) to receivers (customers, citizens, and business). A service provider can be a receiver of another supplier. For example, public organizations are provider of Government-to-Citizen (G2C) e-services, and they also receive services from Business-to-Government (B2G) e-services.



Figure 4 Components of e-Service

E-Services can be provided in three types: complementary, substitutes, and uniquely new e-services (Hofacker et al., 2007). Complementary e-services enrich the existing goods or offline services. For example, several courier companies offer an e-service to track the package online. Moreover, some firms provide substitute e-service for offline services. Substitute e-services provide advantage in terms of reduced cost, increased availability, and additional options (i.e. more color and size). For example, online bookstores provide book review, and make recommendations based on the user profile or purchase history to help book selection process. Furthermore, completely new e-services (i.e. online games) that cannot be offered with the current offline services are developed to meet the needs and expectations of the users.

E-services offer several advantages to the users such as time and cost efficiency, therefore, demand for e-services has been increased. Moreover, electronic networks utilize the service provision and enrich the customer relationship management. Therefore, organizations transform their service components to the e-service (Rust & Kannan, 2002). This transformation is carried out in three manners. Firstly, physical products are transformed into the service products, and distributed through electronic networks. For example, online music and software subscription become more popular. Secondly, intermediary services, such as e-book companies, are created to meet the demand of service products. Moreover, some firms outsource their e-service to application service provider. Finally, e-services are created as new markets such as e-Bay, and Skyscanner.

In parallel with the developments in IT domain, e-services have become widespread. However, the e-service usage rate has not yet reached a sufficient level. Identifying the needs of the users is an important stage in the service development process. The services developed without given proper attention to this stage have difficulty in achieving success. Therefore, identifying the factors that influence users' attitude towards the use of e-service and developing e-service in accordance with these findings are two essential issues.

In the following sections, adoption of new technologies, the models developed to identify the adoption process and previous studies on e-service adoption are presented.

2.2 Adoption of New Technologies

Technology adoption is defined as a “process that begins with awareness of the technology and progresses through a series of steps that end in appropriate and effective usage” (BridgestoTechnology, 2005). In the context of e-service, adoption can be defined as a process that begins with awareness of the e-service and progresses through a series of steps that end in appropriate and effective usage of e-service.

New technology implementation is a complex phenomenon in that it contains technology, people, society, and an environment that is constantly changing. Generally, the studies that investigate the technology adoption focus on one or two of these dimensions. However, ignoring the effect of other dimensions from the adoption procedure may lead misconceptions. Therefore, adoption studies should integrate personal characteristics, culture, social environment, government policy makers, system characteristics, IT developers (Figure 5). They have a strong bond and could affect each other.

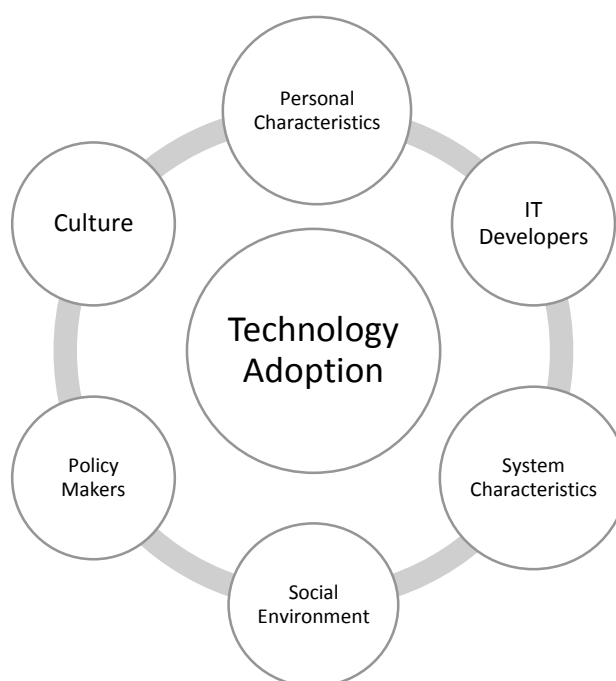


Figure 5 Dimensions of Adoption Research

2.2.1 Stages of Adoption

There are some studies that examine the stages of the adoption. Schwarz and Chin (2007) conducted a research to interpret the meaning of psychological acceptance of IT with etymological approach. They found five dimensions of the acceptance.

1. **Receive:** It is a psychological stage in which technology is taken without questioning.
2. **Grasp:** In this stage, intentionality of the technology is understood completely.

3. **Assess:** The value and desirability of the technology to the user is evaluated in this stage.
4. **Be given:** In this stage, users are ready to adopt their routines to what was required by the technology.
5. **Submit:** It is a psychological stage in which the user surrenders intentionality of the technology.

Moreover, Segerstahl (2008) conducted a qualitative research that investigated the users' adoption of cross media fitness system for three months period. She identified three user experience processes.

1. **Absorption:** is a process that leads to adoption.
2. **Evaluation:** is a process that leads to acceptance.
3. **Settling:** is a process that leads to utilization.

2.3 Technology Adoption Models

User acceptance of technology is defined as "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support" (Dillon & Morris, 1996). There are several models that analyze the users' adoption of the technologic evolution in the literature. Technology Acceptance Model (TAM) developed by Davis (1989) is a most known model for evaluating the attitude towards information technology. Another model is Unified Theory of Acceptance and Use of Technology (UTAUT) that was developed by Venkatesh et al. (2003) through reviewing the current technology acceptance literature. Furthermore, Diffusion of Innovation (DOI) that is based on sociology developed for the acceptance of innovation rather than technology acceptance (Rogers, 1995). While determining the acceptance of a specific technologic products or applications such as e-services or e-learning, these models are taken as a base. Then, some domain specific dimensions might be added to the model.

2.3.1 Technology Acceptance Model

Technology Acceptance Model (TAM) was developed by Davis (1989). The basics of TAM come from psychology. Theories that are analyzing the attitude of people were developed in psychology field and they are used in other disciplines. TAM based on the Theory of Reasoned Action (TRA) developed by Ajzen and Fishbein (1980). TAM is one of most preferred theory for empirical research in information systems literature (Fu, Chao, & Farn, 2004).

TAM evaluates the users' intention to use and behavior towards the technology base on the two constituent (see Figure 6). These are the perceived ease of use and perceived usefulness. Davis (1989) defined the perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). Moreover, the perceived ease of use was defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320). Attitude is a reflection of the results come from the perceived ease of use and perceived usefulness of

the technology. Behavioral Intention is an indication of an individual's preparedness to perform a given behavior.

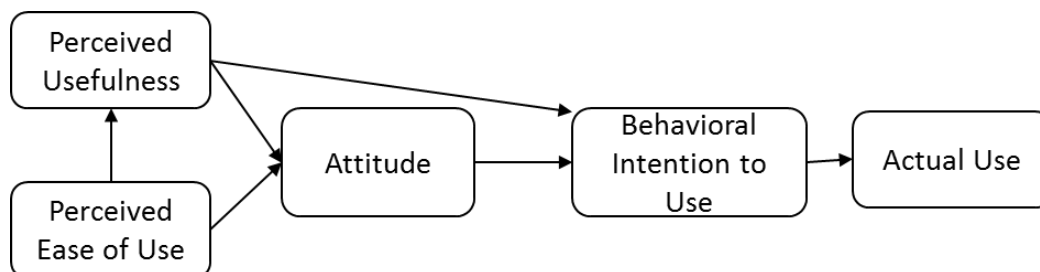


Figure 6 Technology Acceptance Model

Venkatesh and Morris (2000) extended the TAM, and developed the Technology Acceptance Model 2 (TAM 2). In TAM2, the factors affecting the perceived usefulness were investigated and the attitude was removed from the model. Five components: subjective norm, image, job relevance, output quality, and results demonstrability were added to the model. Subjective norm has an impact on the perceived usefulness and behavioral intention to use. In addition, voluntariness and experience were added to the model as a mediator.

Moreover, Venkatesh and Bala (2008) elaborated the TAM3, and investigated the antecedents of the perceived ease of use. They included the computer self-efficacy, perceptions of external control, computer anxiety, and computer playfulness, objective usability constructs to the model.

2.3.2 Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003) examined the existing models and theories in the literature, and developed Unified Theory of Acceptance and Use of Technology. This model includes the performance expectancy, effort expectancy, social influence, and facilitating conditions constructs (see Figure 7). In this model, the behavioral intention is predicted by the social influence, effort expectancy and performance expectancy constructs. Moreover, the facilitating conditions and behavioral intentions are determinant of the behavior. In addition, moderators: gender, age, experience, and voluntariness of use are involved in the model. The impact of the effort expectancy and performance expectancy on the intention are moderated by age and gender. The experience and age moderate the relationship between the facilitating condition and intention.

2.3.3 Theory of Planned Behavior

Theory of Planned Behavior, an extension of TRA, clarifies the human behavior. Figure 8 represents the constructs of TPB. Ajzen (1991) stated that each behavior has diverse normative, behavioral and control beliefs, and the attitude, subjective norm and perceived behavioral control behavioral shape the behavioral intention. Furthermore, the actual use is formed by the behavioral intention and perceived behavioral control.

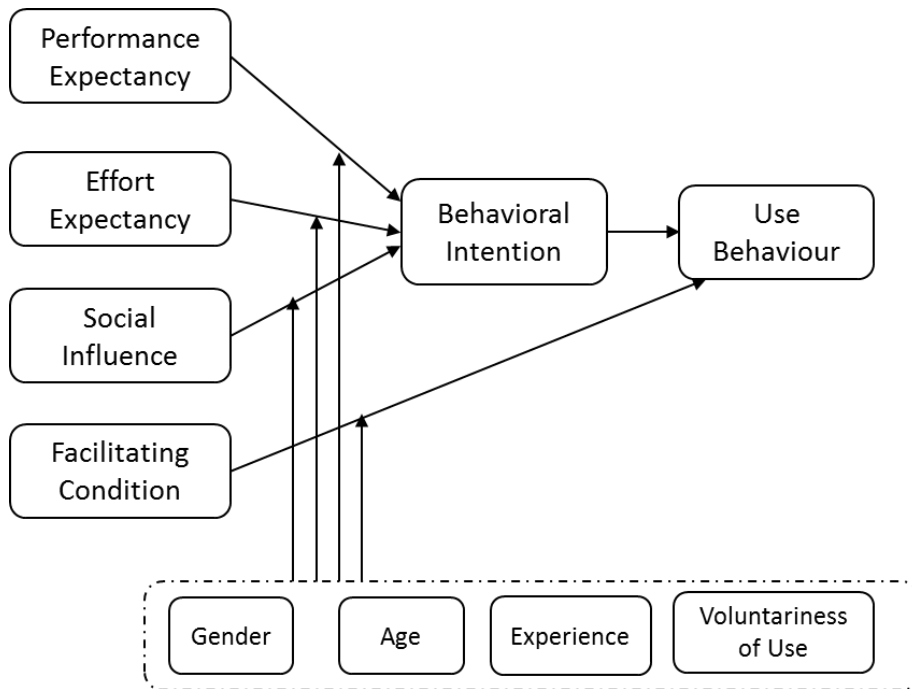


Figure 7 Unified Theory of Acceptance and Use of Technology

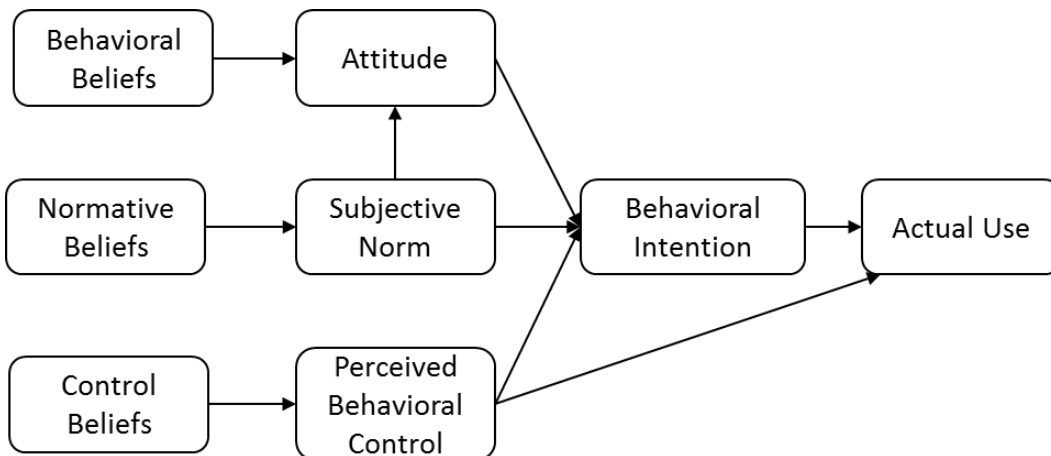


Figure 8 Theory of Planned Behavior

2.3.4 Diffusion of Innovation Theory

Rogers (1995) investigated the adoption of an innovation, and formed Diffusion of Innovation (DOI) theory. DOI is based on sociology and explains dissemination of a new technology. Rogers (1995) stated that the innovation, social system, time, and communication channels are the four elements that affect the diffusion of a new technology or idea. As depicted in Figure 9, DOI theory includes five factors: relative advantage, compatibility, complexity, observability, and trialability. These factors are the characteristics of the new technology or idea, and affect the adoption decision of an individual. Moreover, Moore and Benbasat (1991) developed a scale that measures the adoption of an IT innovation, and expanded the theory with the voluntariness of use, image, results demonstrability, and visibility factors.

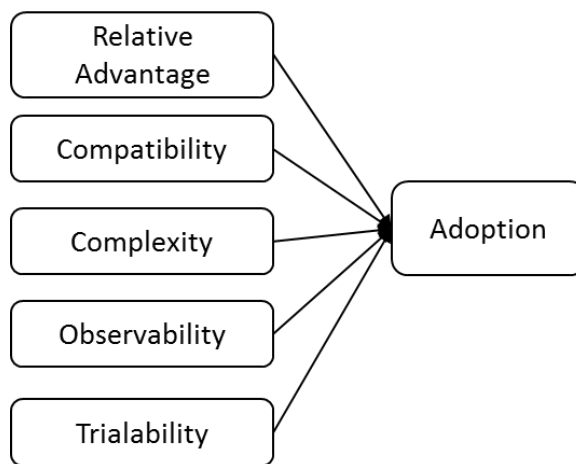


Figure 9 Diffision of Innovations Theory

2.3.5 Review of Technology Adoption Models

This part provides an outline of the literature related to the technology adoption models. It follows a structured approach that shed light on to the formulation of the research model. The most cited and approved theories and models in the literature: TRA, TPB, TAM, TAM2, TAM3, and UTAUT, were analyzed. The theories and models were examined in terms of the factors in the models, their dependent variables, and relationship between the factors and intention (Table 1). Twenty-four factors were investigated. Some factors refers to almost same concept but named differently. Major dependent variables are behavior, behavioral intention, perceived usefulness, perceived ease of use, and subjective norm.

From the viewpoint of relationship between factors and intention, three different effects were identified: direct, mediating and moderating effect. Direct effect means that a causal relationship exists between the dependent and independent variable and a variance in the independent variable causes predictable variance to the dependent variable. The mediating effect indicates that a third variable is necessary for establishing a causal link between an independent and a dependent variable and causality becomes weak when the third variable is absent. The moderating effect represents that a third variable is acting catalytically on

the causal relationship between an independent and a dependent variable, blocking, or enhancing the causality between them. Without the moderator, the causal link exists but it lacks of robust interpretation and can guide to ambiguous conclusions. UTAUT, TAM2 and TAM3 include moderators in the model. These moderators are gender, age, experience, and voluntariness.

Table 1 Technology Adoption Theories and Models

Model	Factors	Dependent Variable	Relationship with Intention
TRA	Behavioral Intention	Behavior	-
	Attitude Toward Behavior	Behavioral Intention	Direct Effect
	Subjective Norm	Behavioral Intention	Direct Effect
TBP	Behavioral Intention	Behavior	-
	Attitude Toward Behavior	Behavioral Intention	Direct Effect
	Subjective Norm	Behavioral Intention	Direct Effect
	Perceived Behavioral Control	Behavioral Intention	Direct Effect
TAM	Behavioral Intention to Use	Actual System Use	-
	Perceived Usefulness	Attitude Towards Use / Behavioral Intention to Use	Direct Effect
	Perceived Ease of Use	Attitude Towards Use	Mediating Effect
	Attitude Towards Use	Behavioral Intention to Use	Direct Effect
TAM2	Intention to Use	Usage Behavior	-
	Perceived Usefulness	Intention to Use	Direct Effect
	Perceived Ease of Use	Intention to Use	Direct Effect
	Subjective Norm	Perceived Usefulness	Mediating Effect
		Intention to Use	Direct Effect
	Image	Perceived Usefulness	Mediating Effect
	Job Relevance	Perceived Usefulness	Mediating Effect
	Output Quality	Perceived Usefulness	Mediating Effect
	Result Demonstrability	Perceived Usefulness	Mediating Effect
	Experience	Subjective Norm	Moderating Effect
Voluntariness	Subjective Norm	Moderating Effect	
TAM3	TAM2 factors + bellows		
	Computer Self Efficacy	Perceived Ease of Use	Mediating Effect
	Perception of External Control	Perceived Ease of Use	Mediating Effect
	Computer Anxiety	Perceived Ease of Use	Mediating Effect
	Computer Playfulness	Perceived Ease of Use	Mediating Effect
	Perceived Enjoyment	Perceived Ease of Use	Mediating Effect

Table 1 (cont.)

	Objective Usability	Perceived Ease of Use	Mediating Effect
UTAUT	Behavioral Intention	Behavior	-
	Performance Expectancy	Behavioral Intention	Direct Effect
	Effort Expectancy	Behavioral Intention	Direct Effect
	Social Influence	Behavioral Intention	Direct Effect
	Facilitating Conditions	Behavior	Direct Effect
	Gender	Performance Expectancy Effort Expectancy Social Influence	Moderating Effect
	Age	Performance Expectancy Effort Expectancy Social Influence Facilitating Conditions	Moderating Effect
	Experience	Effort Expectancy Social Influence Facilitating Conditions	Moderating Effect
	Voluntariness of Use	Social Influence	Moderating Effect

2.4 User Satisfaction

User satisfaction is defined as extent to which expectations of user is meet by supplied service or product (Bhattacharjee, 2001). Success of e-services depends on the usage rate, and satisfaction is an important indicator of the user behavior (Liljander, Riel, & Pura, 2002). When users are satisfied with the provided service or product, they tend to continue to use it. Therefore, studies have been conducted to identify the factors that affect user satisfaction. In this section, two essential models: Service Quality Model and KANO Model that explain the user satisfaction are explained.

2.4.1 Service Quality Model

Service Quality (SERVQUAL) model that was developed by Parasuraman, Zeithaml, and Berry (1985) is based on the perception gap between the received service quality and the expected service quality. It is composed of ten components: reliability, responsiveness, competence, understanding/knowing the customer, access, courtesy, communication, credibility, security, and tangibles. Then, they modified the models and these components were collapsed into five dimensions: reliability, assurance, tangibles, empathy, and responsiveness (Parasuraman, Zeithaml, & Berry, 1988).

Service quality has been widely applied in e-service domains. A majority of studies that investigated the e-service quality view the satisfaction as an antecedent of the quality (Ribbink, Van Riel, Liljander, & Streukens, 2004). Finn (2011) conducted a research with 20 consumers and 20 online retailer web sites combinations to identify the e-service quality factors that affect customer satisfaction. The consumers visited one web site per day, used

the site, and answered the questions. They conducted a factors analysis and identified four factors: functionality, compliance, professionalism, and communality.

Moreover, Rowley (2006) conducted a literature survey that analyzed the e-service quality studies. Table 2 lists the most frequently used factor in the e-service literature. The site features, security, and accessibility were the mostly used factors at the e-service quality studies.

Table 2 Most Frequently Used Factors

Factor	Total number of studies citing a dimension
Site features	25
Security	24
Communication	8
Reliability	13
Customer support	5
Responsiveness	15
Information	10
Accessibility	13
Delivery	7
Personalization	7

There are some doubts about the applicability of the ServQual model and factors to the e-service domain. According to the Tate and Evermann (2010), ServQual is not a sufficient model for explaining the e-service perception due to its face-to-face origin and development before internet age. Therefore, researcher should be carefully use ServQual model and its factors in their research.

2.4.2 KANO Model

KANO model tries to explain how customer satisfaction will change as the firms meet customer requirements (Berger et al., 1996). This model groups the product and service attributes under five categories based on the their shape of the response functions: attractive, one-dimensional, must-be, indifferent and reverse (Sauerwein, Bailom, Matzler, & Hinterhuber, 1996). Figure 10 represents the Kano customer satisfaction model. The horizontal axis of the graph shows how much success is gained by meeting the customer needs for the product or service. The vertical axis shows the degree of customer satisfaction for the product or service. According to the model, fulfillment of the basic (must-be) needs does not increase the customer satisfaction, however, if these needs do not be met the customer becomes dissatisfied. Moreover, fulfillment of the performance (one-dimensional) needs increases the customer satisfaction. In addition, absence of excitement (attractive) attributes does not cause dissatisfaction, and if they provided customer will be delighted.

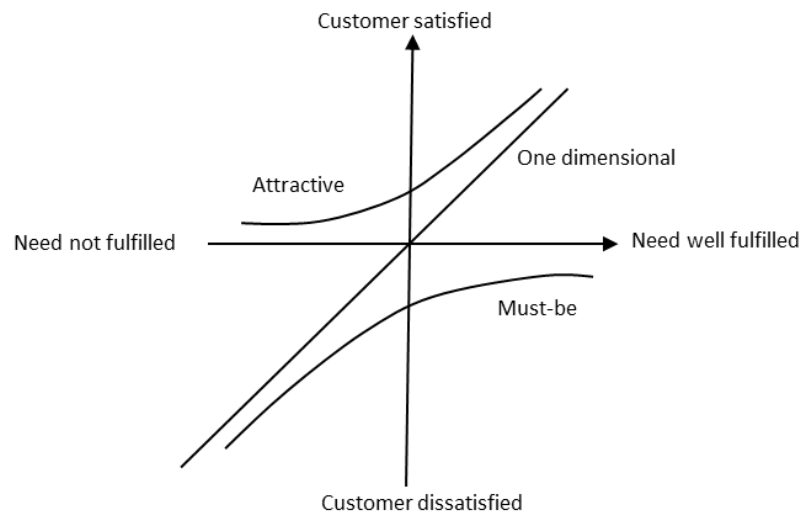


Figure 10 KANO Customer Satisfaction Model ³

2.5 Overview of the Previous Studies on E-Service Adoption

E-Services can be grouped according to the provider and user of the services: business to consumer e-services and government to citizen e-services.

2.5.1 Business to Customer (B2C) e-Service Adoption

Parallel to the expansion of the internet usage, many organizations began offering electronic services to their customer. While some of these services are offered as an alternative to traditional services, some services are offered only electronically. Although e-services provide customer with service from everywhere and every time, e-service usage rate could not reach an efficient level. In order to understand the reasons behind the adoption, studies have been conducted.

