EXPLORATION OF MOBILE SERVICE ADOPTION: SPECIAL FOCUS ON ADAPTIVITY

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EXPLORATION OF MOBILE SERVICE ADOPTION: SPECIAL FOCUS ON ADAPTIVITY

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Thesis Abstract

Ebru Polat, “Exploration of Mobile Service Adoption: Special Focus on Adaptivity”

Quick and easy information access is enabled via developing internet technologies and shrinking mobile devices. It is possible to reach any information at any time by use of hand held devices. Hence, services supporting mobile technologies are becoming widespread which in turn stimulates investigations about mobile service adoption. In addition to the quick and easy accessibility of information by rapid development of mobile services, people would rather services that are efficient in time and that require less effort in their daily rush. Adaptivity, system’s intelligent behaviour due to changing profiles, needs and situations, is one of the factors that is suitable to save time and effort in mobile service usage. The aim of this study is to figure out the determinants in mobile service adoption, find out their effects (primarily adaptive behavior’s impact) on service adoption and their relationship with each other.

The study started with literature review so as to obtain theoretical background about human computer interaction and mobile service adoption. Afterwards, two qualitative studies and a brainstorming session were realized in order to construct mobile service adoption taxonomy based on participants’ views. Lastly, an experimental study was conducted and its analyses were carried out. By conjoint analysis, mobile service preference factors of users were investigated and by regression analysis, determinants of mobile service intention were figured out.

Tez Özeti

Ebru Polat, "Mobil Servis Benimsemesinin Araştırılması: Uyarlanabilirlik üzerinde Odaklaşma"

Gelişen internet teknolojileri ve küçülen mobil cihazlar sayesinde hızlı ve kolay bilgi erişimi mümkün hale geldi. El ile taşınabilir cihazlar sayesinde her an, her bilgiye ulaşılabilir. Böylelikle, mobil servisler gün geçtikçe yayılmakta ve mobil servis benimsemesi ile ilgili yapılan araştırmaları hızlandırmaktadır. Mobil servisler sayesinde olan hızlı ve kolay bilgi erişimine ek olarak, insanlar günlük koşuşturmalarında kendilerine zaman ve çabadan tasarruf sağlayacak servisleri tercih etmektedirler. Sistemin değişen profillere, ihtiyaçlara ve durumlara göre akıllı davranışını ifade eden uyarlanabilirlik, mobil servis kullanımında zaman ve çabadan tasarruf sağlayabilecek faktörlerden biridir. Bu çalışmanının amacı mobil servis benimsemesindeki belirleyici faktörleri bulmak, başta uyarlanabilirlik olmak üzere bunların mobil servis benimsemesi üzerindeki etkilerini ve birbirleriyle ilişkilerini araştırmaktır.

Çalışmaya insan-bilgisayar etkileşimi ve mobil servis benimsemesi ile ilgili teorik altyapı hazırlamak amacıyla literatür çalışması ile başlandı. Akabinde, katılımcıların görüşlerine dayanarak mobil servis benimseme taksonomisini yapılandırmak için iki nitel çalışma ve bir beyin fırtınası çalışması gerçekleştirildi. Son olarak deneysel çalışma ve analizleri gerçekleştirildi. Conjoint analizi ile mobil servis kullanıcılarının ürün seçim faktörleri araştırıldı. Regresyon analizi ile mobil servis kullanım niyetini belirleyici faktörler tespit edildi.

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PREFACE

Together with the developing technologies, fast-evolving World Wide Web environment, computers and hand-held devices, human computer interaction gains more importance. User Interface as the interaction layer between user and information systems has a great role in system adoption. Based on technology acceptance model, acceptance of a system is explained as a function of perceived usefulness and perceived ease of use. Since there are several external variables that have impact on perceived usefulness and perceived ease of use, the content and interface design of every single application should be addressed accordingly in a way to enhance intention to use the system by considering external variables' impact through system usage. The objective of this study is to figure out potential external variables that may have influence on perceived ease of use, perceived usefulness and indirectly on behavioral intention in mobile system acceptance and to explore effects of those variables, primarily adaptivity and their relationships with each other through the limited interface of a mobile device.

The study is composed of six chapters. Chapter 1 is the introduction chapter. Chapter 2 consists of literature review related to interface design, mobile interfaces, usability, adaptivity, mobile and adaptive applications, service adoption, adoption factors and technology acceptance models. In Chapter 3, research framework and research hypotheses are presented. Chapter 4 involves the research methodology. Findings and results are discussed in Chapter 5. Chapter 6, the last chapter of the study, presents conclusion derived from the overall study, implications, limitations and further work to be realized based on this study.