One of the factors that affect e-service usage is perceived risk. Featherman et al. (2010) conducted a research that investigated the effect of the privacy risk on e-service adoption. Four hundred nine subjects used computer simulated demonstration software of a financial bill payment e-service. Then, they filled the questionnaire. Results showed that privacy risk decreased consumer intention to use the e-service and perceived ease of the e-service. In addition, De Ruyter, Wetzels, and Kleijnen (2001) investigated adoption of electronic travel system on a sample of 202 users. A questionnaire was used for the data collection. They found that perceived risk, organizational reputation, and relative advantage had significant effect on behavioral intention.

Self-efficacy is another factor related with e-service adoption. Hsu and Chiu (2004) conducted a research to find relationships between self-efficacy and e-service usage. They divided the self-efficacy to two: general Internet self-efficacy and Web-specific self-efficacy.

³ Source: Berger et al. (1996)

They collected data via questionnaire from 239 subjects. Results showed that both internet and web-specific self-efficacy affect the intention to use e-service.

In addition, satisfaction is examined to clarify its effect on behavioral intention. Carlson and O’Cass (2010) investigated the relationships among e-service quality, consumer satisfaction, attitudes towards the web site, and behavioral intentions. Data were collected with online questionnaire from 518 professional sport service users. They found positive relationships among the e-service quality, consumer satisfaction, attitudes towards the web site, and behavioral intentions. Moreover, Gounaris, Dimitriadis, and Stathakopoulos (2010) conducted interviews with 210 e-service users. They found that e-service quality and e-service satisfaction affected the satisfaction from the e-service. Furthermore, relationship between e-service quality and behavioral intention was stronger than relationship between satisfaction and behavioral intention.

Zhou (2013) examined the factors that affect the adoption of location based services. He followed a dual perspective approach, and investigated the enablers and inhibitors of e-services. Data were collected from the 278 users of a service outlets located in China. The findings indicated that the perceived usefulness and trust enable users to use location-based services whereas privacy risk frustrated them. This study also showed that the contextual offering affects both perceived usefulness and trust, and privacy concern affects trust and privacy risk. In addition, the mediation effects of trust, privacy, and perceived usefulness were analyzed, and the partial mediating effect of trust and perceived usefulness on the relationship between the contextual offering and intention to use location-based services was revealed.

Social influence is a controversial construct in the technology adoption domain. Some studies showed a significant relationship between social influence and intention use a new technology, whereas some of them did not (V Venkatesh et al., 2003). Zeal, Smith and Scheepers (2012) conducted a study to conceptualize the social influence construct in ubiquitous computing era. They reviewed the literature and examined the studies that include the social influence. Then, they conducted interviews with two groups: organizational group (8 participants) and general group (14 participants). They identified four types of influences: normative, informative, value expressive and relationship centered. Moreover, their results indicated that the direction of social influence is bidirectional, and the users may be the sender or receiver of the social influence. In addition, they revealed that the social influence might have positive or negative effect on the intention.

Task type is another component of technology adoption. Pavlou and Fygenson (2006) developed a model that predicts the online consumer adoption. They investigated two task types: getting information and purchasing a product. They identified the factors that have an impact on the intention to use e-services via belief elicitation approach. Then, they developed the research model based on these salient beliefs. They conducted a survey and tested the research model with the partial least square analysis. The results indicated that the intention to purchase had a positive impact on intention to getting information. In addition, the getting information behavior significantly affected the purchasing behavior.

Moreover, their findings revealed that technological characteristics (download delay, information protection, and website navigability), product characteristics (product diagnosticity and value), consumer resources (time and money), and consumer skills were determinants of online consumer behavior.

Moreover, Fang, Chan, Brezezinski and Xu (2006) investigated the moderating effect of the task type on the intention to use handheld devices. They compared three task types: the general task, transactional task and gaming task. They proposed a research model that examined the adoption of wireless technology and composed of four constructs: the perceived usefulness, perceived ease of use, trust, and perceived playfulness. In this study, they identified 12 tasks (6 general tasks, 5 transactional tasks, and 1 gaming task) and built a scenario for each task. Then, they designed the scripts that contain the screen shots of each step. Data were collected from 101 subjects. First, the participants read the scenario and completed the task script. Then, they evaluated the task via the questionnaire that contains the 12 items for the constructs and a question related with the intention to use. This procedure was repeated for the 12 tasks. They conducted multiple regression analysis to test the hypotheses and found that intention to carry out general tasks was affected by the perceived usefulness and ease of use. Moreover, the perceived usefulness and security had an effect on the intention to carry out transactional tasks, whereas the perceived playfulness had an impact on intention to play games.

Zhou (2011) conduct a study to examine the drivers of the mobile internet continue usage. He developed a research model based on UTAUT and flow theory. The dependent variables of this study were the satisfaction and continuance usage. Data were collected from the students of two universities located in China. The results indicated that the satisfaction, performance expectancy, social influence, facilitating conditions, and perceived enjoyment were the essential drivers of the continuance usage of mobile internet. Moreover, performance expectancy, social influence, and attention focus had a significant effect on the satisfaction, and satisfaction fully mediated the impact of effort expectancy on the intention.

Liu and Forsythe (2011) investigated the moderating role of the adoption duration in online shopping, and developed a research model based on UTAUT. The dependent variable of the study was the online purchase intensity, and the independent variables were the performance expectancy, product risk, and facilitating conditions. Moreover, the purchase intensities of the early and late adopters were compared in the study. The results showed that factors that affect the online shopping were different for early and late adopters. The early adopters were influenced by the functional performance and internet usage at home, whereas the late adopters were influenced by product risk, hedonic performance, and internet at work.

AlHinai, Kurnia and Johnston (2007) conducted a meta-analysis to identify the factors that affect the individuals' adoption. They examined the studies between 2000 and 2006. Table 3 summarized the factors that were used more than four studies and the results of the studies. It is seen that ease of use, subjective norm, and service cost were the most

frequently used factors. However, mixed results were found for these factors. Some researchers found the effect of these factors on adoption whereas some did not found.

Table 3 Meta-Analysis Results

Factor(s)	Number of studies	Comments
Ease of use, complexity, effort expectancies	10	Mixed results were found
Subjective norm	10	Mixed results were found
Service cost	9	Mixed results were found
Usefulness, performance expectancies	6	Direct/indirect effect on Intentions was found
Behavioral Control (self-efficacy, facilitating conditions, etc.)	6	Mixed results were found
Trust, Risk, Security	6	Mixed results were found
Enjoyment, playfulness	5	Direct/indirect effect on Intentions was found
Contents and functions availability and quality	5	Direct/indirect effect on Intentions was found
Compatibility, prior experience, relevant past knowledge	5	Mixed results were found
Triability, exposure to service through marketing	5	Mixed results were found

2.5.2 Government to Citizen (G2C) e-Service Adoption

In many countries, governments have started to offer public e-services. While some citizens get benefit from online public services, others prefer to receive public services in a traditional face-to-face way. One of the reasons for this situation is the digital divide problem. Not all citizens of the society are computer literate and benefit from the ICT equally. In addition, for citizens it is not easy to give up their daily habits. Moreover, awareness is an important factor and citizen should be informed about the e-government services via brochure, TV, and radio advertisements. Finally, security and privacy concerns are other important reasons for low adoption rate. Citizens may have a suspicion about safety of their personal data.

Despite the ever-increasing expansion and use of ICTs in the government sector, there does not seem to be sufficient literature on the topic focusing on e-government evaluation, particularly based upon citizen perspectives. As discussed by Wang, Bretschneider, and Gant (2005), "little effort has been placed in evaluation of government service provided through the Web" (p. 129). In order to identify awareness and acceptance of citizens

related with e-government applications, the factors that affect the usage of this new technology should be revealed.

In recent years, studies have been conducted to clarify which factors affect the users' e-government adoption. Results showed that perceived ease of use (Hamner & Qazi, 2009; Hung, Tang, Chang, & Ke, 2009) and perceived usefulness (Fu, Farn, & Chao, 2006; Hung et al., 2009) positively correlated with attitudes using e-government. Individual factors such as gender and age were also investigated and found effective on acceptance (Gupta, Dasgupta, & Gupta, 2008; Hamner & Qazi, 2009). Risk is another dimension that affects the peoples' behavioral intention about e-government usage (Dimitrova & Chen, 2006; Horst, Kuttschreuter, & Gutteling, 2007; Hung et al., 2009). Subjective Norms that is influence of the other people and media on the e-government acceptance is significantly affected the citizen's attitude (Fu et al., 2006; Hung et al., 2009; Ramayah, Yusoff, Jamaludin, & Ibrahim, 2009).

2.6 Limitations of Existing Studies

Limitations of the previous studies are discussed below.

- a. **Lack of qualitative study:** One of the limitations of the existing technology adoption research is the lack of qualitative research. Cetin, Kanat, and Özkan (2012) conducted a systematic review that analysis e-government adoption papers published between 2000 and 2010 at SCI or SSCI indexed journals. All of the studies used qualitative method (questionnaire) and only one of them integrate focus group interview to the study. However, standalone qualitative research method is not sufficient to analyze the related factors in every respect. Lee (1991), Stone (1990), and Coghlan (2004) concerned about lack of interpretive and mixed method research. Therefore, studies that combine the qualitative and the quantitative methods are needed.
- b. **Lack of longitudinal studies:** The main limitations of the studies are not being longitudinal research (Benbasat & Barki, 2007). We need to know the adoption procedure beginning from the first meeting with the new technology. Then compare it when the users gain expertise in time to time. Tyre and Orlikowski (1994)(1994) stated that use of the system might alter in time progressively. Moreover, studies have been conducted to identify the adoption stages. Schwarz and Chin (2007) defined five dimensions of the psychological acceptance. In addition, Segerstahl (2008) identified three phases of user experience process. These studies analyzed the qualitative data. There is a need for quantitative research to understand the system acceptance process with a longitudinal research.
- c. **Repetitious models:** Other limitation is that researchers take one or two model as a base and adds some domain specific factor to them. Generally, researchers choose one model and add new factors to it. This give rises to great amount of model that

investigates the attitude of the people to the new technology (Benbasat & Barki, 2007).

- d. **Lack of actual usage data analysis:** Lack of real usage analysis is another gap in adoption research. Generally, self-assessment method is used while investigation of the behavior, behavioral intention to use, and attitude towards use. Actual usage data such as Google analytics, system logs could be used to examine the behavior (DW Straub & Burton-Jones, 2007).
- e. **Variations in reporting findings:** While there is a shared method in the literature on model development and data collection, the same however cannot be said for the reporting of results. There are several discrepancies in reporting practices even among the articles that share the same statistical method. The reported information usually does not enable independent verification by other researchers. Furthermore, the tests regarding reliability, validity and data requirements are presented in different manner. Consequently, lack of common practice shed light to the reliability of the findings.

Straub, Boudreau, and Gefen (2004) provide guidelines for conducting and reporting statistical analysis in IS. They present data requirements of various statistical methods, heuristics on interpreting results of those methods, and guidelines for reporting the results for IS researchers. We believe that the adoption of such guidelines will improve the quality of research. In addition, results presented in such manner will be comparable across studies.

CHAPTER 3

RESEARCH MODEL DEVELOPMENT

This section presents the progressive development of the research model for e-service adoption. As shown in Figure 3 in Section 1.4, the first step of this study was the research model development. This step includes the theoretical model development, target study, expert group study, and research model building sub-steps.

It is crucial to develop field specific models based on a theory that explores the ground of the behavior (V Venkatesh & Brown, 2001). Therefore, behavioral science theories in the literature were analyzed, and the Theory of Planned Behavior (TPB) was found suitable to e-service behavior research due to its improvable structure. This research mainly based upon the TPB, and the factors influencing the e-service adoption were determined according to the guidance of Ajzen (1991). Involving the actual user of the system to the model development brings about more accurate and efficient results. Therefore, external salient beliefs were identified with the actual users. Moreover, domain experts identified which belief type is related to each specific construct. Consequently, final version of the model was presented as depicted in Figure 12.

3.1 The Theory of Planned Behavior

TPB is a primary and frequently used theory in the behavioral research (Ajzen, 1991) . The principal factor in the TPB is the individual's intention to perform a given behavior. Ajzen (1991) stated that three types of drivers: motivational factors, non-motivational factors and intention, lead the behavior. Motivational factors indicate the power of will to try and the required effort intended to use. Non-motivational factors include the availability of the requisite, opportunities and resources (such as, skills, time and money). In addition, the intention encapsulated the motivational factors.

Ajzen (1991) stated, "behavior is a function of salient information, or beliefs, relevant to the behavior" (p 189). Belief denotes the information that an individual has about the impending behavior (i.e. service use in the e-service domain). Moreover, Ajzen (1991) grouped beliefs under three types in the TPB: behavioral beliefs, normative beliefs and control beliefs. Definition of each belief type is given in Table 4. Each belief type keeps different information about the system use (i.e. e-service use). During the behavior

formation, all of the belief types influence the behavior but with varying weight or importance. In the behavior prediction studies, these three beliefs are considered altogether.

Table 4 Belief Types and Definitions

Belief type	Definition
1. Behavioral Beliefs	“Behavioral Beliefs link the behavior of interest to expected outcomes. A behavioral belief is the subjective probability that the behavior will produce a given outcome” (Ajzen, 2006).
2. Normative Beliefs	“Normative Beliefs refer to the perceived behavioral expectations of such important referent individuals or groups as the person's spouse, family, friends, and depending on the population and behavior studied- supervisor, employer, and coworkers.” (Ajzen, 2006).
3. Control Beliefs	“Control beliefs have to do with the perceived presence of factors that may facilitate or impede performance of a behavior.” (Ajzen, 2006).

TPB has favorable features compared to the other behavior models such as examining the behavior in a primary manner, simple-structured and open for improvement. Moreover, the TPB is suitable for explaining voluntary behaviors i.e. e-service usage. Benbasat and Barki (2007) suggested the TPB as a theoretical grounding and extension of the salient beliefs for adoption research. Moreover, IS researchers used the TPB as a guiding framework to explain the user behavior. The Decomposed TPB (S. Taylor & P. A. Todd, 1995) and Model of Adoption of Technology in Household (MATH) (Brown & Venkatesh, 2005; V Venkatesh & Brown, 2001) models were built upon the TPB and belief structures were decomposed. Therefore, TPB was selected as a ground for this e-service usage research, and the decomposed belief structures were developed for e-service adoption.

3.2 Proposed Theoretical Model

In order to comprehend the e-service use thoroughly, a model that covers all belief types is needed. A theoretical model based on the TPB was proposed to fulfill this need. Figure 11 represents the proposed theoretical model and relationships of its components.

In this model, behavioral belief is divided to two factors: functional and affective factors. Functional factors “capture the individual’s perceptions concerning the functionality of the system in question and his beliefs that using the system will have job-related or, in general, utilitarian outcomes.” (Karaiskos, 2009, p. 61). Affective factors “capture the emotional response associated by an individual with system usage concerning

feelings of joy, and pleasure, or in the other hand feelings of depression, disgust, displeasure, and hate” (Karaïskos, 2009, p. 61) . Most of the models such as TAM, TPB, TAM2, and UTAUT in the acceptance and adoption literature except TAM3 (V. Venkatesh & Bala, 2008) only investigates the behavioral beliefs from functional factor perspective. They do not cover the affective factors. One of the main drawbacks of the TPB based models is lack of emotions (Benbasat & Barki, 2007). In order to fill this gap, affective factors were included in the model.

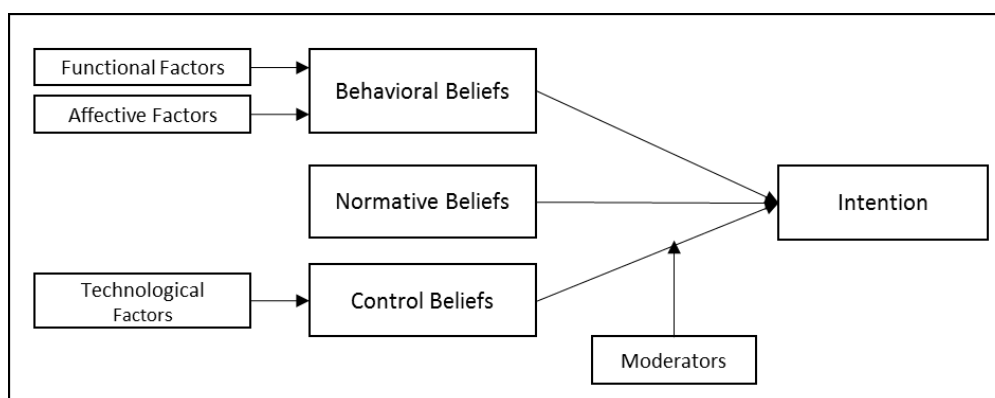


Figure 11 Proposed Theoretical Model Based on Theory of Planned Behavior

Control beliefs denoted the non-motivational factors in this model and included the opportunities and resources that are required to exhibit the behavior. Technological Factors were particular factors of the investigated system and technology. Taylor and Todd, (1995) decomposed the control beliefs into self-efficacy, technology and resource facilitating conditions, and they found that resource and technology facilitating conditions are related to the perceived behavioral control. Therefore, technological factors were included to the model.

Moderators affect the relationship between the salient belief and the intention. Among the technology acceptance models UTAUT (V Venkatesh et al., 2003) investigated the effect of the moderators and found significant moderating effect of the gender, age, experience and voluntariness on intention. Therefore, moderators were included in the model. Moreover, normative beliefs represented social influence and essential referent groups.

3.3 Target Group Study: Identification of the External Salient Beliefs

Ajzen and Fishbein (1980) indicated that new sets of beliefs and salient referents are required for each new behavior, system, and population. They suggested using open-ended questions to clarify the factors that affect the beliefs of the system users. Moreover, involving the actual user of the system to the model development brings about more accurate and efficient results. Therefore, a study was conducted in accordance with the recommendations of Ajzen and Fishbein (1980). The aim of this study was to bring out the salient beliefs for behavioral, normative and control beliefs of the model. A paper-based questionnaire that composed of the six open-ended questions for the belief types was prepared (see Table 5). The questions were adopted from Ajzen and Fishbein (1980)

and Ajzen (1991). The questionnaire was distributed to 60 undergraduate students of Middle East Technical University (METU), Turkey. This participant group was chosen due to their actively and frequently e-service use in their daily life. The summary of the results are given below (see Table 33 in Appendix A for the detailed results).

Table 5 External Belief Questionnaire

Belies type	Question
Behavioral Beliefs	1. What do you believe are the advantages of using an e-service? 2. What do you believe are the disadvantages of using an e-service?
Control Beliefs	3. What factors or circumstances would enable you to use an e-service? 4. What factors or circumstances would make it difficult for you to use an e-service?
Normative Beliefs	5. Please list the individuals or groups who would approve or think you should use an e-service.
Others	6. What else comes to mind when you think about using an e-service?

3.3.1 Behavioral Beliefs

Participants indicated that the time saving, ease of use, usefulness, easy access, incentives and enjoyment are advantages of an e-service usage. Time saving (32%) is the most mentioned advantage. Participants emphasized the queue and extra time requirement of the traditional services. Other advantage was labeled as ease of use (28%) that comprises easy usage and info gathering factors. Moreover, participants referred to the benefits (20%) of using e-service such as make life easier. Furthermore, trust, service quality, computer self-efficacy, and service cost were declared as disadvantages. According to the results, trust issue (48%) is the most important disadvantage of an e-service usage.

3.3.2 Control Beliefs

According to the answer of the participants the time problem, trust, access whenever and wherever wanted enable participant to use e-services. Time problem has the highest percentage (28%) among the factors that enable users to use e-services. They mentioned about the shortage of time and e-service makes easy to buy products or to get information. Then access whenever and whatever wanted comes with the 20%. Moreover, results

showed that the credit card necessity, security concerns, and long procedures make difficult for participants to use an e-service.

3.3.3 Normative Beliefs

Ajzen and Fishbein (1980) recommended that sources of social norms incorporated in the study are relevant to the target group. The referents of the participants were friends, family members, colleagues, fan groups, and other customers. Among them, friends had the highest percentage (33%). Moreover, 24% of the participants answered this question as no one.

3.3.4 Others

In addition, participants mention about the followings:

- For what purposes they use e-service; good for getting information, compare information and buy any kinds of goods online.
- Types of e-service they use; watching a video and lecture, buy any kind of goods online
- Their complaint with the e-services.
- Benefits of using e-service.

The constructs of the research model were chosen from the salient beliefs that identified in this section. Furthermore, the results of this procedure were used to validate that the respondents' salient beliefs were represented by the constructs of the research model.

3.4 Expert Study: Determination of the Belief Type of the Constructs

The constructs were grouped under related belief types by nine experts, eight of whom are research assistant at Information Systems (IS) department, and one of whom is an instructor at IS department. They worked on a project related with technology adoption and have Ms. or PhD thesis in this field. The experts determined the related belief types for each construct. This approach resembled in some aspects to card-sorting technique suggested by Davis (1989) and Moore and Benbasat (1991). They used card sorting to determine items for a construct. In this study, card sorting was used to determine constructs for each belief type.

3.4.1 Procedure of the Expert Study

First, the experts read the name of the belief types and their definition from the sheet. Second, a list that composed of the constructs and their definitions were given. Then, the experts were asked to choose the appropriate belief type for each construct. This process was carried out iteratively until the majority of the experts placed each construct under the same belief type. This belief grouping continued three tours until experts reached a consensus.

Expert group analysis determined the related constructs for each belief types. These results were used during the model development.

3.5 Model Building

The constructs of the research model (Figure 2) were determined from the identified salient beliefs in the Section 3.3, and these constructs were grouped under related belief types by nine experts as explained in the Section 3.4.

Figure 12 represents the proposed research model. The constructs of the research model are presented below.

3.5.1 Behavioral Beliefs

Behavioral beliefs of the research model were investigated in two factor types: functional and affective factors. According to the actual users incentives and enjoyment are advantages of an e-service usage, and the experts grouped them under the affective factors. Therefore, affective factors of this research model were identified as the perceived enjoyment and value to incentive.

Perceived enjoyment is defined as “the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use” (V. Venkatesh & Bala, 2008). Liu and Forsythe (2011) showed that enjoyment influenced the intention use online sites. Moreover, Van der Heijden (2003) examined the factors affecting the use of the portal that contains different services and found that enjoyment positively and significantly affects the intention to use. In addition, Teo, Lim and Lai (1999) investigated the impact of the intrinsic motivation on Internet usage and found positive direct effects of enjoyment on the frequency of Internet usage and daily Internet usage.

Hence, the following hypothesis is proposed:

H1a: Perceived Enjoyment will have a positive impact on intention to use e-service.

Value to incentive means that the extent to which a user values the provided incentive. Bhattacharjee (2001) investigated the drivers of the e-commerce service usage and revealed the effect of incentive on the continuance intention. Moreover, Naidoo and Leonard (2007) found that there was a positive relationship between the users’ perception about the loyalty incentives and continuance intention to use the e-service.

Based on these, the following hypothesis is proposed:

H1b: Value to Incentive will have a positive impact on intention to use e-service.

According to the actual users, the time saving, ease of use, usefulness, easy access are advantages of an e-service usage, and the experts grouped them under the functional factors. Functional factors of the research model were the expected benefit, perceived usability, and value for personalization.

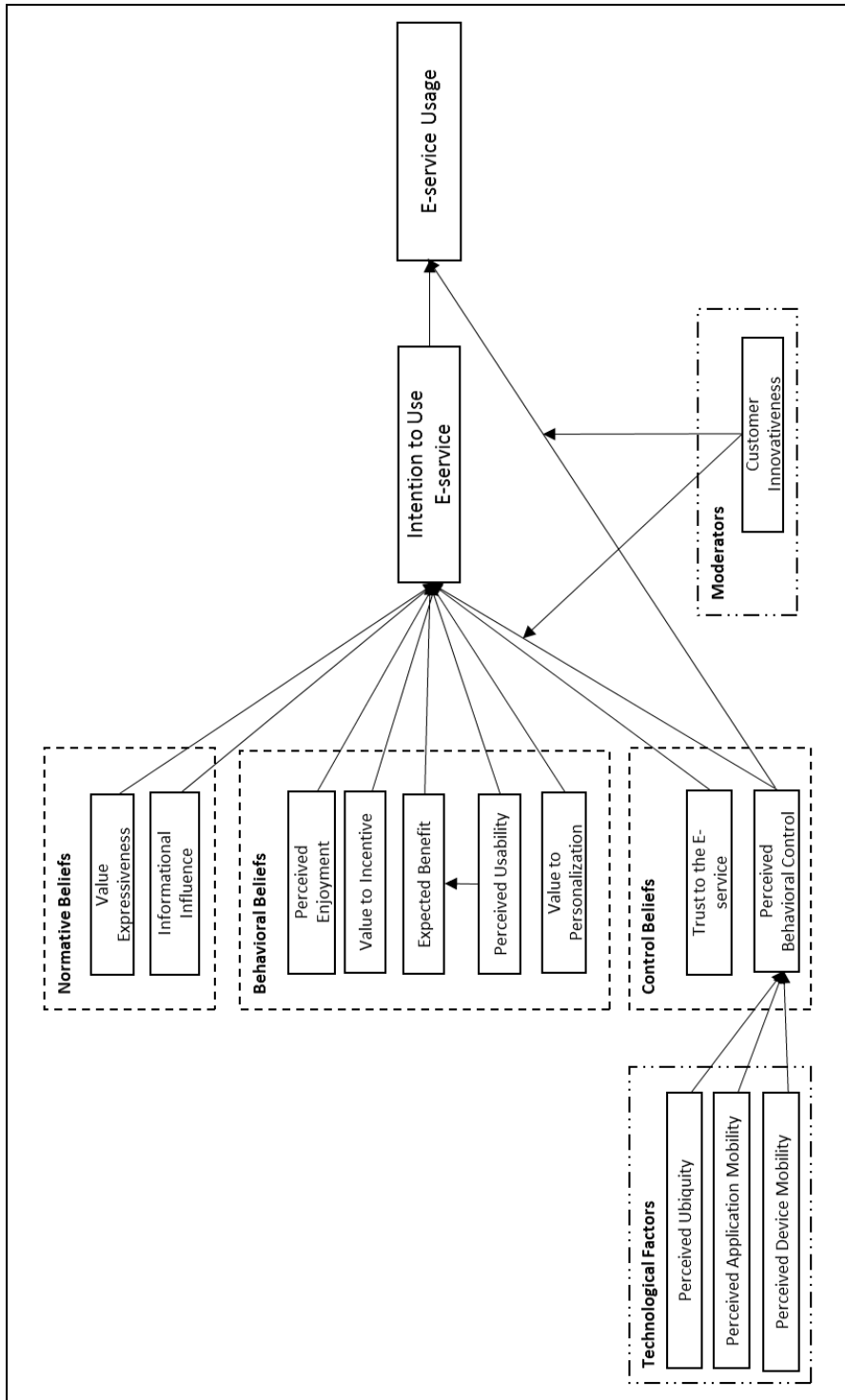


Figure 12 The Proposed Research Model

In the e-service context, **expected benefit** defined as the extent to which a user believes that using the e-service helps him or her to derive utilities. The usefulness of a system and performance expectancy have long been shown to affect the intention (Pavlou & Fygenon, 2006; V Venkatesh et al., 2003). Venkatesh and Davis (2000) investigated the adoption of IT in organizations and indicated that the perceived usefulness has an impact on the adoption of a new technology both in mandatory and voluntary settings. Similarly, Zarpou, Saprikis, Markos and Vlachopoulou (2012) examined the drivers of the m-service adoption and revealed the relationship between the usefulness and behavioral intention.

Thus, the following hypothesis is proposed:

H2a: Expected Benefit will have a positive impact on intention to use e-service.

Value for personalization means the extent to which a user values the use of information about him/her to provide tailored user experiences (Chellappa & Sin, 2005). The positive effect of the value for personalization on the intention to use was revealed by Chellappa and Sin (2005).

Based on this, the following hypothesis is proposed:

H2b: Value for Personalization will have a positive impact on intention to use e-service.

Perceived usability means the extent to which accomplishing a task with in a system is perceived to be easy to learn and easy to use. The effect of ease of use and usability on intention and expected benefit were shown in previous works (V Venkatesh et al., 2003). Featherman et al. (2010) indicated that the ease of use was one of the best predictors of the perceived usefulness. Moreover, van der Heijden (2004) found a strong relationship between the user's perceptions about the usability of the e-service and his/her intentness to adopt the e-service.

Therefore, the following hypotheses are proposed:

H2c: Perceived Usability will have a positive impact on intention to use e-service

H2d: Perceived Usability will have a positive impact on expected benefit.

3.5.2 Normative Beliefs

Deutsch and Gerard (1955) identified three forms of social influence. These are normative, informational, and value-expressive influence. Normative social influence occurs when individuals conform to the expectations of others (W. O. Bearden, Calcich, Netemeyer, & Teel, 1986). Previous works indicated that when the system use is voluntary, social influence (or social norm) does not affect the intention to use (V Venkatesh et al., 2003; V Venkatesh & Morris, 2000). Moreover, the literature suggests that the social norm has a weak role in online behaviors (Liu & Forsythe, 2011). Therefore, normative social influence was not included to the model.

One of the limitations of the TRA and TPB based models is that they only included normative social influence (Jay Zeal et al., 2010; J. Zeal et al., 2012). Informational influence and value-expressive influence do not appear in most of the TRA based models. In order to fill this gap, the informational influence and value expressiveness constructs were included in the research model.

Informational influence means that a form of conformity which occurs when an individual turns to another in order to obtain information. Moreover, it occurs when an individual accepts information as evidence of reality (Burnkrant & Cousineau, 1975).

Therefore, the following is proposed:

H3a: Informational influence will have an impact on intention to use e-service.

Value expressiveness defined as “an individual’s desire to enhance his or her self-image through association with a reference group” by Zeal et al. (2010). Value expressive influence occurs when an individual needs to improve his/her image by linked with a group (W. O. Bearden et al., 1986).

Hence, the following is proposed:

H3b: Value Expressiveness will have an impact on intention to use e-service.

3.5.3 Control Beliefs

According to the actual users, the time problems, access whenever and wherever wanted, and trust enable them to use e-service, whereas credit card requirement and security concerns make difficult their e-service usage, and experts grouped this factors under control beliefs. Therefore, trust to the service, and perceived behavioral control were included in the research model.

Trust is defined as “the belief that the trustee will act cooperatively to fulfill the trustor’s expectations without exploiting its vulnerabilities” (Pavlou & Fygenson, 2006). In e-service context, trust to the e-service means that the belief that the e-service will act cooperatively to fulfill the user’s expectations without exploiting its vulnerabilities. Gefen, Karahanna and Straub (2003) revealed the impact of the trust on the purchase intention in e-commerce setting. Moreover, Pavlou and Fygenson (2006) identified that the trust has a positive effect on the attitude, and this leads to impact on the intention in e-commerce domain. In addition, Komiak and Benbasat (2006) conducted an experiment with the commercial recommendation agents and found that emotional trust significantly affect the intention to use web-based recommendation systems.

Hence, the following hypothesis is proposed:

H4a: Trust to the e-service will lead to greater intention to use e-service.

Perceived behavioral control defined as “the extent to which performing the behavior of interest is perceived to be easy or difficult” (Ajzen, 1991). The effect of perceived behavioral control on intention and behavior was revealed in many studies (Ajzen, 2002; S. Taylor & P. A. Todd, 1995). Pavlou and Fygenon (2006) revealed the positive and significant effect of the perceived behavioral control intention on the intention and behavior of getting information and purchase. Moreover, the findings of Lin (2007) confirmed the relationships between the perceived behavioral control and intention, and between the perceived behavioral control and actual behavior.

Thus, the following hypothesis is proposed:

H4b: Perceived Behavioral Control will lead to greater intention to use e-service.

H4c: Perceived Behavioral Control has a positive impact on the E-service Usage Behavior.

3.5.4 Technological Factors

Taylor and Todd (1995) decomposed the control belief structure into three: self-efficacy, resource facilitating conditions and technology facilitating conditions. They stated that when the technical compatibility and available time are low, the possibility of occurrence of the behavioral intention decreases too. Based on their research, we included the perceived ubiquity as the resource facilitating conditions and the perceived device and application mobility as the technology facilitating conditions.

Actual users indicated that access whenever and wherever wanted enables their e-service usage. The term ubiquity, existence or apparent existence everywhere at the same time, comprises this concept precisely. Therefore, perceived ubiquity was included in the research model. **Perceived ubiquity** is defined as the extent to which a user believes that the system is capable of providing continuous access to information resources irrespective of his/her location within the boundaries of the system.

Thus, the following is proposed:

H5a: Perceived Ubiquity will lead to greater intention to use e-service.

The terms mobility and ubiquity are sometimes used interchangeably by researchers; however, they are distinct concepts. Mobility is defined as the quality or state of being mobile, whereas ubiquity means existence or apparent existence everywhere at the same time. Therefore, ubiquity and mobility (device and application mobility) appeared in the research model separately.

Perceived application mobility means that the extent to which a user believes that the services of the system are transferred across devices along its boundaries. Therefore, the following is proposed:

H5b: Perceived Application Mobility will lead to greater intention to use e-service.

Perceived device mobility means that the extent to which an individual believes that the device of the system is carried by him/her anywhere in its space. Accordingly, the following is proposed:

H5c: Perceived Device Mobility will lead to greater intention to use e-service.

3.5.5 Moderators

Innovativeness was defined by Rogers (1995) as “the degree to which an individual is relatively earlier in adopting an innovation than other members of his social system.” (p. 257). It was found that customers that have higher customer innovativeness level tend to adopt new technology more than others (Rogers, 1995). Furthermore, Liu and Forsythe (2011) investigated the moderating effect of adoption duration (early vs. late adopters) on intention. They found that the effect of facilitating conditions on intention was moderated by adoption duration. In addition, Taylor and Todd (1995) investigated the impact of the experience (experienced vs inexperienced user groups) on the relationships among the perceived behavioral control, intention and behavior. Their findings indicated that the effect of the perceived behavioral control on the intention was stronger for the experienced users, while the perceived behavioral control had a substantial effect on the behavior for the inexperienced users. Moreover, Notani (1998) conducted a meta-analysis and found those users who have less experience affected more by facilitating conditions.

Accordingly, the following is proposed:

H6a: Customer Innovativeness moderate the relationship between Perceived Behavioral Control and Intention

H6b: Customer Innovativeness moderates the relationship between Perceived Behavioral Control and E-service Usage Behavior.

3.5.6 Intention

Behavioral intention is defined as “the degree to which a person has formulated conscious plans to perform or not perform to use ” by Warshaw and Davis (1985). Intention is a primary predictor of behavior in TPB (Ajzen, 2002). Moreover, the effect of intention on behavior was proven in previous technology adoption studies (S. Taylor & P. A. Todd, 1995; V. Venkatesh & Bala, 2008; V Venkatesh et al., 2003).

Thus, the following hypothesis is proposed:

H7a: Intention to use e-service has a positive impact on the E-service Usage Behavior.

CHAPTER 4

METHODOLOGY

This chapter represents the methodology of the study. First, research design of the study is presented. Second, the e-service that was used in the study is explained. Third, the procedure of the research model development is provided. Then, participant selection, data collection, and analysis of Phase 1 and Phase 2 are presented. Finally, ethical issues are given.

4.1 Research Design of the Study

This study was carried out in four steps as depicted in Section 1.4 Design of the Study (see Figure 3). These steps are research model development, PLS-SEM (Phase 1), interview and task analysis (Phase 2), and integration of the results.

In this research, the mixed method research design was employed, and the collection and analysis of the quantitative and qualitative data were carried out sequentially in two phases. In Phase 1, the quantitative data were collected via a questionnaire and analyzed through Structural Equation Modeling (SEM). In Phase 2, in order to confirm and comprehend the findings of the quantitative study, the qualitative data were collected via interviews. Then, the findings of the quantitative and qualitative analyses were triangulated to gain deeper insight on behavioral, normative and control beliefs of e-service adoption.

The main reason behind employing a mixed method approach was to comprehend thoroughly the adoption of the e-services. Venkatesh, Brown and Bala (2013) emphasized the importance of the mixed method research in IS domain, and stated that mixed method research provides several benefits such as providing rich insight.

Moreover, Wu (2012) conducted a case study and revealed the value of a mixed method approach in technology acceptance research. Therefore, we applied mixed method research design to gain complete understanding about the e-service adoption and to offset the shortcomings of one method with the advantage of the other method (Creswell & Clark, 2011; Johnson & Turner, 2003). The quantitative method enables us to examine the structural relationships related to the adoption of the e-service. However, the quantitative data alone might not be adequate to gain a complete comprehension of the e-service

adoption. The qualitative data help us to comprehend the e-service adoption from the standpoint of the participants (Creswell & Clark, 2011).

4.2 MobileMETU: A Mobile Campus E-Service

Mobile medium usage of young people is high, and these technologies can be used to make campus life of students easier. Therefore, MobileMETU, a location-based mobile campus service, was used in the study (Kaya, Özpınar, Çetin Kaya, & Taşkaya Temizel, 2012). MobileMETU was based on Web services and composed of client and server side implementations. The aim of this service is to make campus life of university students easier. This service provides mobile implementations such as search buildings and bus stops on the campus, enter and search campus events, manage a group, send a message to group member. Moreover, the service uses the Google map facilities in mobile devices in terms of accessing location information, and the user can see the location of the other users on the map.

In order to enhance the efficiency of the service several improvements were done on the MobileMETU. First, Graphical User Interface (GUI) was designed to improve usability of the application. Buttons were designed with Photoshop CS program. Figure 13 represents the screen shots from old design and Figure 14 shows screen shots of new GUI design. The new design is more user-friendly.

Then, shortcomings of the application were determined with a five-person group. Below modifications were made to overcome the identified shortcomings.

- At the first usage of the application, a warning message is shown to the user about whether s/he wants to open the GPS (Global Positioning System) or not.
- When a user has a new subscribe request for his/her group, a warning message is shown to the user at the start up.
- Building list in “Search Buildings”, “Create Event”, and “Search Event” services has been ordered alphabetically.
- “Update User Info” service has been implemented.
- Message management functionality has been implemented. Users may reread and delete their messages from “Messages” service.

Third, I took photos of the buildings in the METU campus. These photos are used for results of building search service of the application. These photos serve to improve the efficacy of the application. Forth, we identified which logs need to be saved. Two types of logs have been saved. First, one is service usage logs and second is cumulative usage logs. The information of these log types and examples are given below.

A **service usage log** is saved when a user invokes a service. This log includes id, user name, invoked service, register date and time. Table 6 presents an example of service usage logs. Although Service Usage type of log provides elaborative information it has some disadvantages. For example, there are too many records for a user in the database. This

condition may complicate the preparation of log data to the analysis. In order to overcome these difficulties a second type of log has been formed.



Figure 13 Screen Shots from the Old Design: (a) Login Screen (b) Groups (c) Search a Building



Figure 14 Screen Shots from the New GUI: (a) Find Buildings at Specified Range (b) Groups (c) Create an Event

Table 6 Service Usage Logs

ID	User name	Service	Register date	Register time
1927	*****	login	02.10.2012	7:12:14 PM
1928	*****	groups	02.10.2012	7:12:23 PM
1929	*****	showmygroup	02.10.2012	7:12:27 PM

In **cumulative usage log**, a log is saved for a user that includes the number of use for each service. Table 7 depicts an example of the cumulative usage logs that composes of ID, username, register date, login, logout, and 28 services (such as getbuilding and getevent). These logs may be used for actual usage data easily and they may be grouped according to the task type such as information gathering, transaction, and social networking.

Table 7 Cumulative Usage Logs

ID	UName	Login	Logout	Getbuilding	Getevent	Deletgroup
102	*****	13	12	10	5	0
103	*****	14	11	7	6	0
104	*****	20	15	3	12	1

Finally, testing was performed to ensure that application is ready to use and services work correctly.

4.3 Research Model Development

Research model was progressively developed as explained in Chapter 3 in detail. Figure 15 represents the steps and brief explanations. In first step, a theoretical model based on TPB was proposed. In second step, the target study was conducted to determine the constructs of the model. 60 students participated to the study. Data were collected via a questionnaire that consisted of the six open-ended questions. In third step, the expert study was conducted with the aim of grouping the constructs under the most appropriate belief type. Three-round study was conducted with the nine expert in IS domain. Finally, an e-service adoption model was build according to the results of the expert and target group studies.

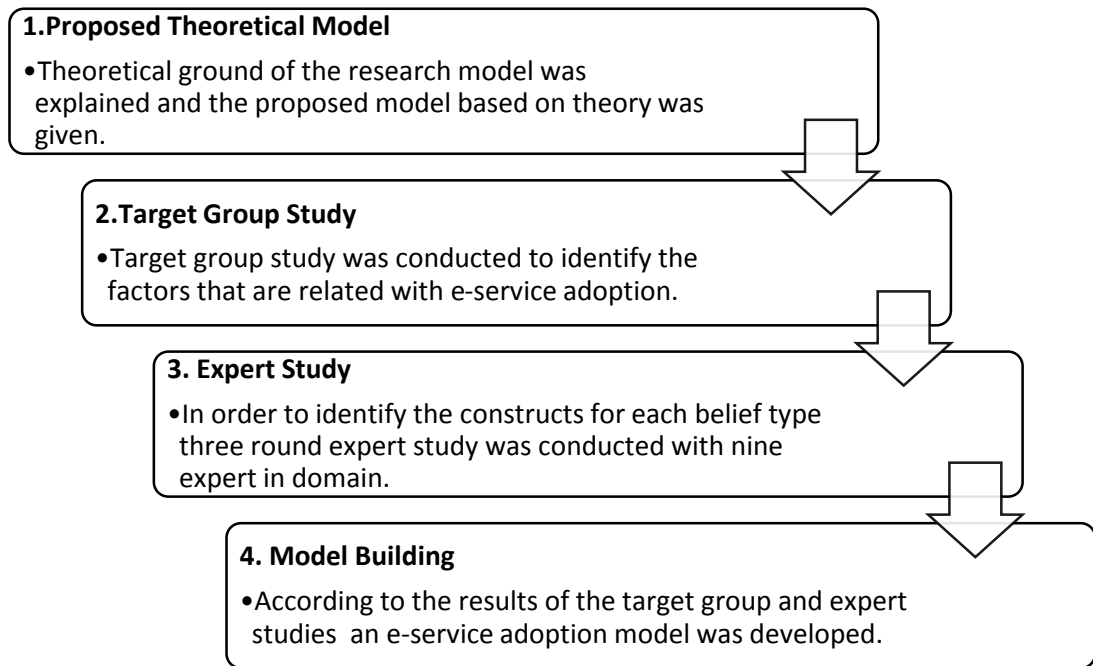


Figure 15 Steps of Research Model Development

4.4 Phase 1: PLS-SEM

The aim of conducting this phase was to validate the proposed research model. First, a survey instrument was developed. Then, the instrument was administrated. Finally, the research model and instrument were validated.

4.4.1 Instrument Development

MacKenzie, Podsakoff and Podsakoff (2011) investigated the scale development and validation in IS and behavioral research. They discussed limitations in the current scale development research and made some recommendation for construct measurement and validation procedures. The instrument used in this study was developed according to the guidance of MacKenzie et al. (2011).

First, conceptual definitions of the constructs were identified. Then, the item pool was generated. The items that appropriately represent the each construct were selected after the expert review and cognitive interview processes. Expert review was conducted with five experts in the technology adoption and scale development domain. The experts evaluated the individual and collective representativeness of the each constructs' items. After the expert review, scale items were translated to Turkish. Then, three cognitive interviews were conducted with the potential subjects of the study. The thinking aloud procedure was applied during the cognitive interviews. The participants thought aloud and indicated the unclear parts while they filled the questionnaire. Notes were taken from their feedback and items were revised to enhance clarity.

a. Conceptual Definition of the Constructs: According to the MacKenzie et al. (2011), one of the most important parts of the scale development is sufficiently defining the construct that is measured but this step is ignored by many studies. This may causes misconception about the construct and its relationship with other constructs. Therefore, conceptual definition of the each construct that used in the current study was identified clearly at the beginning of the study. Definition of each construct is given in Table 8.

Table 8 Definitions of the Constructs

Construct name	Definition
Customer Innovativeness	“The degree to which an individual is relatively earlier in adopting an innovation than other members of his social system” (Rogers, 1995).
Expected Benefit	The extent to which a user believes that using the e-service helps him or her to derive utilities.
Informational Influence	A form of conformity that occurs when an individual turns to another in order to obtain information.
Intention to Use E-Service	“The degree to which a person has formulated conscious plans to perform or not perform to use E-Service” (Warshaw & Davis, 1985).
Perceived Application Mobility	The extent to which a user believes that the services of the system are transferred across devices along its boundaries.
Perceived Behavioral Control	“The extent to which performing the behavior of interest is perceived to be easy or difficult” (Ajzen & Fishbein, 1980).
Perceived Device Mobility	The extent to which an individual believes that the device of the system is carried by him/her anywhere in its space.
Perceived Enjoyment	“The extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use” (V. Venkatesh & Bala, 2008).
Perceived Ubiquity	The extent to which a user believes that the system is capable of providing continuous access to information resources irrespective of his/her location within the boundaries of the system.

Table 8 (cont.)

Perceived Usability	The extent to which accomplishing a task with in a system is perceived to be easy to learn and easy to use.
Trust to the Service	The belief that the e-service will act cooperatively to fulfill the user's expectations without exploiting its vulnerabilities (Pavlou & Fygenson, 2006).
Value Expressiveness	"An individual's desire to enhance his or her self-image through association with a reference group" (Jay Zeal et al., 2010)
Value for Personalization	The extent to which a user values the use of information about him/her to provide tailored user experiences (Chellappa & Sin, 2005).
Value to Incentive	The extent to which a user values the provided incentive.

b. Item Pool Generation: An item pool that consists of the items from the literature and newly created for this research was generated. Table 9 represents the references of the paper items of which involved in the item pool.