CHAPTER 1

INTRODUCTION

Information is the absolute means for human kind as a social being to improve oneself, control environment and organize relations with nature and other people around. In the past, being able to reach the needed information required great effort on its own. However, by today's fast evolving technologies and internet environment, information is everywhere at any time. The key point is obtaining the useful information and dealing with that information with the upmost ease through interaction with computers.

Human computer interaction occurs at the user interface which has a distinctive role in determining acceptance of a system. Based on Technology Acceptance Model (TAM), a model that explains how information systems users accept a technology when they are presented with a new one, acceptance of a system is explained as a function of perceived usefulness and perceived ease of use. There are several external variables that have impact on perceived usefulness and perceived ease of use and those external factors affect system acceptance indirectly (Davis et al., 1989).

The content and interface design of every single application should be addressed accordingly in a way to enhance intention to use the system by considering related external variables' impact through system usage. Adding adaptivity into systems may be one of the ways to do so.

So far there have been a huge amount of research on design and implementation of user interfaces for stationary desktop machines. However, mobile device interfaces have not been investigated relatively that much yet. Mobile device is a highly portable

computing device with a small display screen and a varied connection in contrary to stationary desktop machines. Mobile device interfaces of mobile services have to provide the same services with stationary desktop interfaces on a much smaller screen and with a limited, inflexible input entry mechanism. In case external factors in mobile system acceptance are figured out and addressed properly, users' intention to adopt mobile services and their satisfaction with the mobile services will be ensured. The effects of potential external factors need to be taken into consideration in mobile user interface design and implementation so that users do not have more difficulty in using mobile services when compared with using accustomed desktop services. To make mobile services serve as stationary desktop services in terms of usefulness and ease of use, narrow screen and limited input entry handicaps of mobile devices need to be handled so as not to hinder interaction of mobile device users with mobile interfaces. Adaptivity, which refers to adjustment of an application's behaviour or an application's interface in response to user information, user's past interactions with the application and user choices, is one of the most effective variables in that users' input entry needs are tried to be reduced to minimum and most user-related content is figured out and displayed in the narrow screen when adaptive features are integrated into the system.

This thesis aims to figure out potential external variables that impact mobile system acceptance and to explore effects of those variables, primarily adaptivity and their relationships with each other through the limited interface of a mobile device. We expect that different external variables have different impacts on perceived ease of use and perceived usefulness and that adaptivity, one of the external variables that we mostly dwell upon, enhance both ease of use and usefulness and indirectly behavioral intention in mobile system adoption. Also, those external variables are expected to have

effect on each other which influences mobile IS acceptance through mediation of perceived ease of use, perceived usefulness and behavioral intention.

In this study, several mobile user interface designs and prototypes have been developed, usability testings, questionnaires, in-depth interviews have been realized. A brainstorming session has been carried out and an experimental study has been conducted together with analyses.

CHAPTER 2

LITERATURE REVIEW

Research has several streams related to our objectives. User Interfaces, the interaction layer of human-computer, as the outlining topic of our study has been delved into by many researchers in many studies and applications. Thus, it consists of a great amount of work carried out from various perspectives. There is a significant amount of work done specifically in the adoption of information systems. There is a growing amount of work focusing on mobile services and finally equal amount of work focusing on adaptivity factor.

Interface Design

Interface of an application is the only channel for users to interact with the application. Hence, design of an interface needs to be given high importance so as to enhance usability of the application. Shneiderman, a computer scientist who contributed to the creation of the discipline of human-computer interaction, proposed fundamental principles for good interaction design via his “Eight Golden Rules of Interface Design” (Shneiderman, 1992). Those design principles constitute a good guide for interface designers and developers. Following the general guidelines of Shneiderman, a huge amount of research and studies has been realized for good interface design up until now. The scope of user interface design has been shrinked in later studies as mobile devices have come forward and spred out.

Mobile Interfaces

Mobile device usage comprises most of the daily life and satisfies people's needs with upward speed in conjunction with progression in technology. As mobile device usage increases, small screen size becomes more of an issue that needs to be dealt with by interface designers so as to ensure maximum utility with minimal screen space and to provide users the same experience they have with their desktop computer or other large screen size devices in a small screen size device.