Table 9 Items from the Literature

Construct name	Number of items	Research reference
Expected Benefit	22	Cetin and Özkan (2010) Davis (1989) Liu and Forsythe (2011) Parthasarathy and Bhattrcherjee (1998)
Perceived Usability	20	Brooke (1996) Davis (1989) Karahanna, Straub and Chervany (1999) Shin, Lee , Shin and Lee (2010) Venkatesh and Bala (2008)
Perceived Enjoyment	12	Lee, Christy, Chon-Ling and Lim (2006) Liu and Forsythe (2011) Van der Heijden (2003) Vankatesh et al. (2003)

Table 9 (cont.)

Value to Incentive	12	Atcharyachanvanich, Okada and Sonehara (2006) Bhattacharjee (2001) Lee, Lee and Kwon (2005)
Value for Personalization	9	Chellappa and Sin (2005) Komiak and Benbasat (2006)
Informational Influence	12	Bearden, Netemeyer and Teel (1989) Kim and Lee (2004)
Value Expressiveness	7	Brown and Venkatesh (2005) Perse (1990)
Perceived Behavioral Control	9	Ajzen (2002) Kanat and Özkan (2009) Vankatesh et al. (2003)
Trust to the Service	15	Gefen and Straub (2003) Ha and Stobel (2009) Kanat and Ozkan (2009) Suh and Han (2002) von Watzdorf, Ippisch, Skorna and Thiesse (2010)
Perceived Ubiquity	15	Bailey and Pearson (1983) Goodhue (1998) Karahanna et al. (1999) Karaikos (2009) Kettinger and Grover (1997) Lin and Lu (2000)
Perceived Device Mobility	4	Karahanna et al. (1999) Lin and Lu (2000) Karaikos (2009)
Perceived Application Mobility	3	Karaikos (2009)
Customer Innovativeness	6	Agarwal and Karahanna (2000) Liu and Forsythe (2011)
Intention to Use E-Service	12	Cetin and Özkan (2010) Lee et al. (2006) Vankatesh et al. (2003)

After the item pool generation, items that represent the construct definitions best were selected for each construct. Finally, refined item pool consisted of 67 items was formed.

The next step is evaluation of the items in the pool. For the content validation, cognitive interview and expert review were conducted. Details of these steps are given below.

c. Expert Review: Content validity defined as “the degree to which items in an instrument reflect the content universe to which the instrument will be generalized” by Straub, Boudreau and Gefen (2004, p. 424). Expert review method was used to assess the content validity. Expert review was conducted with five experts in technology adoption and scale development domain. The experts carried out two evaluations. First, they evaluate items in terms of their individual represent ability of the construct definition. Then, collectively representativeness of items of each construct was evaluated by experts.

Suggestions of the experts are listed below.

- Revision of the some items those are not clear. For example “I found the SERVICE easy to remember”, “Even if not monitored, I trust the SERVICE to do job right”
- Give examples for items of the incentive and personalization constructs.
- Underline “satın alma” and “bilgi edinme” words at the demographics part questions.
- Correction of some typos.

After the expert review, the scale items were translated to Turkish. The items best represent the each construct were selected and the questionnaire was formed. As a response format, 6-point Likert scale was used from “strongly agree” to “strongly disagree” (Figure 16). According to McMillan and Schumacher (2001), when attitude, opinion, and perception are measured Likert-type scale is used. Moreover, Gliner and Morgan (2000) stated that Likert-type scale is the most common example of scaled items used in the questionnaires. Therefore, Likert-type scale items were used in the survey instrument. Questionnaire has two parts: demographics part and item part. Demographics part consisted of the questions related with the moderators of the framework; individual characteristics such as age, gender, education and technology and task characteristics. In addition, questions for behavior and satisfaction constructs were placed at this part.

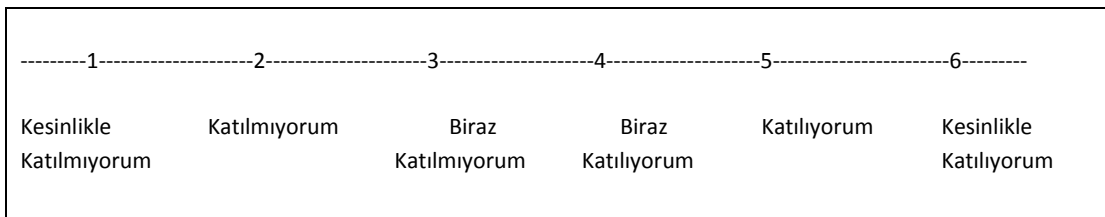


Figure 16 Six-point Likert Scale (Turkish Version)

d. Cognitive Interviews: Three cognitive interviews were conducted with the potential subjects to the research. During the cognitive interview, “thinking aloud” procedure was applied. Notes were taken from their feedback about the questionnaire. In accordance with the feedbacks of the participants, items were revised to enhance clarity. First feedback is related with demographic questions. Two of the subject suggested adding uneducated option to the education level. In order to use an e-service a user need to be literate even if

not educated; therefore, “literate” option was added. Second feedback is about giving example of other aims of the using e-service for the fifth question in the demographic part. In addition, some translations were revised for the options of the eighth question at the demographic part according to the feedbacks. Another feedback is about typos. I corrected the typos that were found by the reviewers. Moreover, some items were not clearly understood by the interviewer. We detected these items and tried to write comprehensible items.

Required modifications were done after the cognitive interviews and expert review. In order to prevent clustering effects items were randomly placed on the questionnaire.

e. Pilot Testing: In order to test the instrument in terms of reliability and construct validity, a pilot study was conducted with 60 participants. Mean age was 22, and 36 of them were female and 23 of them were male.

Before the analysis, outliers were identified, and data of the two participants were removed from the data set. Then, reliability analysis was conducted with PASW 18. First, Cronbah’s Alpha values of the constructs were examined, and they range from .70 to .86 (see Table 10). According to the Hair (1998), Cronbach’s Alpha value should be above .70, and all constructs fulfill this condition. Then, we investigated Cronbach’s Alpha if item deleted, corrected-item total correlation and inter item correlation values. In order to increase the internal consistency, the measurement instrument was refined and nine items were removed from the instrument. In addition, some items were revised according to the feedback of the participants. Final questionnaire, composed of demographics part (eight questions) and item part (40 items), is given in Appendix B. In addition, the items of the instrument in English are given in Appendix C.

Table 10 Cronbach’s Alpha values

Construct name	Cronbach's alpha
Expected Benefit	.782
Perceived Usability	.735
Perceived Enjoyment	.702
Value to Incentive	.884
Value for Personalization	.813
Informational Influence	.862
Value Expressiveness	.780
Perceived Behavioral Control	.719

Table 10 (cont.)

Trust to the Service	.812
Perceived Ubiquity	.859
Perceived Device Mobility	.822
Perceived Application Mobility	.770
Intention to Use E-Service	.802

Moreover, the effect of social desirability on the scale score was investigated. Social desirability is defined as a personality trait that contributes to the individual acceptable in social or interpersonal relations. Social desirability appears when an individual misquote his/her beliefs due to aware of his/her action is being monitored (Crowne & Marlowe, 1960).

Social-desirability bias is considered to be one of the most common and persuasive sources of bias affecting the validity of experimental and survey research findings in psychology and social sciences. (King & Bruner, 2000, p. 80)

There are several scales that used to social desirability. In order to measure the social desirability of an individual Crowne and Marlowe (1960) developed the Marlow Crowne Social Desirability Scale (MCSDS). The MCSDS consists of 33 statements and respondents answered to the statements that describe their personality as "true" or "false". Response that matches with the social desirability is graded as one point. Then, they added and SD score is obtained. Reynolds (1982) works on short forms of the MCDS. They provided three scale Short Form A, Short Form B and Short Form C consist of 11, 12 and 13 items, respectively. Furthermore, Kozan (1983) developed a scale to measure social desirability for Turkey. This scale composed of 20 items. Scoring technique of the scale is similar to MCSDS. We examine those scales. Finally, Reynold's Short Form A was selected to measure the effect of the social desirability on the response to the questionnaire.

In literature, construct validity was checked via correlation analysis between SD score and instrument score. Therefore, we investigated the correlation between SD score and instrument score. There is no significant correlation between them $r_s = 0.157$ ($p > .05$, one-tailed). However, our instrument composed of subscales. Therefore, we analyzed the validity of each constructs individually. Non-parametric correlation analysis was conducted to test the effect of social desirability on the response to the each constructs. Correlations among SD score and score of subscales were non-significant (all $p > .05$, one tailed). The detailed results of the analysis are given in Table 35 in Appendix D. Therefore, we can conclude that SD has no effect on this scale.

4.4.2 Participant Selection and Data Collection Procedure

The data were collected from the 217 undergraduate and graduate students of Middle East Technical University (METU), Turkey. They are the target audience of the mobile campus service. Undergraduate students were from a service course. This course has been taken by students from diverse departments of the METU.

The proposed research model was empirically tested with the mobile campus service that was introduced in Section 4.2.

Some preparations were made before the data collection process as listed below.

- MobileMETU application was uploaded to Android Market (Google Play Store).
- Demonstration of the each service use was recorded via Captivate program.
- A presentation was prepared with PowerPoint and demos were included to it.
- Educational material that introduces how to use application was prepared and published via iSpring Pro 6.2.
- A web page was designed for the application advertisement. The educational material and presentation were included to the web page.

First, the mobile campus service was introduced with a presentation that approximately takes 15-20 minutes. Then, the participant used the service via a mobile phone or tablet PC. During this process, they asked questions if any. After that, the paper-based questionnaire (see Appendix B) was distributed, and participant filled the questionnaire.

Actual usage behavior: Previous technology adoption studies have some limitations in terms of measuring the actual behavior. Since, the data that were collected to measure the usage behavior composed of self-reported measurement, and the self-reported data may be a misleading due to the social desirability bias (Armitage & Conner, 2001). Straub and Burton-Jones (2007) claimed that future studies which measure the behavior with actual usage data such as computer logs, will aid to obtain results that are more precise. Therefore, we used the system captured usage log to measure actual usage behavior. The service usage logs were saved for the eight-month period. The construct "E-service Usage" represents the actual usage behavior. This construct was measured with three indicators: the total number of log-ins, the total number of service use, and diversity of the used service. The total number of log-ins was the login value in the log files. The total number of service use was calculated by summing the number of use of each service in the log files. The diversity of used service type value was calculated by adding 1 point if a user used at least one service of a service type. There are six service types: building information, event information, transportation information, groups, message, and leave footprint. This step was repeated for six-service type, and the final diversity of the used service value was obtained.

4.4.3 Data Analysis

Data were analyzed in three parts: data screening and missing values, reliability and validity assessment, and partial least square (PLS)-SEM. Microsoft (MS) Excel 2010, PASW Statistics 18 and SmartPLS were used for the data analysis. First, the data, obtained via questionnaire, were organized with MS Excel. Then, outliers, missing values, data distribution, and multicollinearity were analyzed with the PASW 18. Finally, reliability, validity, and path assessment were carried out via SmartPLS program.

a. Data screening and missing values

First, the participants that only filled the demographic part of the questionnaire were identified, and removed from the data set. Second, missing data were identified. Third, multivariate outliers were checked with Mahalanobis distance method and studentized residuals. Forth, the distribution of the data was analyzed via Kolmogorov-Smirnov test. Finally, multicollinearity was checked with non-parametric correlation analysis (Spearman Rho).

b. Reliability and Validity assessment

Reliability was confirmed with composite reliability (CR) value. Validity was evaluated in terms of discriminant and convergent validity. First, convergent validity was checked via bootstrap test, and item loadings were analyzed. Then, Average Variance Extracted (AVE) values that reflect the average communality for each latent construct were investigated. Second, discriminant validity was assessed. First step of discriminant validity check is the comparison of correlation between constructs and AVE. Second, items loadings to the constructs were examined.

c. PLS-SEM

In order to test the research model and hypotheses, SEM was used. Due to the data requirements, PLS-based SEM was chosen. PLS uses a component-based approach and has minimal restriction related with sample size and distribution (Chin, 2003). PLS-Algorithm was run to identify the path coefficients and R^2 and bootstrap analysis was run to identify the t-values.

Three types of effect were analyzed in this study. These are direct, mediating, and moderating effects. Figure 17 represents the effect types. In the direct effect analysis, the effect of the independent variable on the dependent variable is investigated. In the moderating effect analysis, the effect of the moderator variable on the path between dependent and independent variable is analyzed. In the mediating effect analysis, the effect of independent variable on dependent variable through the mediator variable is examined.

The significance of the direct and moderating effects were evaluated via bootstrap test. In order the test the significance of the mediation effects, the Sobel tests were conducted. The Sobel test is a method of testing the significance of a mediation effect (Baron & Kenny, 1986). Figure 17-c represents a model that has a mediating effect. "A" denotes the path

from the independent variable to the mediator variable. “B” denotes the path from the mediator variable to the dependent variable. “C” denotes the path from the independent variable to the dependent variable.

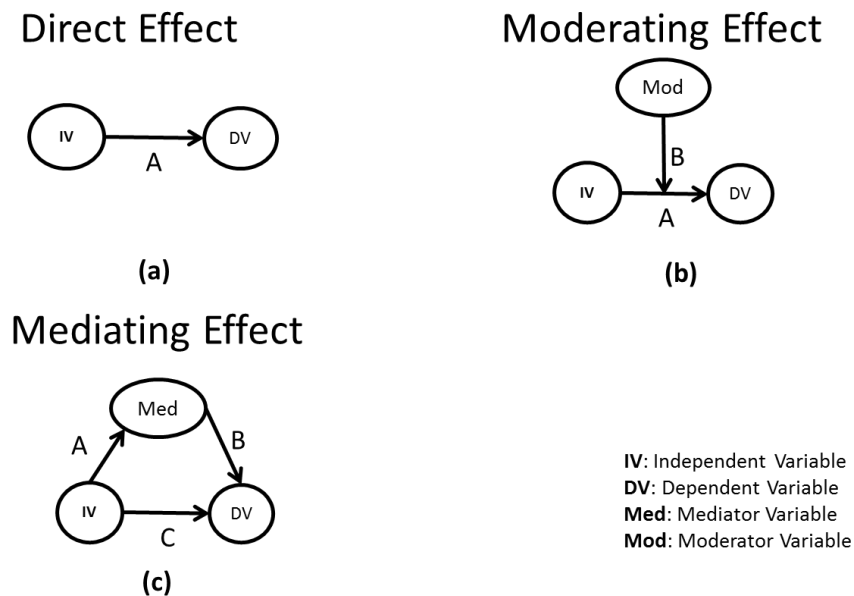


Figure 17 Analyzed Effect Types

If the Sobel test is significant

- and C is significant, the mediator variable is a partial mediator.
- and C is non-significant, the mediator fully mediates the impact of independent variable.

4.5 Phase 2: Task Analysis and Interviews

The aim of conducting this phase was to confirm and comprehend the findings of the quantitative study (Phase1).

4.5.1 Participant Selection and Equipment

The participants who participated in the Phase 1 of the study and volunteered to participate in the further study were invited to Phase 2 of the study via e-mail. Thirteen students participated to the Phase 2.

All the participants used the e-service via HTC EVO 3D mobile phone. The task completion and interview processes were recorded via a voice recorder with the approval of the participant. In addition, the researcher used a stopwatch to determine the task completion time.

4.5.2 Data Collection Procedure

The studies were scheduled according to the schedule of the participants as a single session. The study has two phases: pre-brief and data collection. In pre-brief, the participants signed the informed consent form. The mean study completion time was 37 minutes (range from 20 to 47 minutes). This form contains the information about the aim and procedure of the study. Then, the participants filled the demographic part questions (see Appendix E Instrument (Phase 2)).

The data collection had two steps: task completion and interview. In the task completion step, the participant performed predefined five tasks given in Table 11. Each task started at the application home page. During the task completion process, thinking aloud procedure was applied and observations were done. After each task, the participant ranked the easiness level of the task from 1 to 5 (worst to best). After all tasks completed, the participants were asked to identify the most difficult and easiest task, and their satisfaction level from 1 to 5 (worst to best). Two forms: a participant form and a researcher form (Appendix F) were used during these processes.

Table 11 Tasks and Descriptions

Task no	Description
Task1	Update password
Task2	Send a message to a group member
Task3	Find buildings in 100 meters range
Task4	Find events in the sport centre in this week
Task5	See group members on the map

In the second step, a semi-structured interview was conducted. Two parts of questions were asked to the participants (see Appendix G for Interview Questions). First part includes the 11 questions about MobileMETU usage. Second part consists of the 15 questions related with the constructs of the developed e-service adoption model. These questions aim to confirm and comprehend the findings of the qualitative part. The Interviews were transcribed immediately after the interview process.

4.5.3 Data Analysis

Data of the Phase 2 were analyzed in three parts: analysis of interviews, analysis of the tasks, and analysis of the log files. MS Excel was used for these analyses.

a. Analysis of the Interviews

The interview data were analyzed in two parts. In part 1, the interview data were analyzed according to the steps suggested by Taylor-Powell and Renner (2003). In first step, the audio files recorded during the interviews were transcribed in a separate Word document for each participant immediately after the interview. The transcript files are approximately 4-page length and consist of approximately 1397 words. These files were read several times to understand the data deeply.

Step 2 started with export of the data to an excel file to code them. An excel spreadsheet composed of user ID, question ID, text, memos, code and code 2 columns has been created. First, each text was read and memos were taken. Then, the codes were generated from these memos. Some answers include more than one memo then these memos were coded as code and code 2 separately.

In third step, codes were identified in the previous step were categorized. The key ideas being expressed within the preset categories were identified in forth step. Then, similarities and differences between the responses were investigated. Finally, relationships among categories were examined.

In part 2, in order to identify the most essential factors qualitative data were quantized by continuing the frequency of occurrence of the each category (Miles & Huberman, 1994).

b. Analysis of the Tasks

The tasks were analyzed in terms of easiness level, completion time, and number of errors. The easiness level was obtained from the participants rank that range from 1 to 5. The completion time includes the period between the start and finish time of the task. The number of errors denotes the error made by the participant such as using an inappropriate service or tapping a wrong button during the task completion.

c. Analysis of the Log Files

The usage logs of the e-service were recorded during the eight-month period. The log files were analyzed to gain information about the actual usage behavior. The cumulative usage logs were used to analyze the actual usage. In cumulative logs, a log was saved for a user that includes the number of use for each service. First, the services in the log files were grouped. Second, logs were analyzed in terms of aim of use: getting information and social networking. Then, services were investigated in detail for each service type.

4.6 Ethical Issues

The quantitative and qualitative data collection of this research includes human participation. Therefore, we applied to the Applied Ethics Research Center at the Middle East Technical University for ethics approval. The committee approved the ethic clearance of the research (see Appendix H and Appendix I).

CHAPTER 5

RESULTS AND DISCUSSION

This chapter presents results of the study. The results of each phase are given below separately. Phase1 starts with the demographic information of the participants and continues with general properties of the data. Then, reliability, validity, and structural model results are presented. After that, the data analysis and coding, task analysis and actual usage data analysis of Phase2 are given. Finally, results of the quantitative and qualitative data are integrated.

5.1 Results of Phase1: PLS-SEM

In this section, the results of Phase1 are given in six sections: demographics, data screening and missing values, factor assessment, reliability assessment, validity assessment, and structural model results.

5.1.1 Demographics

The participants of the Phase1 comprised of 217 students of Middle East Technical University (METU). 122 of them are female and 95 are male. Their age range from 18 to 32 (mean was 21.4). They reported that they mostly use e-services via portable devices. 89% of the subjects used a laptop and 64% of them used a mobile phone to reach e-services. However, usage rate of tablet PC was considerably lower (9.7%). Table 12 represents the type of tool that used for reaching e-services.

Table 12 General E-Service Use

Type of tool	Frequency	Percent
Desktop PC	114	52.5
Laptop	194	89.4
Mobile phone	140	64.5
Tablet PC	21	9.7

Furthermore, number of types of tool used for reaching e-service was investigated (see Table 13). 41.9 % of the participants use two different type of tool. Then, three and one type of tool comes, %27.6 and %24.9 respectively.

Table 13 Number of Different Tools

N. of tool type	Frequency	Percent	Cumulative percent
1	54	24,9	24,9
2	91	41,9	66,8
3	60	27,6	94,5
4	12	5,6	100,0
Total	217	100,0	

Moreover, the participants were asked about their aim of e-service use (see Table 14). Obtaining information had the highest percentage (95%). Then, social networking, entertainment, and online transaction came with 84%, 67%, and 55.3%, respectively. The mobile campus service serves to two aims: provides buildings, bus stop, and event information to obtaining information, and offers group functions for social networking.

Table 14 Aim of E-Service Use

Aim of e-service use	N. of subject	Percent
Information gathering	206	94.9
Comparison	70	32.3
Online transaction	120	55.3
Entertainment	151	69.6
Social networking	183	84.3

In order to measure the customer innovativeness of the participant, the time since the participant first adopted the e-services to obtaining information, transaction and social networking were asked. The results are summarized in Table 15. As seen in the table, most of the participants were early adopters of the e-services for obtaining information tasks. 45% of them used e-services for obtaining information more than six years, and 36% of them used between three and five years. Similarly, social networking related usage was also high. 55% of them used e-services more than 3 years, and more than six years usage length rate was 16%. However, transaction related e-service usage length of participants

was low. For example, 6% of them used e-services more than six years for the transaction, whereas 33% of them did not use e-service for this task.

Table 15 E-Service Usage Lengths

Usage type/ Time	Information gathering		Transaction		Social networking	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
None	3	1.38	72	33.18	10	4.61
Less than 1 year	4	1.84	35	16.13	13	5.99
1-2 years	33	15.21	61	28.11	35	16.13
3-5 years	78	35.94	34	15.67	119	54.84
6 years or more	97	44.70	12	5.53	34	15.67

To compare the traditional service and e-Service usage for information gathering and transaction related tasks two questions were asked. First, we asked the participants that the percentage of the product they purchased via e-Service in the recent year. 99 of them use e-Service below 25 %, whereas only 14 of them use e-Service above 50 % of their total transaction (see Table 16). This result is consistent with their customer innovativeness level founded above analysis. In addition, percentage of the information that they gathered via e-Service was investigated. The results differ from the transactional task. They mostly prefer e-Service for information gathering related task. 165 of them obtain information via e-Service over 50 % of their total service use in the recent year (see Table 16).

Table 16 Percentage of e-Service Usage

Usage type / frequency	Information gathering		Transaction	
	Frequency	Percent	Frequency	Percent
0%	5	2.30	65	29.95
1-24%	14	6.45	99	45.62
25-49%	25	11.52	31	14.29
50-74%	85	39.17	9	4.15
75-100%	80	36.87	5	2.30

Moreover, average satisfaction rate of the participants was 4.7. The rate of the 195 subjects was above 3 and 162 of them was above 4. We can conclude that they were satisfied from e-service in general.

Furthermore, we asked them "Other comments you want to add about MobileMETU". The suggestions are listed below.

- Same application should be developed for other operating systems.
- Application may be put to the bus stops via monitors in the campus and students who not have a smart phone can reach to the application by this way.
- I hope this beautiful project do not prioritize commercial purposes (such as fee-paying applications and taking advertisement etc.).

5.1.2 Data Screening and Missing Values

First, the data were prepared for the analysis. Some participants only filled the demographic part of the questionnaire. These participants were identified, and seven participants removed from the data set. Then, the data were screened and frequency analysis was conducted. Minimum and maximum values were checked to ensure data were entered correctly. Moreover, missing data were analyzed. Missing values range from 0% to 2.9% for the items. When the missing values below 5%, data can be transformed, or list-wise option can be used (Hair, 1998). Transformation technique was chosen, and missing values were replaced with the mean.

Multivariate outliers were checked with the Mahalanobis distance method and studentized residuals. Critical value should be .001 for Mahalanobis distances, and studentized residual should be below than $|+/- 3|$ (Hair, 1998). Eight participants were identified as multivariate outlier, and one residual was greater than three. Therefore, eight participants were removed from the data set due to the multivariate outlier problem.

The distribution of data was analyzed if the data is normally distributed. Kolmogorov-Smirnov test was conducted to analyze the distribution of the data. The p value should be higher than .05 for a normal distribution (Hair, 1998). However, all items had p values lower than .001. Therefore, we can conclude that data have non-normal distribution. The skewness and kurtosis values were checked if this non-normality is severe. All skewness and kurtosis values were between $+/- 3$, and this indicates that the distribution does not have severe effects on the results.

Furthermore, multicollinearity was checked with non-parametric correlation analysis (Spearman Rho). The correlations between the items were lower than the threshold value .90 (Hair, 1998).

5.1.3 Factor Assessment

Factor analysis was conducted to confirm the unidimensionality of each constructs. Principal component analyses with varimax rotation were conducted. Factor loading $\pm .30$ is considered minimal level, whereas loadings $\pm .50$ and above are considered practically

significant (Hair, 1998). Hair (1998) provided a guideline for identifying significant factor loadings based on sample size. After elimination of the outliers, data of 202 participants are suitable for the analysis. According to this guideline, in a sample of 200, factor loadings .40 and above are statically significant. Therefore, .40 was selected as a cut point of factor loadings. Loadings of all items on its theoretical construct were above .40 (see Table 36 in Appendix J). Therefore, we can conclude that all loadings are practically and statistically significant, and unidimensionality is confirmed.

5.1.4 Reliability Assessment

Reliability was confirmed with composite reliability (CR) value. Composite reliability values of all constructs were above the threshold value .70 (Hair, 1998) (see Table 17).

Table 17 Composite Reliability Values of the Items

Construct	Abbreviation	Composite reliability
Perceived Application Mobility	AM	0.82
Perceived Device Mobility	DM	0.91
Expected Benefit	EB	0.88
Informational Influence	II	0.88
Intention to Use E-Service	INT	0.95
Perceived Behavioral Control	PBC	0.84
Perceived Enjoyment	PE	0.91
Value to Personalization	PR	0.88
Perceived Usability	PU	0.79
Trust to the e-Service	T	0.84
Perceived Ubiquity	UB	0.90
Value Expressiveness	VE	0.97
Value to Incentive	VINC	0.90

5.1.5 Validity Assessment

Convergent and discriminant validity were examined, and the result were presented separately below.

a. Convergent validity: Convergent validity is obtained when all items have statistically significant and .70 and above loading on their theoretical construct (D. Straub et al., 2004). First, the bootstrap test was conducted. The t-values showed that the loading of the items on their theoretical construct was significant. Then, PLS algorithm was run obtain to loading values. The items: PBC1 (.52), PU2 (.64) and T3 (.65) had loadings to their theoretical construct below than .70.

Moreover, Average Variance Extracted (AVE) values that reflect the average communality for each latent construct were investigated. AVE should be greater than the .50 (Hair, 1998). All AVE values were above the .50. The items PBC1, PU2 and T3 were removed, and analyses were rerun. After this modification, all latent constructs had AVE above .50 and loadings above .70 (see Table 18).

Table 18 Item Loadings, CR, AVE, Mean, and SD Values

Construct	Item	Loadings	AVE	Mean	SD
Perceived Application Mobility	AM1	0.90	0.70	4.24	1.11
	AM2	0.78			
Perceived Device Mobility	DM1	0.94	0.83	4.50	1.18
	DM2	0.88			
Expected Benefit	EB1	0.86	0.65	4.80	0.71
	EB2	0.84			
	EB3	0.77			
	EB4	0.74			
Informational Influence	II1	0.80	0.64	4.00	1.01
	II2	0.83			
	II3	0.72			
	II4	0.84			

Table 18 (cont.)

Intention to Use E-service	INT1	0.91	0.86	4.09	1.27
	INT2	0.93			
	INT3	0.94			
Perceived Behavioral Control	PBC2	0.97	0.65	4.04	1.22
	PBC3	0.97			
Perceived Enjoyment	PE1	0.88	0.78	4.10	0.99
	PE2	0.86			
	PE3	0.91			
Value to Personalization	PR1	0.81	0.65	4.61	0.83
	PR2	0.84			
	PR3	0.83			
	PR4	0.74			
Perceived Usability	PU1	0.80	0.57	4.64	0.59
	PU3	0.85			
Trust to the E-service	T1	0.93	0.65	4.70	0.70
	T2	0.83			
Perceived Ubiquity	UB1	0.90	0.75	3.99	1.11
	UB2	0.83			
	UB3	0.87			
Value Expressiveness	VE1	0.95	0.90	2.67	1.39
	VE2	0.97			
	VE3	0.93			

Table 18 (cont.)

Value to Incentive	VINC1	0.89	0.75	4.27	1.13
	VINC2	0.79			
	VINC3	0.91			

b. Discriminant validity: First step of discriminant validity check is the comparison of correlation between constructs and AVE. Square root of the AVE (sqrt (AVE)) should be higher than the correlations (at least .10) (D. Straub et al., 2004). Sqrt(AVE) values are shown bold in Table 19. All sqrt(AVE) values were higher than the correlation with other constructs. Second, items should load their constructs more than others (D. Straub et al., 2004). All discriminant validity requirements were obtained.

Table 19 Item Correlation and SQRT AVE Comparison

	AM	DM	EB	II	INT	PBC	PE	PR	PU	T	UB	VE	VINC
AM	0.84												
DM	0.71	0.91											
EB	0.45	0.50	0.80										
II	0.22	0.17	0.36	0.80									
INT	0.48	0.43	0.59	0.31	0.93								
PBC	0.45	0.53	0.28	0.21	0.41	0.97							
PE	0.39	0.44	0.64	0.33	0.60	0.21	0.88						
PR	0.35	0.38	0.52	0.50	0.44	0.36	0.45	0.81					
PU	0.35	0.43	0.60	0.18	0.30	0.30	0.37	0.41	0.83				
T	0.39	0.46	0.61	0.20	0.36	0.28	0.38	0.45	0.60	0.89			
UB	0.58	0.65	0.43	0.16	0.43	0.50	0.38	0.36	0.45	0.46	0.87		
VE	0.28	0.17	0.38	0.31	0.41	0.21	0.44	0.28	0.18	0.26	0.19	0.95	
VINC	0.33	0.28	0.42	0.36	0.44	0.34	0.33	0.45	0.25	0.27	0.25	0.41	0.86

5.1.6 Structural Model Results

In order to test the significance of the paths and hypotheses, the path analysis was conducted via Smart-PLS program. The PLS-Algorithm was run to identify the path coefficients and the R^2 , and the bootstrap analysis was run to identify the t-values.

Figure 18 represents the PLS results of the research model. Overall, the model explained the 54% of the variance in the e-service usage intention and the 6% of the variance in the e-service usage behavior. Moreover, the 33% of the variance in the perceived behavioral control and the 36% of the variance in expected benefit was explained with the proposed research model. The t statistics are given in Table 20. The t-values above the ± 1.96 indicate a significant path from a construct to intention (Hair, 1998). The path coefficients of the significant paths range from 0.13 to 0.60 (see Figure 18).

Table 20 Results of the Structural Model

Construct(Abbreviation)	Path	T Statistics	Path Coefficients
Perceived Application Mobility (AM)	AM -> PBC	1,28	0.09
Customer Innovativeness (CI)	CI*PBC -> INT	2,42	0.15
	CI*PBC -> U	1,49	0.08
Perceived Device Mobility (DM)	DM -> PBC	3,21	0.30
Expected Benefit (EB)	EB -> INT	3,34	0.28
Informational Influence (II)	II -> INT	0,66	-0.03
Intention to Use E-Service (INT)	INT-> U	2,96	0.20
Perceived Behavioral Control (PBC)	PBC -> INT	3,72	0.22
	PBC -> U	0,95	-0.07
Perceived Enjoyment (PE)	PE-> INT	3,52	0.29
Value to Personalization (PR)	PR -> INT	0,82	0.04
Perceived Usability (PU)	PU -> INT	1,53	-0.10
	PU -> EB	12,73	0.60
Trust to the E-service (T)	T -> INT	0,22	-0.01
Perceived Ubiquity (UB)	UB -> PBC	2,87	0.25

Table 20 (cont.)

Value Expressiveness (VE)	VE -> INT	1,77	0.10
Value to Incentive (VINC)	VINC -> INT	2,00	0.13

In addition, the direct, indirect, and total effects of the constructs on the intention to use e-service are given in Table 37 in Appendix K.

The results of hypotheses testing are given separately for the direct, moderating, and mediating effect types below.

a. Direct Effects: According to the results, behavioral belief constructs; perceived enjoyment ($p < .001$), value to incentive ($p < .05$), and expected benefit ($p < .001$) were the drivers of the Intention and H1a, H1b and H2a were supported. Furthermore, the perceived usability positively affected the expected benefit, and H2d was supported. Moreover, the effect of the perceived behavioral control on the intention was found significant ($p < .001$), and H4b was supported. On the other hand, the paths from the normative belief constructs; informational influence and value expressiveness to the intention were not found significant. In addition, the paths from the trust to the e-service, perceived usability and perceived personalization to the intention were not found significant. Consequently, H2b, H3a, H3b, and H4a were rejected.

Furthermore, intention ($p < .01$) is the driver of the e-service usage behavior, and H7a was supported. On the other hand, the paths from the perceived behavioral control to the usage behavior were not found significant. Therefore, H4c was rejected.

b. Moderating Effects: It was found that the customer innovativeness ($p < .05$) significantly moderated the path between the perceived behavioral control and intention. The customer innovativeness had a positive moderating effect. The influence of the perceived behavioral control on the intention increased with the customer innovativeness. Thus, we can conclude that H6a was supported. However, the moderating effect of the customer innovativeness on the path between the perceived behavioral control and usage behavior was not found significant. Therefore, H6b was rejected.

c. Mediating Effects: The research model included four mediating effects on the intention. The Sobel test, a method of testing the significance of the mediation effect, was conducted to test the significance of the mediation effect (Baron & Kenny, 1986). The results of the Sobel Test are given in Table 21. According to the results, the perceived behavioral control fully mediated the impact of the perceived device mobility and perceived ubiquity on the intention. Furthermore, the expected benefit fully mediated the impact of perceived usability on the intention. Thus, H2c, H5a, and H5c were supported whereas H5b was rejected.

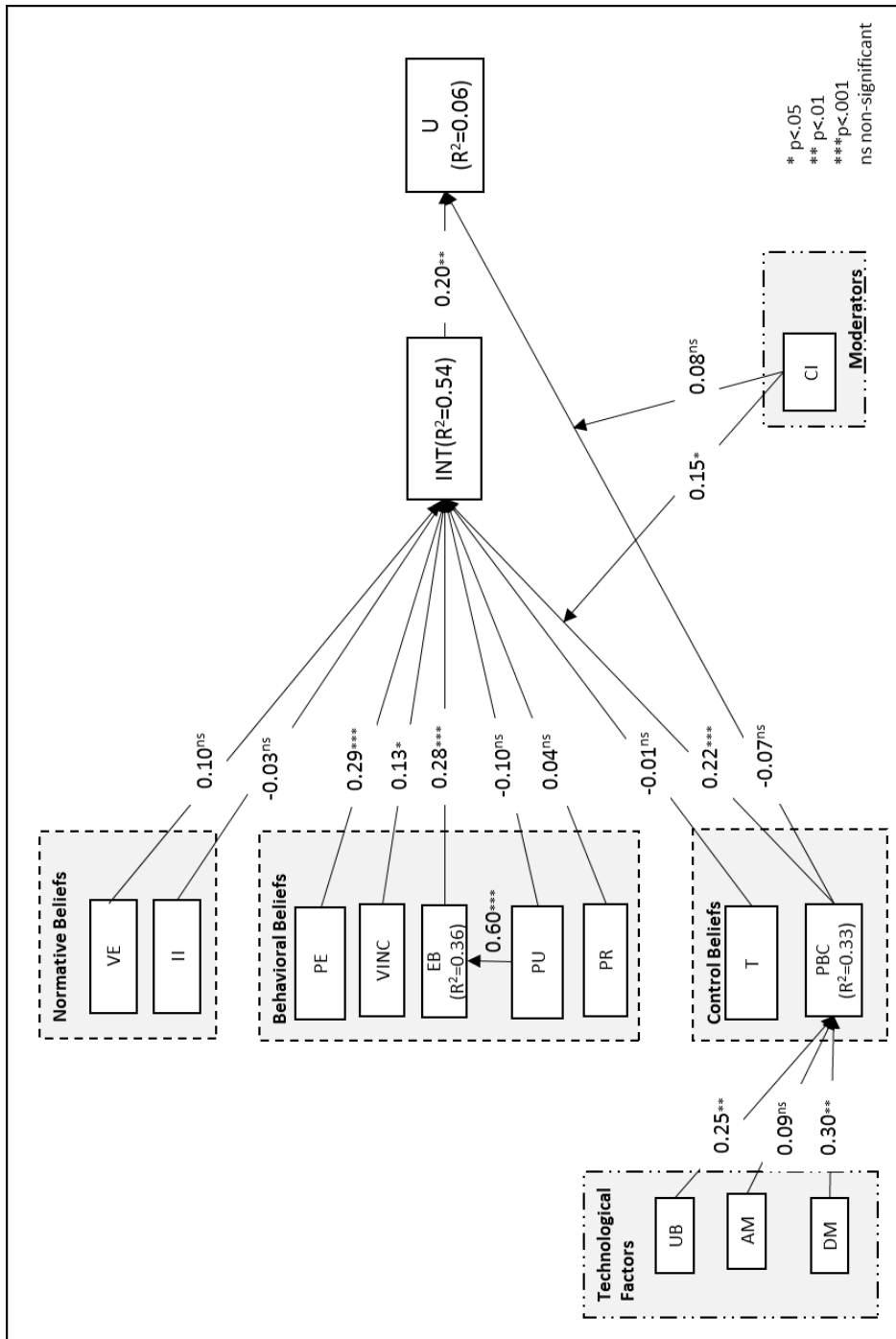


Figure 18 PLS Results of the Research Model

Table 21 Sobel Test Results

Independent variable	Dependent variable	Mediator variable	Sobel test statistics	P value
AM	INT	PBC	1,263	0,207
DM	INT	PBC	2,096	0,036
PU	INT	EB	2,017	0,002
UB	INT	PBC	3,164	0,044

5.2 Results of Phase2: Task Analysis and Interviews

In this section, the results of Phase2 are given in five sections: demographics, results of interviews, task, and actual usage data analysis, and comparison of the results.

5.2.1 Demographics

Thirteen subjects participated to the study. Eight of them are female, and five of them are male. Age of the participants ranged from 20 to 33. Most of them reported that they used laptop (100%) and mobile phone (84.62%) to reach e-services. All the participants reported that they used e-services for getting information and social networking purposes.

5.2.2 Results of the Interviews

First, the data quality of the qualitative study is discussed. Then, results of the interview analysis are given.

a. Data Quality of the Qualitative Study: In quantitative research, quality and verification of a study is confirmed via reliability and validity procedures. However, in qualitative research there is no common procedure to examine the quality. Lincoln and Guba (1985) revealed four criteria to confirm the quality of the qualitative data. These are credibility, transferability, dependability, and confirmability. The following strategies were carried out to fulfill the trustworthiness of the current study.

Credibility is one of the principal criteria to confirm the quality of an inference. According to the Mertens (2005), an inference credible in the case of “there is a correspondence between the way the respondents actually perceive social structures and the way the researcher portrays their viewpoints” (p. 254). Triangulation technique was used to confirm the credibility issue. The questionnaires, transcribed interviews, and notes taking during the interviews were used for the triangulation of the source.

Transferability means that “transferring of inferences from a specific sending context to a specific receiving context”. In order to ensure the transferability of the current study

detailed description of the methodology was given. The data collection and data analysis steps were described in detail.

Confirmability means that “the extent to which the product of the inquiry is confirmable” (Teddlie & Tashakkori, 2009, p. 296). A confirmability audit was prepared to ensure confirmability. This audit included the audio file of the interviews, transcribed interviews, coding files, notes of the researcher and detailed procedure of the data analysis.

b. Interview Results: During the interviews, two parts of questions were asked to the participants (see Appendix G). The first part of the interview questions investigated the MobileMETU usage. The second part composed of the questions that are related with the investigated factors of research model. The results of each part were given below separately.

Part 1-MobileMETU Usage: First, the favorite service of the MobileMETU was investigated. According to the results, the favorite part of the MobileMETU was transportation related services (ring, find buildings, and bus stops). Then, location sharing and event services came.

Second, it was asked to the participants that what aspects of MobileMETU they do not like. The interface related complains stand out among the answers. The layout and size of the buttons on the screen and navigation were criticized. In addition, the message interface was found complicated.

The participants had difficulty in performing the “send message” task. Some of the participants could not gain a clear understanding of how to send a message, and tried to find group member from the “Subscribed Groups” or “My Groups” pages. However, a message is sent by selecting the group member via the red marker on the map. They suggested that when a member is selected from the member list, related options (i.e. send message and show on the map) are presented to the user. Furthermore, some of them could not click the red marker and needed to adjust the scale of the map.

Moreover, we asked that which features they want to be added to MobileMETU. Integration with the other services was the most preferred features. For example, they wanted to share the event they created or their location with Facebook and Twitter. Moreover, they wanted to see the daily food menu of the cafeteria or restaurants in Çarşı. Second, file sharing, especially photo sharing, was desired. The other features are related with the interface: homepage button, language option, well organized interface.

The aim of use also examined. Most of the participants preferred to use MobileMETU for getting information. On the other hand, three of them prefer to use MobileMETU both for getting information and social networking aims.

Afterwards, the factors affected the user to discontinue using MobileMETU and to start to use a new one having similar features were investigated (see Table 22). Among these factors, the usability had the highest percentage (31%). Participants emphasized that they

choose the e-service that is easy to use and has simple interface. Then, benefits, technological factors, and popularity came with 28%, 19%, and 13%, respectively.

Table 22 Factors Affected the User to Discontinue Using

Category	Key ideas	Number of comments	Total	Percentage
Usability	Ease of use	6	10	31
	Simple interface	4		
Benefits	Benefit	5	9	28
	Fulfil the needs	3		
	Serve the purpose	1		
Technological factors	Ubiquity	2	6	19
	Application mobility	2		
	Speed	2		
Popularity	Popularity	2	4	13
	Friends	2		
Others	Personalization	1	3	9
	Promotion	1		
	Information content	1		

Then, the factors that encourage continuing to use the m-service were examined (see Table 23). The benefits and popularity were the key factors that affect the decision to continue to use the e-service.

Table 23 Factors Affected the User to Continue to Use

Category	Key ideas	Number of comments	Total	Percentage
Benefits	Serve the purpose	3	7	39
	Benefit	3		

Table 23 (cont.)

	Time savings	2		
Popularity	Friends	5	6	33
	Number of users	1		
Usability	Ease of use	2	2	11
Integration	Integration	2	2	11
Habit	Habit	1	1	6

Furthermore, the factors that affect behavioral and control beliefs were investigated. The Table 24 summarized the factors. The detailed results are given in Appendix L.

Table 24 Factors that Affect Behavioral and Control Beliefs

Factors	Advantages	Disadvantages	Enabling factors	Disabling factors
Technological factors	√	√	√	√
Perceived behavioral control		√	√	√
Trust		√	√	√
Benefit	√		√	
Popularity		√	√	
Usability		√		√
Leisure time				√
Innovativeness			√	
Enjoyment	√			
Personalization	√			
Incentive	√			

Part 2-Constructs of the Model: After the interview, the data were exported to an Excel file, the texts were read, and 64 codes were identified. Then, the codes were organized under the 20 categories. We identified twelve preset categories and seven emergent categories. The preset categories are the constructs of the proposed research model. On the other hand, the emergent categories are new dimensions that are related with e-service usage intention and behavior. Table 25 represents the preset and emergent categories. Then, key ideas being expressed within the preset categories were identified (see Table 26).

Table 25 Categories

Category type	Category
Preset categories	Trust Perceived Enjoyment Expected Benefit Usability Perceived Behavioral Control Personalization Device Mobility Application Mobility Ubiquity Incentive Informational Influence Value Expressiveness
Emergent categories	Service quality Integration with other e-services Habit Self-Efficacy Popularity Voluntariness Pleasure Time

Table 26 Key Ideas within the Categories

Category	Key ideas	Other ideas
Perceived Enjoyment	Satisfy one's curiosity	Location sharing Time Savings Ease of use Enhance communication Socializing Access to information Access anytime

Table 26 (cont.)

Personalization	Interface Profile Promotion Cater to different users	Ease of Use
Incentive	Food discount coupon Prize competition Mobile Incentives	Special incentive to METU
Expected Benefit	Time Saving Enhance Communication Facilitate Transportation Socializing /Event	Mobility Location Special to university Access anytime
Perceived Usability	Interface Turkish language option	Time saving Internet access Phone properties Comply with habits
Perceived Behavioral Control	Internet access Phone, Tablet PC properties	
Trust	Location sharing Information privacy Manageable location sharing	Lack of knowledge Personalization
Ubiquity	Fulfill the instant need	Access event info Affect Satisfy one's curiosity Make use of spare time Mobility Time saving
Device Mobility	Fulfill the instant need Access anytime	Comply with habits Get benefit
Application Mobility	Ability work on different phones	
Informational Influence	Friends Expert opinion Try it myself	Get benefit
Value Expressiveness	Leading role Prestige Shaped by daily life	Enhance communication

Finally, relationships between the categories were examined. Table 27 represents the relationships and example quotations from the transcripts.

Table 27 Relationships between Categories

Category 1	Category 2	Relationship direction	Example quotations
<u>Perceived Enjoyment</u> Location sharing Satisfy one's curiosity Socializing Time savings Access to information	<u>Expected Benefit</u> Time Saving Enhance Communication Facilitate Transportation Socializing/Event Serve a purpose	EB→PE	“When I want to create an event, I can create it immediately. I do not need to wait or fill too many forms. It’s being quick increases the joy. Saving time increases the fun, really.”(P5) «Time is indeed very important in our age. MobileMETU helps to decide and perform in a short time. It shows the bus stop. If you do not know where to go and there is no one around you to ask, it indicates the direction. I think this is even a fun.” (P9)
<u>Expected Benefit</u> Time Saving Enhance Communication Facilitate Transportation Socializing /Event Serve a purpose	<u>Perceived Usability</u> Time saving	PU→EB	«I think it is very useful. As, you can access to the program by one-touch clicking on the mobile phone screen instead of typing to the internet browser address line.” (P9) “Being functional is more important when it is mobile. It is important to get things done more quickly. There is no keyboard and I write from the screen, therefore, it is better to be fast.”(P5)
<u>Perceived Usability</u> Interface Ease of use	<u>Personalization</u> Interface Fast process	PR→PU	“For example, after the X bank made it (personalization), it became more easy to use. They added the frequently used button to the top. When I directly click this button, credit card debt and EFT are all there. Something that I reached with four-button before, now I am accessing to them with only one button. This is something I want.” (P6) * The name of the bank was replaced with "A"

Table 27 (cont.)

Expected Benefit	Incentive	VINC→EB	
Time Saving	Food discount coupon		« I'm thinking the locations that I spend money on campus. Food in particular. Clothes, I do not spend money on things like clothes." (P6)
Enhance Communication	Prize competition		«Discount coupons for foods or anything that you can get with money. They attract more attention. Actually, discount is always attractive. It is more attractive for students." (P10)
Facilitate Transportation	Mobile Incentives		
Socializing/Event			
Serve a purpose			

5.2.3 Results of the Tasks Analysis

The tasks were analyzed in terms of easiness level, completion time, and number of errors. The easiness level was obtained from the participants ranks that range from 1 to 5. The completion time includes the period between the start and finish time of the task. The number of errors denotes the error made by the participant such as using an inappropriate service or tapping a wrong button during the task completion. The number of errors represents the effectiveness, and the completion time represents efficiency.

The mean values of the easiness level, completion time, and number of errors for each task are given in Table 28. The easiness levels (range from 1 to 5) of the tasks were above the mid-point 3 and a few errors were made.

Table 28 Results of the Task Analysis

Task No	Easiness level	Completion time(sec)	Number of errors
Task-1	4.46	38	0.08
Task-2	3.23	100	0.92
Task-3	4.85	20	0.00
Task-4	4.38	57	0.46
Task-5	4.31	42	0.62

According to the results, Task-2 (send a message to a group member) had the highest number of errors and completion time. The Task-3 (find buildings in 100 meters range); however, had the lowest completion time and none of the participant made an error during this task. Parallel to these results, Task-2 had the lowest easiness value (3.23) whereas Task-3 had the highest (4.85).

Furthermore, 61.5% of the participants indicated the Task-2 as a hardest task, and 72.9% of them indicated the Task-3 as an easiest task. We can conclude that when a participant makes a mistake this affects his/her decision about the easiness level of the task. In order to investigate the relationships between number of errors and easiness level nonparametric correlation analysis was conducted. We found a negative significant correlation between the number of errors and easiness level, $r = -.60$, $n=65$, $p < 0.01$.

Furthermore, satisfaction degree of the participants was high. They ranked the satisfaction with a Likert scale that range from 1 (worst) to 5 (best). The average satisfaction rate is 4.31 (range from 4 to 5). This result showed that participants were considerably satisfied with the e-service.

5.2.4 Results of Actual Usage Data Analysis

The log files were analyzed to gain information about the actual usage behavior. The cumulative usage logs were used to analyze the actual usage. First, the services in the log files were grouped (see Table 29). First group represents the frequency of use and composes of the login and logout services. Second group includes the services that are related with getting information. Third group comprises the message and group services that are used for social networking purpose. Last group involves the location sharing option.

Table 29 Service Groups

Group name	Service type
Number of use	Login, Logout
Getting information	Buildings, Bus Tops, Ring and Event Information
Social networking	Message, Groups
Location sharing	Leave Foot Print

Second, logs were analyzed in terms of aim of use. MobileMETU serves to two aims: getting information and social networking. Table 30 depicts the percentage of service usage by aim and service type. The users used MobileMETU for getting info more than for social networking. Then, services were investigated in detail for each service type. Among the getting information services, transformation information related services (bus stop and

ring) had the highest percentage (58%). Then, building and event information came with 22% and 19%, respectively. In social networking, group services (90%) were used much more than message services (10%). Moreover, 39% of the users used the “Leave Footprint” service to share their location as an alternative to GPS usage.

Table 30 Service Usage by Aim and Service Types

Aim of use	Percentage	Service type	Percentage
Getting information	59	Building information	22
		Event information	19
		Transportation information	58
Social networking	41	Message	10
		Groups	90

5.2.5 Comparison of the Results

In this part, the results of the interview, task and actual usage data analyses are compared. According to the actual usage data, MobileMETU was used more for getting information (59%) than social networking (41%). This result was supported with the interview and task analysis results. Most of the participants preferred to use the e-service for information gathering purpose. Moreover, getting information tasks (Task-3 and Task-4) had higher easiness level and lower number of errors than social networking tasks (Task-2 and Task-5).

Among the getting information services, transportation information (58%) had the highest usage rate (see Table 30). In addition, this type of service was the favorite of the participants, and nine participants emphasized the time saving advantage of transportation information. On the other hand, message services (10%) had the lowest usage rate (see Table 30). Moreover, most of the participants had difficulty in “send a message” task. They stated that message interface was complicated and needs to be redesigned. The number of errors for this task (0.92) was higher than the other tasks (range from 0 to 0.62) and easiness level of this task (3.23) was the lowest among the five tasks.

The findings of the interviews revealed that the users do not want to continue to use the e-service if they faced with a usability problem. The results of the log analysis were parallel with this finding. The message service that was found complicated used rarely by the actual users of the m-service. Moreover, the interview results indicated that if the service provides benefits and fulfils the needs, the users are encouraged to continue to use. In addition, participants’ favorite service was transportation information services. Concordantly, the log analysis results showed that transportation service had the highest usage rate.

5.3 Integration of the Qualitative and Quantitative Results

The findings of the qualitative and quantitative analyses were integrated in this section. The research model was validated with the mobile campus e-service, and the data were collected from the METU students. Therefore, the findings should be cautiously interpreted and be avoided from the generalization of the findings of this study to the general population and e-services.

5.3.1 Perceived Enjoyment

Our results were revealed that perceived enjoyment significantly influenced the intention ($p < .01$, $\beta = 0.28$). During the interviews, we asked the participants in what aspects this e-service is enjoyable. It was found that satisfying one's curiosity, location sharing, time saving, ease of use, enhancing communication, socializing, access to information and access anytime were the aspects that make this application enjoyable. Some quotes are given below.

For one thing, the most important and chief sense of man about entertainment is curiosity. I think MobileMETU arouses people's curiosity. Therefore, it is entertaining. It is enjoyable because I am able to see things that I wonder. One thing that makes it fun is to see where someone in real-time. (P3)

I think it is pretty cool. Once, it enables you to be social, you look the events. As a result, you can go to the event and socialize. It is a pleasant thing. (P9)

You may see the location of people. It can be fun. It is enjoyable when I see others. This may be a good sharing. (P1)

5.3.2 Expected Benefit

It was found that expected benefit was a strong driver of the intention ($p < .001$, $\beta = 0.29$). According to the qualitative analysis results time saving, enhancing communication and facilitating transportation were the essential benefits of the mobile campus service. Table 31 gives example quotes for each benefit type. Furthermore, it was identified that there was a relationship between perceived enjoyment and expected benefit. Most of the participants mentioned about the time saving, communication and transportation aspects that make the mobile campus service enjoyable.

Table 31 Type of Benefits

Type of benefit	Example quote
Time saving	"It brings back the time that I lost. This is an important thing to prevent the waste of time." (P7) "Time is indeed very important in our age. MobileMETU helps to decide and perform in a short time." (P9)

Table 31 (cont.)

Enhancing communication	<p>“If we use this service with my friends, it will be useful to us in terms of being in communication with our friends.” (P2)</p> <p>Communicating with my friends and determining their locations via the application is very important for me in case of not being reachable. Because, sometimes I may not reach my friends. I may not know where s/he is. However, if I know that s/he uses this application constantly, it will be much more comfortable.”(P4)</p> <p>“Group is very important. Group work is done in many departments of METU, really. For at least one course, each semester we carry out group work. Therefore, this would be very effective among group members.” (P10)</p>
Facilitating transportation	<p>“Search Buildings can be quite useful. I am new at METU. This is my second year. I have to search by asking someone. So search buildings and bus stop is a good property.” (P7)</p> <p>“Finding out the location of the ring by looking from the MobileMETU would be much more comfortable than waiting at the bus stop for half an hour.” (P4)</p>

5.3.3 Value to Incentive

The results showed that the value to incentive had a significant effect on the intention ($p < .05$, $\beta = 0.13$). Furthermore, all of the participants indicated that incentives affected their usage decision and increased their usage rate. One of the participants mentioned that

I am interested in incentive, of course. As I said before, it may show places related with food. If someone says there is a promotion for users of the mobile campus service, it attracts me of course. I use it, if I regularly eat there. (P9)

Moreover, they were asked that which type of incentive they suggest increasing the usage rate. Six of them suggests food discount coupon and five of them suggested mobile incentive such as bonus airtime minutes, application, and Internet access.

5.3.4 Perceived Usability

Although the path from perceived usability to intention was not found significant, the mediating effect analysis shows that expected benefit fully mediated the impact of the perceived usability on Intention for our sample. Moreover, the relationship between the perceived usability and expected benefit was identified in the interview analysis. Some of

the participants emphasized the effect of usability issues on time saving aspect of the expected benefit. One of the participants mentioned that

I think that it is very useful. Because, you can access to the program by one-touch clicking on the mobile phone screen instead of typing to the address line of the internet browser. (P9)

Moreover, other expressed that

Being functional is more important when it is mobile. It is important to get things done more quickly. There is no keyboard and I write from the screen, therefore, it is better to be fast. (P5)

Furthermore, one participant gave an example from his/her daily life by stating that

For example, I started to use X but it was not like Y. In Y, when I write the first letter, the person that I look for appears. However, I need to return to the home page in X. That takes so long time. For that reason I unsubscribed from X. (P12)

*The name of the applications were replaced with "X and "Y"

Moreover, it was asked to the participant that if another e-service that has the similar function with the mobile campus service is introduced to you, which factors encourage you to choose this new application. Usability had the highest rate (46%) among the answers of this question.

5.3.5 Value to Personalization

The effect of the value to personalization on intention was not found significant for our sample. In order to examine the effect of personalization, the participants were asked whether they prefer to use an e-service that is personalized according to their expectations and needs. Three of them did not prefer to use personalized service whereas 10 of them preferred. However, some of them complained about the quality of personalized services. For example, one of the participants indicated that

Personalization is important but there are many services that make mention of doing it. None of them does it properly. They divide to the five groups. They serve some things according to these groups. It is not a sufficient personalization. (P6)

Moreover, one participant indicated that he needs personalized service when the data density increases by saying that

I would like personalization but this depends on data density. When the data density is increased, it will be more important to me. Since, it will also contain a lot of information that are not valuable to me. (P3)

In addition, one of them emphasizes the difficulty of personalized service provision by saying that

It may be a little difficult. Many people will use it. So, everyone's personal expectations may be different. However, I personally would not want. All in all, a lot of people use this. Probably you do not find something that is really creative and meet the personal needs of everyone. (P10)

Furthermore, some of them indicated that personalization increases usability. Some quotes are given below.

For example, after the X bank made it (personalization), it became more easy to use. They added the frequently used button to the top. When I directly click this button, credit card debt and EFT are all there. Something that I reached with four-button before, now I'm accessing to them with only one button. This is something I want. (P6) * The name of the bank was replaced with "A"

This is important for my use decision. Because, accessing a thing that I want is becomes quicker. This makes it easy to use. Since, it is something that I use frequently. (P13)

5.3.6 Informational Influences

The path between the informational influence and the intention was found non-significant in our model. It was asked to the participants that do opinions of others affect their intention to use a service. The answers to this question differed among the participants. Three sub-groups were identified. The first group thought that informational influence had an effect on their decision, and seven of them indicated that opinions of their friends influenced them. The second group composed of four participants, and they took advice of an expert. The last group preferred trying the service oneself, and three participants emphasized that their own opinion about the service was important than the others. The examples of each group are given in Table 32.

Table 32 Differences between Responses Related with Informational Influence

Group	Text
1	"If one of my friends says that it is so slow, or I cannot access recently, I will think that it does not worth to use, it is too slow." (P13)
2	"The people from whom I am impressed a lot about this matter are mobile software and application developers. I value their opinions. That kind of friends. I expect that they have a certain degree of knowledge." (P3)
3	"The most impressive decision that influenced me in every respect has always been my own decision. If I think that it is useful, I will try it." (P9)

5.3.7 Value Expressiveness

PLS analysis showed that the value expressiveness had not significant effect on intention for our sample. However, some of the participants mentioned that they had gain prestige by using the mobile campus service. For example, one of them stated that

It is perhaps the biggest influence of social networking site. It is a platform from which people earn more prestige with more sharing, and thus gained more followers. This prestige concern will increase the use. In that sense, there is a positive link between them. It will have a positive effect. (P3)

Moreover, one of the participants emphasized the leading role by stating that

Creating an event means that to do organization. If I create this event and twenty of my friends join to it, I will assume the leading role of course. It will be effective. It may not be too dominant, but it will be effective. (P9)

On the other hand 4 of them indicated that if someone is active in daily life then he/she would be active in the MobileMETU.

I do not believe it so much. Because, if a person is not volunteered to participate in an activity, I do not think it would be more of volunteer by using the program. Still, s/he will not agree to participate. (P7)

People, who are already active, will use this application. S/he will form a group and take action related with it. (P6)

5.3.8 Trust to the E-service

In our model, the effect of the trust on intention was not found significant. This effect was investigated during the interview. The participants were asked that whether they have concerns related with the trust during the mobile campus service usage. Most of them (11 out of 13) indicated that they did not have any concern about the trust. Some of them emphasized the leave footprint function that enables users to manually identify and share their location. They stated that if they do not want to show their location to the group members they have a chance to use this option. One participant indicated that

If I do not want, I may not leave a footprint. It is in control of my own, therefore, I do not have a problem related with confidence. (P8)

Before the first usage of the program, the user of the e-service was asked that whether he/she want to open the GPS. Moreover, the user can only see the location of other users if they are members of the same group. These features give control to the user over the program. These may affect their decisions about the trust. Furthermore, some of the participant indicated that the mobile campus service is particular to university. Therefore, they have no concern about trust.

Moreover, some of them indicated that they do not share the bank account, credit card number, or password by saying that

I have not so much problem in terms of the trust. Actually, I do not give a bank account number. It is a compact program, and you do not share so much personal thing. The things you may lose are very few. You may lose the group information and messages. It does not become a problem in case they are backed-up in somewhere. (P5)

The main concern about the trust was information privacy. For example, one of the participants mentioned about privacy of location information and indicated that

I have a concern related with privacy, as it knows my location. I do not know my location is shared with whom or stored in a safe way. (P6)

5.3.9 Perceived Behavioral Control

The effect of perceived behavioral control on intention was found significant ($p < .001$, $\beta = 0.22$). Moreover, participants mentioned about the Internet access problem that disabled them to use the mobile campus service. Some quotes are given below.

The need of constant internet connection is the technical inadequacy of the service. I may not have internet access on campus all the time. (P3)

The only annoyance may be the areas that have no Internet. We can reach Internet at many places in the campus. I may use it anywhere where there is Internet but cannot use where there is no Internet. (P10)

I need a constant internet connection. Perhaps it may be difficult to achieve these conditions. I may not have this opportunity over the campus. (P3)

It's being constantly connected to the Internet may force me to use. However, if I have not any trouble with Internet, I use it. (P2)

5.3.10 Perceived Device Mobility

According to the structural model analysis result, perceived device mobility had a significant effect on perceived behavioral control ($p < .01$, $\beta = 0.30$). Moreover, the effect of the perceived device mobility on the intention fully mediated by the perceived behavioral control. Some of the participants emphasized the importance of the mobility by saying that

Mobility is too important. For example, this application's being mobile is important. For instance, when I go somewhere I want to see my friends being there. I may not bring along my laptop, therefore, I want to use my phone. (P6)

I think it is very important for me in this period. It is also crucial to everyone. As I said, we cannot be at the desk every minute. However, I may remove the phone out of my bag and look everything that I need. (P10)

5.3.11 Application Mobility

It is found that the Application Mobility has no significant effect on the Perceived Behavioral Control for our sample.

One of the participant emphasized the effect of the Application Mobility on the Ubiquity and stated that

In general, being used at more platforms means that access of more people. I benefit from the program. Also, other people benefit from it. The more people take advantage of it the more events are created. (P7)

One of the participant mention about this construct as a factor that enable to use e-service, and stated that

We cannot use the application at every phone. At present, I do not have such a phone. But, if I buy, I want to use. I think it is effective for many people. The people who have this kind of phone will use the application firstly. (P10)

5.3.12 Perceived Ubiquity

The path analysis revealed that perceived ubiquity had a significant effect on perceived behavioral control ($p < .01$, $\beta = 0.25$), and perceived behavioral control fully mediated the effect of perceived ubiquity on intention. All of the participants indicated that ubiquity has a substantial effect on their e-service usage intention. Most of them indicated that ubiquity is important to fulfill the instance needs. One of them indicated that

I would like to access from everywhere on the campus. I do not know where and when I would need. I would like to open and get information at any place. (P9)

Another participant said that

It is really important if I need at that moment. For example, I forgot to take note of this building's address before I came here. I logged in from the phone and looked, at that moment. However, I might not have Internet access at that moment. In such circumstances, I ask to someone who has Internet access. However, you cannot do this all the time. You cannot give your password to everyone. Therefore, if I really need, access to something is very important to me. I can access and see many things; therefore, it is a good service for me. I think that there are many people who think like me. (P10)

5.4 Discussions

In this part, the results of the current study are compared with the findings in the literature, and the similarities and differences are presented. The results were discussed in terms of four research questions proposed in Chapter 1. These are: (1) what are the factors that affect e-service usage adoption? (2) what are the relationships between these factors? (3) what is the weight of each factor on the e-service usage behavior? (4) what are the e-service users' perceptions about these factors influencing their e-service usage?

5.4.1 Behavioral Beliefs

According to the results, behavioral beliefs had a substantial impact on the e-service usage adoption for our sample.

One of the main drawbacks of the TPB based models in the adoption literature is the lack of affective factors dimension. Our study supported the necessity of the affective dimension in adoption studies. The results showed that the perceived enjoyment was one of the drivers of intention, and had the strongest effect on the intention to use e-service. This finding implied that beliefs of e-service users about the enjoyment of the e-service influence their usage intention. Our results were parallel with the findings of Liu and Forsythe (2011). In their research, they found that enjoyment positively affects the intention to use of online sites and motivates the consumers to purchase online. Moreover, the study of Van der Heijden (2003) confirmed the relationship between the perceived enjoyment and the intention to use. In addition, Teo, Lim and Lai (1999) revealed that enjoyment was one of the best predictors of the frequency of Internet usage and daily Internet usage. As a consequence, this study presents that users are in a tendency to use e-services when they perceived that the e-service is enjoyable.

Another predictor of e-services adoption is expected benefit. The findings of this study indicated that users' beliefs about the expected benefit from the e-service have significant impact on the intention to use the e-service. Expected benefit was the most influential construct among the functional factors, and had the second largest direct effect on e-service usage intention. These findings implied that the decisions of users concerning the e-service adoption depend on the perception that they have on expected benefit. Similar to these findings, the effect of benefit on intention was also presented in the former studies. Lee and Rao (2009) found a strong relationship between website usefulness and intention to use website for information and transaction. Furthermore, Venkatesh et al. (2003) indicates that acceptance of IT is based on performance gain obtained by the IT usage. Moreover, Pavlou and Fygenon (2006) revealed that usefulness is one of the best predictors of both attitude toward getting information and attitude toward purchasing. In addition, the results of the actual usage data analysis showed that the services perceived more beneficial (i.e. transportation information services) used more frequently by the users.

Moreover, we identified a relationship between perceived enjoyment and expected benefit. During the interviews, the participants emphasized that the benefits gained by using an e-service affect their belief about the enjoyment of the e-service. If they gain more

benefit, the perception that they have about the enjoyment also increases. Besides, we found that time saving, and efficiency (i.e. enhancing communication) are the main benefits gained by using the e-service. In addition, the results of the interviews indicated that e-service usage saves time and this increases the enjoyment. This relationship was also confirmed by Compeau, Higgings and Huff (1999) for the computer usage behavior in business domain.

Incentive is an essential driver of the behavioral intention. Our findings indicated that the value to incentive significantly and positively affected users' intention to use the e-service. In addition, the path coefficients depicted that this construct has the fourth largest effect on the e-service usage intention. This result is consistent with the Naidoo and Leonard (2007) that found positive relationship between the loyalty incentives and intention to use e-services. In addition, the interview results revealed that the e-service users preferred discount coupons and domain specific incentives (i.e. bonus airtime minutes and Internet access).

Furthermore, qualitative analysis results indicated that there was a relationship between incentive and expected benefit. If the e-services provide incentives to their users, the perception of users about the usefulness of the e-service positively influenced. In addition, users perceived the incentives as a benefit gained by e-service usage. Similarly, the interaction between incentive and usefulness was shown by Bhattacharjee (2001).

Although personalization and usability are important aspects of e-services domain, the direct effects of value to personalization and perceived usability on intention were not significant in our study. However, we found that the effect of perceived usability on intention was mediated by the expected benefit. Similarly, Shin et al. (2010) found that ease of use did not have a significant direct effect on the intention to use mobile internet; however, it affects intention indirectly through usefulness. Moreover, our results were consistent with the findings of Lin and Lu (2000) and Featherman and Sprott (2010). In other words, users' perception about the usability of e-service is a vital strength in shaping their decision concerning the benefit of the e-service.

Furthermore, we identified that usability has an impact on the actual e-service usage decision. In this study, the services of the mobile campus service were used less frequently if they have a vast number of usability problems. For instance, during the task analysis, participants made more error in the "send a message" task, and the results of log analysis showed that this service had the lowest usage rate.

In addition, interview results revealed the relationship between personalization and usability. The users stated that personalized services provide easy access to the information and improve the usability of the e-service.

5.4.2 Control Beliefs

According to the results of current study, control beliefs had a considerable impact on the e-service usage adoption.

Quantitative results indicated that perceived behavior control had a significant direct effect on intention. Moreover, perceived behavioral control was the third most effective factor in predicting e-service usage intention. These findings implied that users that perceive higher behavioral control (i.e. knowledge, resource, and ability) have a higher intention use the e-service. Similarly, this effect was emphasized in several previous studies (H. F. Lin, 2007; Pavlou & Fygenson, 2006; V Venkatesh, Thong, & Xu, 2012; Zhou, 2013). As a consequence, this study presents that users are in a tendency to use e-services when they perceived that they have adequate resources and abilities.

In addition, our results indicated that customer innovativeness significantly moderate the relationship between the perceived behavioral control and intention to use the e-service. Similarly, Taylor and Todd (1995) revealed the effect of the experience on the path from the perceived behavioral control to behavioral intention.

Furthermore, our findings indicated that technological factors had a substantial influence on the e-service usage adoption. The results showed that perceived device mobility and ubiquity had a significant and positive effect on the perceived behavioral control. Users perceive that they have more control over the service if they can reach the service anytime and anywhere. The ability to move with the device while using an e-service also encourages users and enhances the control over the service. Moreover, the indirect effects of the perceived device mobility and ubiquity on intention to use the e-service were found significant. Besides, technological factors have the fifth largest total effect on intention to use the e-service. Our results are similar to Kim and Garrisson (2009) that found a positive relationship between the perceived ubiquity and intention to use the mobile wireless technology in the business settings. Moreover, Boakye, Prybutok and Ryan (2012) revealed that if the users are satisfied with web access quality, they tend to continue to use the service. In addition, study of Hong, Thong, Moon and (2008) confirmed the relationship between users' perception about overall mobility and their willingness to continue to use m-service.

On the other hand, the path between the trust and intention was insignificant in our study. This result differs from Gefen et al. (2003), who found that trust affects online shopping intention. However, Fang, Chan, Brzezinski, and Xu (2006) investigated the effect of task type on the intention of using handheld devices. In their investigation, they found that the perceived security affected the intention of transactional tasks, whereas it did not affect the intention of general tasks (i.e. sending and reading an e-mail) and gaming tasks. The mobile application used in the current study involves only general tasks and our results are consistent with Fang et al. (2006). In addition, Zarpou, Saprikis, Markos and Vlachopoulou (2012) investigated the effect of the trust on m-service acceptance and found that trust did not have a direct effect on the intention; however, it has a significant effect on the usefulness and ease of use. Moreover, the interview results showed that some features, such as making location sharing optional and not requiring too much personal information

(e.g. credit card information or personal identification number), affect users' decisions about their trust because they feel they have control over the program.

5.4.3 Normative Beliefs

TPB based models generally include only social norm construct as normative beliefs. In addition to the social norm, there are two types of social influence: informational influence and value to expressiveness (Deutsch & Gerard, 1955). In order to enrich normative beliefs of the research model, informational influence and value expressiveness were included in the model. Previous works found that when the behavior being researched is voluntary, social influence does not influence the intention (V. Venkatesh & Davis, 2000; V Venkatesh & Morris, 2000). Our quantitative results are parallel with these findings. According to the PLS-SEM results, informational influence and value expressiveness did not have a significant effect on intention. However, Hsu and Chi (2004) pointed out that though social norms do not have a direct impact on behavioral intention, they affect intention indirectly through attitude. Therefore, one should avoid stating that normative beliefs do not have any effect on behavioral intention.

Moreover, our qualitative findings indicated that opinions of others about e-services have an impact on users' decision to use the e-service. For instance, one of the participants claimed that if one of his/her friends mentions favorable features regarding the e-service and recommends it, s/he will be encouraged to use this e-service. In addition, we identified different groups concerning the effect of information obtained from the others. The participants in the first group indicated that they were influenced by their friends. On the other hand, the participants in the second group stated that they consider the opinion of the experts only. They are influenced by the people who have more knowledge and expertise on e-services than themselves. In other words, the credibility of the information source has an impact on informational influence. This finding is consistent with the results of (Chong & Ngai, 2013). They found that both expertise and trustworthiness of the reviewer have an impact on adoption of information obtained from reviewers of location-based social services. Moreover, the effect of source credibility on adoption was revealed in persuasive communication (Johnston & Warkentin, 2010), and mobile payment service (Yang, Lu, Cao, Gupta, & Zhang, 2012) domains.

Although we could not find a significant effect of value expressiveness on intention, we identified a relationship between value expressiveness and expected benefit in qualitative analysis. Interview results indicated that the prestige gained by using an e-service influences users' opinion about the benefit of e-service usage. Users consider that if they gain prestige by using the e-service, they also gain benefit. This situation also encourages them to use the e-service. The effect of image on perceived usefulness was confirmed by Venkatesh and Davis (2000) in a business setting. In addition, Lu, Yao and Yu (2005) confirmed the relationship between the social influence and usefulness of wireless Internet services. Moreover, Al-Debei and Al-Lozi (2014) revealed that the social influence has an impact on both utilitarian (i.e. efficiency and effectiveness) and hedonic (i.e. pleasure and joy) values obtained from the usage of wireless mobile data service. Thus, value expressiveness may have an indirect impact on the behavioral intention.

5.4.4 Intention

The effect of intention on behavior was revealed in many studies (Ajzen, 1991). However, technology adoption studies had some limitations in terms of using self-reported data for usage behavior (Armitage & Conner, 2001). In order to overcome this shortcoming, we measured the e-service usage with the system captured logs (DW Straub & Burton-Jones, 2007). Our results are parallel to the findings in literature, and we found that intention to use an e-service is the primary determinant of e-service usage. In addition, intention significantly and positively affects the e-service usage. If the users have a tendency to use e-service, the e-service usage rate of the user increases. Moreover, previous studies indicated substantial intention-behavior correlation (Armitage & Conner, 2001; Randall & Wolff, 1994). However, the results of a meta-analysis conducted by Webb and Sheeran (2006) showed that medium-to-large size change in intention brings about a small-to-medium change in behavior. Similarly, we found that intention was a driver of an e-service usage; though, the variance explained via intention was limited.

CHAPTER 6

CONCLUSION

This chapter presents summary of the study, contributions, implications for researchers and practice, and limitations and recommendations for future research.

6.1 Summary

This study aimed to develop an e-service adoption model that predicts and explains the e-service usage and covers different belief determinants of usage intention. A progressive approach was followed when developing the model. Firstly, a theoretical model grounded on the well-established theory TPB was proposed. Then, salient beliefs of the actual users were identified, and a research model was proposed. After that, an instrument was developed and tested via pilot study. In order to validate the proposed research model PLS-based SEM analysis was carried out. Finally, the interviews were conducted and the mobile campus e-service usage was observed to deeply understand the results of the structural model analysis.

The factors that affect the mobile campus e-service usage behavior were identified. According to the results, Perceived Enjoyment and Expected Benefit are the essential factors that affect the intention, based upon the data in hand. Second, Perceived Usability has a significant effect on Expected Benefit, and the effect of the Perceived Usability on the intention is fully mediated by Expected Benefit for our sample. Third, Value to Incentive has also an influence on the intention in our model. Forth, Perceived Behavioral Control not only significantly affects the intention for our sample but fully mediates the effect of Perceived Device Mobility and Perceived Ubiquity on the intention as well. Fifth, Customer Innovativeness moderates the relationship between Perceived Behavioral Control and Intention in our model. Lastly, Intention to Use E-Service is the most important factors that had an impact on the actual mobile campus e-service usage.

Interview results indicated that that time saving, enhancing communication and facilitating transportation are the essential benefit of the mobile campus service usage. Besides, time saving, ease of use, enhance communication, and access to information anywhere and anytime were the main aspects that make this e-service enjoyable. Moreover, incentive is one of the most important issues that increase the e-service usage intention, and food

discount coupons and mobile incentives are the most preferred incentive types for mobile campus service.

In addition, the influence of the opinion of the others on the adoption decision was investigated and three different user groups were identified. These groups are: the users that affected from opinions of other users (such as friends, family members), the users that affected from opinions of the expert, and the users that not affected from the opinions of anybody (try the e-service himself/herself). Furthermore, technological factors have an important role in e-service adoption for our sample. Participants stated that internet access problem is the crucial reason that disables them to use the mobile campus e-services. The users want to access an e-service anytime and anywhere to fulfill instant needs. Additionally, mobility is a key factor, and most of the users prefer to access the e-service via mobile devices such as smartphones.

6.2 Contribution of the Study

The proposed research model contributed to the literature by identifying the factors that influence the e-service usage for behavioral, normative and control beliefs. Besides the findings in the literature, actual users were included in the factor determination process. This approach brought about more accurate and efficient results. Furthermore, a sequential mixed methods research design was applied to gain rich insight about the e-service usage intention. Moreover, this research made valuable contribution to the literature by using objective measure for behavior. The actual usage data that obtained from the system logs were used to measure usage behavior. Furthermore, a specific e-service was used for validation apart from the generic e-service usage that was done by some previous works. Investigation of a single e-service usage provides more valuable results in terms of implications than general e-service usage.

6.2.1 Implications for Researchers

This study identified the factors that affect the intention to use e-services. As we have noted before, TPB based models do not involve emotional factors (Benbasat & Barki, 2007). In order to overcome this drawback, affective factors were included in the research model. Results supported the necessity of the affective factor dimension in adoption studies. It was found that affective factors of the research model: perceived enjoyment and value to incentive significantly affect the e-service usage intention. In this regard, affective factors should be included in further studies based on TPB.

E-services are provided through electronic networks; therefore, ICT related factors need to be considered to predict the user behavior. Consequently, technological factors were integrated in the research model. Our results showed that perceived ubiquity and perceived device mobility had significant direct effect on perceived behavioral control and influenced intention through perceived behavioral control. Thus, further research investigating the e-service adoption should take the ICT related factors into account.

6.2.2 Implications for Practice

The findings of this study have several implications for e-service developers and providers. According to the results, enjoyment is the strongest driver of the e-service usage intention. In order to increase the use of e-service, e-service providers should define proper strategies to make service more enjoyable. Moreover, to the related question of which aspects make the e-service enjoyable given answers mostly included the expected benefits from the usage. Thus, e-service providers should emphasize the benefits obtained from the e-service use. Furthermore, results showed that expected benefit had a strong influence on intention to use. Therefore, e-service developers should identify the needs and expectations of the target audience before the service implementation.

According to our results, perceived usability affects the expected benefit. Moreover, interview results showed that the usability is the most important factor affecting the decision to stop using a particular e-service and start using a new one that has similar properties. For that reason, usability issues should be examined in detail when designing an e-service. In order to enhance the perceived usability, e-service developers should take all dimensions of usability into consideration: easy to learn, error tolerant, effective, efficient and engaging (Quesenbery, 2003).

The findings obtained in this study indicated that the incentive affects user's intention to use e-service. Moreover, it was observed that the majority of the participants preferred food discount coupons as they most of their money on food on campus. Besides, mobile incentives were demanded because the service needs an internet connection and wireless access points may not be accessible everywhere. This shows that service providers can benefit from incentives to increase the use of the e-service. The demands of the target audience should be investigated carefully when determining incentives. The incentives that attracted the attention of the user should be identified and offered.

In this study, it was found that the participants did not have severe concerns about trust when using the mobile campus service. Participants stated two reasons: they rely on the work of the university and find the leave footprint function convenient. The mobile campus service enables the users to share their location with other users via GPS. Before the first use, users are asked whether they want to open the GPS. If users do not want to use the GPS feature, they can determine their location manually by using the leave footprint function. In addition, their locations are shared with other users only if they want. This option increased the participants' trust in mobile campus service. It has been shown that one of the problems encountered in the adoption of location-based service is privacy (Zhou, 2013). Therefore, e-service providers should offer options and alternative procedures to eliminate privacy issues, and this will positively influence the trust and e-service usage.

This research highlights the importance of perceived ubiquity and device mobility in e-service usage intention. Similarly, participants indicated that they expect to access the service whenever and wherever they need. Thus, e-service providers should make the necessary arrangements and provide ubiquitous service to users.

6.3 Limitations and Recommendations for Future Research

One of the limitations of this research was its scope. This study validated the proposed research model on a mobile campus service. In order to generalize the findings, further research on different e-services by using this model is needed. For instance, e-banking service may be investigated in further research, and the results may be compared in terms of differences and similarities. However, the researchers should be cautious about the participant selection procedure. The target audience of the e-service should be identified carefully and the representative group should be selected from this population. For example, the university students that participated to our study are not an appropriate sample group for e-banking. Since, they rarely make online transactions.

Other limitation was that this study measured the factors that affect e-service usage intention at a single time point. Future research, using this model, may investigate how usage perception is formed and altered with the increasing experience. Such studies may approve the validity of this model and may lead to accumulation of further research in this field.

Although the explanatory power of the model for e-service intention, perceived behavioral control, and expected benefit were satisfactory, the power was insufficient for e-service usage. Further research that improves the explanatory power of the model in terms of R^2 for e-service usage will be helpful to enhance the model. Therefore, a further study by revising the external salient beliefs and including the emergent factors identified through interviews will be useful.

Moreover, the characteristics of user group that participated in the current study may be a limitation for generalization of the results. Different user groups in terms of age, education, and experience may be tested. The target group of this study was university students. The people between ages 16 to 24 has the highest percentage of ICT usage as reported in information society statistic (EuroStat, 2014). Therefore, this age group is a proper representative of e-service users. However, future research conducted with different groups in terms of age and experience gives chance to investigate the effects of these factors on e-service usage behavior.

In addition, the participants of this study were METU students. The further studies that will be conducted with the students of other universities in Turkey may give different results. Therefore, the researchers should take into account this condition while interpreting our results.

Besides, the tasks that investigated in this study contain only general tasks (i.e. searching a building and sending a message). However, different task types such as transactional tasks (purchasing goods via online channels) may have different effect on the results. A further study that examines the effect of task type on e-service usage behavior will provide useful findings.

Furthermore, we found that usability has a substantial effect on expected benefit and intention to use the mobile campus service. In order to improve the usability of the mobile campus service further studies that utilize the methods in human computer interaction domain may be conducted. One of these methods is the model based test that enables the researchers to predict and comprehend the cognitive process of a user (John & Suzuki, 2009). A new version of the m-service may be designed by improving the usability problem detected in this study. Then, a cognitive modelling study may be conducted with the old and new versions of the service. The results may be compared in terms of completion time, cognitive and physical efforts. Afterward, the design that provides the best result may be identified.

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APPENDICES

APPENDIX A: TARGET GROUP STUDY

Table 33 Results of Target Group Study

Question	Label	Responses	Percentage
Q1	Time saving	Time saving, Required little time, Not waiting for a queue, You do not have to wait hours, Fast	32,00
	Ease of use	Easy, Easy to use, Easily getting the info about activities Easy pay back.	28,00
	Usefulness	Usefulness, You are not tired, It makes life easier, Buy whenever you want, Early booking, No need to go out for buying something.	20,00
	Easy Access	Easy access, Availability, Easy to reach, Ease of available.	14,00
	Monetary value	Monetary value	2,00
	Incentive	Incentive	2,00
	Enjoyment	You are not bored	2,00
Q2	Security	Security, Not trustable, Fake products.	47,83
	Service Cost	Extra money for service usage- service price.	21,74
	Service Quality	Inadequate service quality, Tickets/reservations may be cancelled, Following steps and typing credit card number is boring.	17,39
	Computer Self-Efficacy	Computer self-efficacy, Complicated to use, Not knowing how to use the e-Service.	13,04
Q3	Time problem	Time problem, Not having time, Time limitations, Shortage of time, Time and options offer us to exact place, It is so hard to go out and buy a product.	28,00

Table 33 (cont.)

	Access whenever what wanted	and ever	I cannot go city center whenever I want, I can access whenever I want, Access from public points, Easy to access, Easy access to internet.	20,00
	Trust		Trust	20,00
	Benefits		Advantages or priorities to e-Service buyers, Cheaper prices, Getting information from the service, It should make the process easier than the physical action.	16,00
	Perceived Behavioral Control		Internet connection, Tiredness, Money, Having an account for an e-Service.	16,00
Q4	Credit necessity	card	Not having credit card, Not having internet connection, Credit card limit, Using credit card, I already have a PayPal account and I wish I should use it without signing up to e-Service.	57,14
	Security Concerns		Credit card use, Security	14,29
	Long procedures		I hate when there are many steps such as registration before buying, Procedure are very long, Unnecessary information is wanted, If the process takes too long to complete.	28,57
Q5	Friends		Friends, Close friends.	33,33
	No one		No one [5]	23,81
	Family members		Family members, Father.	14,29
	Everyone		Everyone [2]	9,52
	Colleagues		My colleagues [2]	9,52
	Fan groups		Fan groups [1]	4,76
	Customers		Other customers [1]	4,76

APPENDIX B: INSTRUMENT (PHASE1)

GÖNÜLLÜ KATILIM FORMU

Bu çalışma, Bilişim Sistemleri Ana Bilim Dalı öğretim görevlisi Sevgi Özkan ve araştırma görevlileri Yasemin Çetin Kaya tarafından yürütülen bir çalışmadır. Çalışmanın amacı, kullanıcıların e-hizmet sistemlerini kullanmasını etkileyen faktörler hakkında bilgi toplamaktır.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

Ad Soyad:

Öğrenci No:

Tarih:

İmza:

Çalışma hakkında daha fazla bilgi almak için Bilişim Sistemleri Anabilim dalı Ar. Gör. Yasemin Çetin Kaya (Oda: Enformatik Enstitüsü B105; Tel: 210 7722; E-posta: ycetin@ii.metu.edu.tr) ile iletişim kurabilirsiniz.

e-Hizmet Kullanım Anketi

Bu anket e-hizmetlerin(e-alışveriş, e-bankacılık, e-devlet, Facebook gibi) kullanımı ile ilgili görüşlerinizi almak için düzenlenmiştir.

1. Cinsiyetiniz: Kadın Erkek

2. Yaşınız: _____

3. Eğitim Durumunuz (Mezun olduğunuz):

İlkokul Ortaokul Lise Yüksek Okul Üniversite Yüksek Lisans Doktora

4. e-Hizmetlere hangi araçlar ile erişiyorsunuz. (Birden fazla işaretleyebilirsiniz)

Masaüstü Bilgisayar Dizüstü Bilgisayar Cep telefonu Tablet PC

Diğer _____

5. Hangi amaçlarla e-hizmet uygulamalarından faydalaniyorsunuz? (Birden fazla işaretleyebilirsiniz.)

Bilgi edinme Karşılaştırma yapma Online işlem gerçekleştirme(satın alma gibi)

Eğlence Sosyal paylaşım Diğer (bankacılık, resmi işlemler gibi): _____

6. Genel olarak e-hizmetleri (e-bankacılık, e-devlet, e-alışveriş, Facebook gibi) ne kadar süredir kullanıyorsunuz?


	Hiç kullanmadım	1 yıldan az	1-2 yıl	3-5 yıl	6 yıl ve üzeri
Bilgi edinmek için	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ürün/hizmet satın almak için	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sosyal paylaşım için	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Son 1 yıl içinde e-hizmetleri kullanarak...

	%0	%1-24	%25-49	%50-74	%75-100
Satın aldığınız ürünlerin diğer yöntemleri de (mağazadan satın alma gibi) içeren tüm satın almalarınıza göre yüzdesi:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bilgi edinmek için yaptığınız aramaların diğer yöntemleri de (gazete ilanlarını inceleme gibi) içeren tüm aramalarınıza göre yüzdesi:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


8. E-Hizmet kullanımıyla ilgili genel deneyiminiz hakkında nasıl hissediyorsunuz:

	Kesinlikle Katılmıyorum	Katılmıyorum	Biraz Katılmıyorum	Biraz Katılıyorum	Katılıyorum	Kesinlikle Katılıyorum
Memnunum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hoşnudum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mutluluk verici	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tatmin edici	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Diğer sayfaya geçiniz 

Yönerge: Aşağıdaki ifadeleri 1’den 6’ya kadar sağdaki sütunların **yalnız birinin** içine “X” işareti koyarak yanıtlayınız. Lütfen ifadeleri **eksiksiz** olarak işaretleyiniz.

		1= Kesinlikle Katılmıyorum	2=Katılmıyorum	3= Biraz Katılmıyorum	4= Biraz Katılıyorum	5=Katılıyorum	6=Kesinlikle Katılıyorum
1.	MobileMETU’nün güvenilir olduğuna inanıyorum.	1	2	3	4	5	6
2.	MobileMETU’yü kullanmayı öğrenmek kolaydır.	1	2	3	4	5	6
3.	MobileMETU’yü kullanmayı planlıyorum.	1	2	3	4	5	6
4.	Birden fazla cihaz üzerinden MobileMETU’yü kullanmam mümkündür (Tablet PC, akıllı telefon gibi).	1	2	3	4	5	6
5.	MobileMETU’yü kullanmayı eğlenceli buluyorum.	1	2	3	4	5	6
6.	Bir ürün veya hizmetle ilgili çok az deneyimim varsa, sıklıkla bir uzmana danışırım (Sinema eleştirmenlerinin yorumlarını okuma gibi).	1	2	3	4	5	6
7.	MobileMETU’de işlemleri başarıyla tamamlamak kolaydır.	1	2	3	4	5	6
8.	MobileMETU’yü kullanmak, kampüs içi iletişim kurma ve ulaşım işlerini kolaylaştırır.	1	2	3	4	5	6
9.	Kişiselleştirilmiş bilgi sağlayan e-hizmetlere değer veririm (ilgi alanıma giren grupların bilgilerinin sunulması gibi).	1	2	3	4	5	6
10.	Bir hizmeti kullanmadan önce sık sık arkadaşlarım ve ailemden hizmet hakkında bilgi toplarım.	1	2	3	4	5	6
11.	Kullanım deneyimime göre kişiselleştirilmiş e-hizmetlere değer veririm (Sık işlem yaptığım grupların üst sıralarda gösterilmesi gibi).	1	2	3	4	5	6
12.	MobileMETU’yü kullanmak için gereken imkânlarla sahibim.	1	2	3	4	5	6
13.	Hizmeti kullanmaya devam etmem için sunulan sadakat teşviklerini önemserim (Bir sonraki satın almada kullanmak için verilen %10 indirim kuponu gibi).	1	2	3	4	5	6
14.	MobileMETU’ye ihtiyaç duyduğum her yerde erişebilirim.	1	2	3	4	5	6
15.	MobileMETU’yü kullanmayı keyifli buluyorum.	1	2	3	4	5	6
16.	MobileMETU’ye taşınabilir cihazlardan (cep telefonu, tablet pc gibi) erişebilirim.	1	2	3	4	5	6
17.	MobileMETU’yü kullanmak niyetindeyim.	1	2	3	4	5	6
18.	MobileMETU’ye her yerden erişebilirim.	1	2	3	4	5	6
19.	Bir ürün veya hizmetle ilgili çok az deneyimim varsa, sıklıkla bu konuda arkadaşlarıma soru sorarım.	1	2	3	4	5	6
20.	Kişisel tercihlerimi dikkate alarak hizmetleri kişiselleştiren e-hizmetlere değer veririm (Kişisel tercihlerime göre özelleştirilmiş bir ana sayfa gibi).	1	2	3	4	5	6
21.	MobileMETU’yü kullanmayı ilginç buluyorum.	1	2	3	4	5	6
22.	MobileMETU’nün online işlemleri sadakatle yürüttüğüne güveniyorum.	1	2	3	4	5	6
23.	MobileMETU’yü kullanırken yapılan hatalar kolayca düzeltilebilir.	1	2	3	4	5	6
24.	MobileMETU’yü kullanırken cihazımla birlikte dolaşabilirim.	1	2	3	4	5	6
25.	MobileMETU’nün menfaatlerimi en iyi şekilde koruyacağına güveniyorum.	1	2	3	4	5	6
26.	MobileMETU’yü kullanmak diğer yöntemlere kıyasla zaman/emek tasarrufu sağlar.	1	2	3	4	5	6
27.	MobileMETU’yü kullanmak için gerekli kaynaklara (mobil cihaz gibi) sahibim.	1	2	3	4	5	6
28.	Hizmeti kullanmaya devam etmem için verilen ödülleri (ücretsiz ürün ve hizmet gibi) önemserim.	1	2	3	4	5	6
29.	Başka bir cihazı kullandığım zaman MobileMETU işlemlerine bu cihazla devam edebilirim.	1	2	3	4	5	6
30.	Kullandığım cihaz (bilgisayar, cep telefonu vb.) için kişiselleştirilmiş e-hizmetlere değer veririm.	1	2	3	4	5	6
31.	MobileMETU’yü her zaman kullanabilirim.	1	2	3	4	5	6

Diğer sayfaya geçiniz 

Yönerge: Aşağıdaki ifadeleri 1’den 6’ya kadar sağdaki sütunların **yalnız birinin** içine “X” işareti koyarak yanıtlayınız. Lütfen ifadeleri **eksiksiz** olarak işaretleyiniz.

		1= Kesinlikle Katılmıyorum	2=Katılmıyorum	3= Biraz Katılmıyorum	4= Biraz Katılıyorum	5=Katılıyorum	6=Kesinlikle Katılıyorum
32.	MobileMetu'yü kullanmak kampüs içi iletişim kurma ve ulaşım işlerini daha etkili hale getirir.	1	2	3	4	5	6
33.	Doğru hizmeti kullandığımdan emin olmak için, sık sık başkalarının hangi hizmeti kullandığını gözlemlerim.	1	2	3	4	5	6
34.	MobileMETU'yü kullanmam için gerekli bilgiye sahibim.	1	2	3	4	5	6
35.	MobileMetu'yü kullanmak kampüs içi işlerimi daha çabuk bitirmemi sağlar.	1	2	3	4	5	6
36.	MobileMETU'yü kullanmayı düşünüyorum.	1	2	3	4	5	6
37.	Hizmeti kullanmaya devam etmem için sunulan ürün indirimini gibi teşvikleri önemserim.	1	2	3	4	5	6
38.	MobileMETU'yü kullanan öğrenciler kullanmayanlardan daha çok prestij sahibi olur.	1	2	3	4	5	6
39.	MobileMETU'yü kullanan öğrenciler yüksek bir profile sahip olup ilgi çekerler.	1	2	3	4	5	6
40.	MobileMETU'yü kullanmak statü sembolüdür.	1	2	3	4	5	6

Ankete katıldığınız için teşekkür ederim 😊

Çalışmanın ileriki aşamalarında yer alıp bize yardımcı olmayı kabul ediyorsanız. Lütfen sizinle iletişime geçebileceğimiz bir e-mail adresi girin: _____

MobileMETU uygulaması ile ilgili eklemek istediğiniz görüşleriniz:

APPENDIX C: ITEMS OF THE INSTRUMENT (IN ENGLISH)

Table 34 Items of the Instrument (In English)

Abb.	Item	Reference
AM1	I can transfer the <SERVICE> to another device when I use it.	Adopted from Karaiskos (2009)
AM2	I am able to use the <SERVICE> through multiple devices.	
DM1	I can access to the <SERVICE> through portable devices.	Adopted from Karahanna et al. (1999), Lin and Lu (2000), Karaiskos (2009)
DM2	I can wonder around with my device while using the <SERVICE>.	
EB1	Using the <SERVICE> makes the communication and transportation tasks more effective.	Adopted from Davis (1989), Liu and Forsythe (2011)
EB2	Using the <SERVICE> enables me to finish my tasks on the campus more quickly.	
EB3	Using the <SERVICE> makes the communication and transportation tasks easier.	
EB4	Using the <SERVICE> saves my time/effort over other means of performing same task.	
II1	To make sure I use the right product, I often observe what others using.	Adopted from Bearden et al. (1989)
II2	I frequently gather information from friends and family about the service before I use.	
II3	If I have little experience with a product or service, I often consult to an expertise (such as product review)	
II4	If I have little experience with a product or service, I often ask my friends about it.	
INT1	I plan to use the <SERVICE>	Adopted from Venkatesh et al. (2003)
INT2	I expect to use the <SERVICE>.	

Table 34 (cont.)

INT3	I intend to use the <SERVICE>.	
PBC1	I have the knowledge necessary to use the <SERVICE>.	Adopted from Ajzen (2002)
PBC2	I have the ability to use the <SERVICE>.	
PBC3	I have the resources necessary to use the <SERVICE>.	
PE1	I find using the <SERVICE> to be interesting.	Adopted from Van der Heijden (2003)
PE2	I find using the <SERVICE> to be enjoyable.	
PE3	I find using the <SERVICE> to be pleasant.	
PR1	I value services that acquire my personal preferences and provide personalized the services.(such as customizable homepage)	Adopted from Chellappa et al. (2005)
PR2	I value services that are personalized for the device (e.g. computer, palm, mobile phone etc.) that I use.	
PR3	I value the services that provide personalized information (such as customizable e-bulletin).	
PR4	I value services that are personalized for my usage experience preferences.	
PU1	It is easy for me to complete the tasks successfully through the <SERVICE>.	Adopted from Karahanna et al. (1999), Venkatesh and Bala (2008)
PU2	It is easy for me to learn to use the <SERVICE>.	
PU3	It is easy for me to correct the mistakes encountered during the <SERVICE> use.	
T1	I trust the <SERVICE> to keep my best interest in mind.	Adopted from Suh and Han (2002) Gefen et al. (2003)
T2	I trust the <SERVICE> to carry out online tasks faithfully.	
T3	I believe that the <SERVICE> is trustworthy.	
UB1	I am able to use the <SERVICE> anywhere.	Adopted from Goodhue (1998),
UB2	I am able to use the <SERVICE> anytime.	

Table 34 (cont.)

UB3	I am able to access the <SERVICE> wherever I need it.	Bailey and Pearson (1983)
VE1	Students who use the <SERVICE> have more prestige than who do not.	Adopted from Brown and Venkatesh (2005)
VE2	Students who use the <SERVICE> have a high profile.	
VE3	Using the <SERVICE> is a status symbol.	
VINC1	I appreciate the reward given for my continued patronage of service.	Adopted from Bhattacharjee (2001)
VINC2	I appreciate the loyalty incentives for my continued use of the service	
VINC3	I appreciate the incentive offered for my continued use, such as discount.	
CI	Time since the respondent first adopted the e-services to obtaining information, transaction, and social networking.	Adopted from Liu and Forsythe (2011)

APPENDIX D: SOCIAL DESIRABILITY RESULTS

Table 35 Social Desirability Results

		SD_score	
Spearman's rho	Instrument_score	Correlation Coefficient	.157
		Sig. (1-tailed)	.121
		N	57
AM_score	Correlation Coefficient	-.055	
	Sig. (1-tailed)	.341	
	N	57	
DM_score	Correlation Coefficient	.036	
	Sig. (1-tailed)	.396	
	N	57	
EB_score	Correlation Coefficient	.053	
	Sig. (1-tailed)	.348	
	N	57	
II_score	Correlation Coefficient	.034	
	Sig. (1-tailed)	.402	
	N	57	
INT_score	Correlation Coefficient	-.090	
	Sig. (1-tailed)	.252	
	N	57	
PBC_score	Correlation Coefficient	.063	
	Sig. (1-tailed)	.321	
	N	57	
PE_score	Correlation Coefficient	.032	
	Sig. (1-tailed)	.407	
	N	57	
PR_score	Correlation Coefficient	.200	
	Sig. (1-tailed)	.068	
	N	57	
PU_score	Correlation Coefficient	.215	
	Sig. (1-tailed)	.054	
	N	57	
T_score	Correlation Coefficient	.188	
	Sig. (1-tailed)	.081	
	N	57	

Table 35 (cont.)

UB_score	Correlation Coefficient	.208
	Sig. (1-tailed)	.060
	N	57
VE_score	Correlation Coefficient	.087
	Sig. (1-tailed)	.261
	N	57
VINC_score	Correlation Coefficient	.052
	Sig. (1-tailed)	.350
	N	57

APPENDIX E: INSTRUMENT (PHASE2)

DEMOGRAFİK BİLGİLER

1. Cinsiyetiniz: Kadın Erkek

2. Yaşınız: _____

3. Eğitim Durumunuz:

Üniversite Yüksek Lisans Doktora

4. Genel olarak e-hizmetleri (e-bankacılık, e-devlet, e-alışveriş, Facebook gibi) ne kadar süredir kullanıyorsunuz?

- Bilgi edinmek için _____
- Ürün/hizmet satın almak için _____
- Sosyal paylaşım için _____

5. e-Hizmetlere hangi araçlar ile erişiyorsunuz. (Birden fazla işaretleyebilirsiniz)

Masaüstü Bilgisayar Dizüstü Bilgisayar Cep telefonu Tablet PC Diğer _____

6. Mobil hizmetleri kullanıyor musunuz?

Evet. Evet ise hangi araçlarla erişiyorsunuz (telefon, tablet pc, vs.) _____

Hayır

7. Hangi amaçlarla e-hizmet uygulamalarından faydalaniyorsunuz? (Birden fazla işaretleyebilirsiniz.)

Bilgi edinme Karşılaştırma yapma Online işlem gerçekleştirme(satın alma gibi)

Eğlence Sosyal paylaşım Diğer (bankacılık, resmi işlemler gibi): _____

8. Son 1 yıl içinde e-hizmetleri kullanarak...

- Bilgi edinme oranınız nedir? (Yüzde)
- Satın alma oranınız? (Yüzde)

APPENDIX F: PARTICIPANT AND RESEARCHER FORMS

Katılımcı No: _____

Katılımcı Görev Formu

Görev 1: Şifre değiştirme

- Şifrenizi "metu" olarak değiştirin.

Kolaylık derecesi : _____ (1'den 5'e kadar 1-çok zor 5- çok kolay)

Görev 2 : Grup üyesine mesaj gönderme

- Grup Adı: Yasemin'in Dünyası
- Mesajın gönderileceği üye : Mahir Kaya
- Mesaj başlık: Toplantı
- Mesaj İçeriği: Cuma günü

Kolaylık derecesi : _____ (1'den 5'e kadar 1-çok zor 5- çok kolay)

Görev 3: Çevredeki binaları bulma

- Metre bilgisi : 100 metre

Kolaylık derecesi : _____ (1'den 5'e kadar 1-çok zor 5- çok kolay)

Görev 4: Binadaki etkinlikleri bulma

- Bina adı: Cultural and Conventional Center
- Başlangıç Tarihi:
- Bitiş Tarihi:

Kolaylık derecesi : _____ (1'den 5'e kadar 1-çok zor 5- çok kolay)

Görev 5: Grup üyelerini haritada bulma

- Grup adı: Yasemin'in Dünyası

Kolaylık derecesi : _____ (1'den 5'e kadar 1-çok zor 5- çok kolay)

1. Görevleri gerçekleştirirken hissettiğiniz memnuniyet dereceniz : _____ (1-en kötü 5- en iyi)

2. Sizce en zor görev : _____

3. Sizce en kolay görev: _____

Katılımcı No: _____

Uygulayıcı Görev Formu

Görev 1: Şifre değiştirme "1234" olan şifrenizi "metu" ile değiştirin.

Başlangıç: _____ Bitiş: _____ Kolaylık derecesi : _____

Hata sayısı: _____ Deneme sayısı: _____

Not:

Görev 2 : Grup üyesine mesaj gönderme Grup: Yasemin'in Dünyası, Mahir Kaya, Toplantı, Cuma günü

Başlangıç: _____ Bitiş: _____ Kolaylık derecesi : _____

Hata sayısı: _____ Deneme sayısı: _____

Not:

Görev 3: Çevredeki binaları bulma 100 metre

Başlangıç: _____ Bitiş: _____ Kolaylık derecesi : _____

Hata sayısı: _____ Deneme sayısı: _____

Not:

Görev 4: Binadaki etkinlikleri bulma Cultural and Conventional Center - Tarih

Başlangıç: _____ Bitiş: _____ Kolaylık derecesi : _____

Hata sayısı: _____ Deneme sayısı: _____

Not:

Görev 5: Grup üyelerini haritada bulma Yasemin'in Dünyası

Başlangıç: _____ Bitiş: _____ Kolaylık derecesi : _____

Hata sayısı: _____ Deneme sayısı: _____

Not:

- Görevleri gerçekleştirirken hissettiğiniz memnuniyet derecesi :** _____ (1'den 5'e kadar 1-en kötü 5- en iyi)
- En zor görev :** _____
- En kolay görev:** _____

APPENDIX G: INTERVIEW QUESTIONS

Part 1: MobileMETU Usage

1. MobileMETU' nün en çok hangi kısmını/özelliğini beğendin?
2. MobileMETU' nün beğenmediğin yönleri neler?
3. Görevleri gerçekleştirirken en çok hangi kısımlarda zorlandın? Bu zorlukları ortadan kaldırmak için neler önerirsin?
4. MobileMETU' ye hangi özelliklerin eklenmesini istersin?
5. En çok hangi amaçla MobileMETU' yü kullanmak istersin? (bilgi edinmek, sosyal paylaşım)
6. Eğer biri sana kampus içi iletişim ve sosyalleşme ile ilgili başka bir uygulama sunsa
 - a. Hangi faktörler bu yeni uygulamayı tercih etmeni teşvik eder?
 - b. Hangi faktörler MobileMETU' yü kullanmaya devam etmeni teşvik eder?
7. Mobile METU' yü kullanma kararında çevrende seni etkileyecek birileri var mı?
8. Mobile METU' yü kullanmanın avantajlarının neler olduğuna inanıyorsun?
9. Mobile METU' yü kullanmanın dezavantajlarının neler olduğuna inanıyorsun?
10. Hangi faktör ya da koşullar senin MobileMETU' yü kullanmana olanak sağlar?
11. Hangi faktör ya da koşullar senin MobileMETU' yü kullanmanı zorlaştırır?

Part 2: Constructs of the Model

1. MobileMETU' yü kullanmayı eğlenceli /keyifli buldun mu? Evet ise hangi yönlerden?
2. MobileMETU' nün çeşitli indirimler, avantajlar sağlaması ilgilini çeker mi? Nasıl bir yol önerirsin? Bu kullanma sıklığını artırır mı?
3. MobileMETU' nün senin beklenti ve ihtiyaçlarına göre kişiselleştirilmiş hizmet sunmasını ister misin? Bu senin için ne kadar önemli?
4. MobileMETU' nün senin için faydalı olduğunu düşünüyor musun? Evet ise ne gibi faydaları var?
5. MobileMETU' nün kullanılabilirliği(kullanım kolaylığı) hakkında ne düşünüyorsun?
6. MobileMETU' yü kullanırken zorlanacağı kısımlar neler?
7. MobileMETU' ye ihtiyaç duyduğun her yerden ve her zaman erişebiliyor olmak senin için önemli mi? Hangi açılardan önemli?
8. MobileMETU' yü kullanırken güvenle ilgili kaygıların var mı? Varsa neler? Lokasyonunu paylaşmak seni rahatsız eder mi?
9. Bir servisi kullanmaya karar vermende daha önce kullanan arkadaş ya da tanıdıklarının ya da uzmanların görüşü nasıl etkiler?
10. Taşınabilir cihazlardan uygulamaya erişim senin için hangi açılardan önemli? MobileMETU' yü kullanırken cihazınla birlikte dolaşabilmek ister misin?
11. Bu mobil uygulamayı kullananların arkadaş gruplarında daha etkili olacağını düşünüyor musun?

12. MobileMETU' yü kullanmak için gerekli kaynak ve imkânlarla sahip misin? Gerekli kaynak ve imkânlarla sahip olman kullanımını nasıl etkiler?
13. MobileMETU' yü kullanmak için gerekli bilgiye sahip olduğunu düşünüyor musun? Bunun uygulamayı kullanmana etkisi nasıl olur?
14. Şu ana kadar konuştuğumuz içinde senin için en önemli olan neydi?
15. Eklemek istediğin başka bir şey var mı?

APPENDIX H: ETHIC CLEARANCE-1



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05.12.2011

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GÖNDEREN: Doç.Dr.Sevgi Özkan
Enformatik Enstitüsü Müdür Yrd.
KONU: Yasemin Çetin

Sevgi

Bilişim Sistemleri Anabilim Dalı Doktora programı öğrencisi Yasemin Çetin'in, 15 Kasım 2011 - 31 Aralık 2012 tarihleri arasında "E-HİZMETLERİN BENİMSENMESİNİ ETKİLEYEN FAKTÖRLERİN BELİRLENMESİ" başlıklı araştırma çalışmasına ilişkin ODTÜ ve halka açık mekanlar'da uygulama yapmak için görevlendirme başvurusu incelenmiş, ilgili EABD Başkanlığı'nın görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine Etik Komite onayı koşulu ile uygun görülmüştür.

Saygılarımla,

Ek: YKK
EABD

Etik Komite Onayı

Uygundur

06.12/2011

Canan Özgen

Prof. Dr. Canan ÖZGEN
Uygulamalı Etik Araştırma Merkezi
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ODTÜ 06531 ANKARA

ÖİSB 8/12
Uygundur.
Sevgi'nin onayıyla
Prof. Dr. Belgin AYVAŞIK
Rektör Danışmanı

1190
12/12
8/12.

APPENDIX I: ETHIC CLEARANCE-2

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22 Ocak 2013

Gönderilen: Doç. Dr. Sevgi Özkan
Bilişim Sistemleri Bölümü

Gönderen: Prof. Dr. Canan Özgen
IAK Başkan Yardımcısı

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz Bilişim Sistemleri Bölümü Doktora öğrencisi Yasemin Çetin Kaya'nın "E-hizmetlerin Benimsenmesini Etkileyen Faktörlerin Belirlenmesi" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

22/01/2013

Prof.Dr. Canan ÖZGEN
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkanı
ODTÜ 06531 ANKARA

APPENDIX J: ITEM LOADINGS

Table 36 Item Loadings

Construct	Item	Loading
Perceived Application Mobility	AM1	.846
	AM2	.846
Perceived Device Mobility	DM1	.913
	DM2	.913
Expected Benefit	EB1	.867
	EB2	.850
	EB3	.763
	EB4	.729
Informational Influence	II1	.795
	II2	.826
	II3	.731
	II4	.837
Intention to Use E-Service	INT1	.920
	INT2	.924
	INT3	.939
Perceived Behavioral Control	PBC1	.401
	PBC2	.958
	PBC3	.945
Perceived Enjoyment	PE1	.879
	PE2	.862
	PE3	.911
Value to Personalization	PR1	.820
	PR2	.776
	PR3	.836
	PR4	.805
Perceived Usability	PU1	.818
	PU2	.755
	PU3	.701

Table 36 (cont.)

Trust to the E-Service	T1	.843
	T2	.834
	T3	.758
Perceived Ubiquity	UB1	.899
	UB2	.838
	UB3	.870
Value Expressiveness	VE1	.947
	VE2	.969
	VE3	.939
Value to Incentive	VINC1	.783
	VINC2	.668
	VINC3	.798

APPENDIX K: DIRECT, INDIRECT AND TOTAL EFFECTS

Table 37 Direct, Indirect and Total Effects

Construct	Direct effect	Indirect effect	Total effect
AM	0.00	0.02	0.02
DM	0.00	0.07	0.07
EB	0.28	0.00	0.28
II	-0.03	0.00	-0.03
PBC	0.22	0.00	0.22
PE	0.29	0.00	0.29
PR	0.04	0.00	0.04
PU	-0.10	0.17	0.07
T	-0.01	0.00	-0.01
UB	0.00	0.05	0.05
VE	0.10	0.00	0.10
VINC	0.13	0.00	0.13

APPENDIX L: DETAILED INTERVIEW RESULTS

Table 38 Advantages of Using MobileMETU

Category	Key ideas	Number of comment	Total	Percentage
Benefit	Time saving	9	20	69
	Access to information	2		
	Communication	5		
	Socialization	2		
	Event	2		
Technological Factors	Location	1	6	21
	Mobility	3		
	Ubiquity	2		
Enjoyment	Satisfy one's curiosity	1	1	3
Personalization	Specific to the university	1	1	3
Incentive	Financial return	1	1	3

Table 39 Disadvantages of Using MobileMETU

Category	Key ideas	Number of comment	Total	Percentage
Perceived behavioral control	Internet Access	3	4	36
	Phone storage capacity	1		
Technological factors	Speed	2	3	27
	Application mobility	1		
Trust	Location sharing	2	2	18
Usability	Usability	1	1	9
Popularity	Number of users	1	1	9

Table 40 Factors that Enable to Use MobileMETU

Category	Key ideas	Number of comment	Total	Percentage
Popularity	Friend	4	4	22
Benefit	Fulfil the needs	4	4	22
Perceived behavioral control	Device features	1	3	17
	Internet access	2		
Technological factors	Ubiquity	1	3	17
	Mobility	2		
Innovativeness	Open to innovation	3	3	17
Trust	Trust	1	1	6

Table 41 Factors that Disable to Use MobileMETU

Category	Key ideas	Number of comment	Total	Percentage
Perceived behavioral control	Internet access	5	6	43
	Phone features	1		
Technological factors	Application mobility	2	3	21
	Speed	1		
Usability	Ease of use	2	2	14
Trust	Privacy	1	2	14
	Location sharing	1		
Leisure time	Leisure time	1	1	7

CURRICULUM VITAE

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2008 to present	Middle East Technical University - Ankara, Turkey PhD, Informatics Institute, Information Systems Program
2004-2008	Middle East Technical University - Ankara, Turkey MSc, Informatics Institute, Information Systems Program
2000-2004	Osmangazi University - Eskişehir, Turkey B.S., Education Faculty, Department of Computer Education and Instructional Technologies

WORK EXPERIENCE

2004- Present	Middle East Technical University – Ankara, Turkey Research Assistant
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PUBLICATIONS AND PRESENTATIONS

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TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü

Sosyal Bilimler Enstitüsü

Uygulamalı Matematik Enstitüsü

Enformatik Enstitüsü

Deniz Bilimleri Enstitüsü

YAZARIN

Soyadı : Çetin Kaya

Adı : Yasemin

Bölümü : Bilişim Sistemleri

TEZİN ADI (İngilizce) : IDENTIFICATION OF FACTORS AFFECTING THE E-SERVICE ADOPTION:
AN EMPIRICAL INVESTIGATION

TEZİN TÜRÜ : Yüksek Lisans

Doktora

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın.
2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullanıcılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)
3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)

Yazarın imzası

Tarih ...23/06/2014.....