Similar to Shneiderman's rules for interface design, Gong & Tarasewich (2004) proposed guidelines for mobile device interface design. Some of those guidelines are Shneiderman's interface design guidelines, some of them are modifications to Shneiderman's existing rules and some are additional guidelines one of which is about personalization usage. Jung (2005) developed accesible and convenient factors for mobile interface design with regard to Principles of Universal Design defined by The Center for Universal Design at North Carolina State University (The Center for Universal Design, 1997). Those principles are making design usable by all people and without need for adaptation.

In addition to rules and guidelines derived, factors having influence on mobile device usage have been identified and effects of those factors have been explored and related applications have been designed/developed for research. Karlsson & Djabri (2001) explored impact of aesthetic parameters (engagement and transparency) on small devices through a design problem related to navigation and offered design solutions. Marsden et al. (2000) designed an efficient user interface by use of an algorithm based on hashing and the design was successful in that it reduced number of key presses for

realizing functions in a menu structure of a mobile device. Chan et al. (2002) examined usability problems related to factors such as content presentation, user tasks, search, navigation systems and design constraints in mobile devices and recommended guidelines accordingly. Usability of a product or system is a key measure to identify whether users can accomplish their goal quickly, easily and get satisfied with their experience with the product or system they use. Therefore, usability testings, inspection methods and identification of usability problems through human computer interaction evaluation ought to be included in good interface design process.

Usability

International Standard, ISO 9241-11, define usability:

"[Usability refers to] the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of user."

For better interface design and user experience with application, system usability had better be evaluated and interface design need to be improved with respect to evaluation results before completion of design and beginning of implementation. Kim et al. (2002) identified different contexts and their effects on usability problems in mobile environment now that different problems may arise from different contexts. Usability problems were categorized into 4 groups: Representation, Structure, Navigation, and Content and context parameters included Goal, Emotion, Hand, Leg, Visual, Auditory, Co-location, and Interaction. Brewster (2002) investigated usability of different size buttons that are supported with sound and derived out that sound that

supports information about button increased their usability and allowed reduced button sizes. In their study, Lim et al. (2008) investigated effect of culture on web site usability by focusing on localisation and internalisation factors.

There are numerous methods for identification of usability issues and evaluation of interfaces. Usability testing, cognitive walkthrough, heuristic evaluation, think-aloud method, tracking eye movement are the ones highly preferred. Rogers et al. (2005) compared the ability of usability testing and cognitive walkthrough in error identification in technical documentation development and results showed that the evaluation techniques are complementary based on their findings. Liu et al. (2005) derived out that when cognitive walkthrough method is used for evaluation of user interfaces, user background settings had better include various factors such as cognitive and physical in order to identify usability problems more efficiently. Tracking eye movements in human agent interaction is an objective evaluation method in which users are not hindered from realizing their primary task. Russell (2005) realized an eye-tracking study in order to find out contribution of eye-movement data to usability tests in case of first time web site usage. In their research, Prendinger et al. (2007) analyzed effects of eye movement data on the utility of interface agents and usability of agent based interfaces. Similarly, Guan et al. (2006) used eye movement data to assess validity of Retrospective Think Aloud method, a usability method in which users verbalize their performance after completing the tasks. In order to investigate its validity and reliability, the eye movement data is compared with subjects' verbal reports.

In addition to the method used in usability problem identification, there are other parameters of critical importance that should be taken into account and adjusted for the problem to be found with high probability. Those parameters involve sample size and

number of evaluators. Faulkner's research (2003) indicated that as sample size increased, the percentage of problems being revealed increased. Hertzum & Jacobsen (2001) focused on evaluator effect in that different evaluators evaluating the very same interface with the same usability evaluation method figure out different problems and proposed that evaluator effect can not be totally eliminated, but can be reduced by use of multiple evalutors.

Unlike studies focusing on usability evaluation methods, usability tests and parameters in usability problem identification, Folstad et al. (2006) explored HCI practitioners' evaluation of their own work and their suggestions for improvement since results of human computer interaction activities mostly depend on the practitioners than the methods used.

The studies related to usability mentioned up until now have focused on usability issues on non-adaptive user interfaces in which customization, personalization or other intelligent behavior is not involved. Gajos et al. (2008) investigated influence of accuracy and predictability on adaptive user interface usability and concluded that improved accuracy and predictability both increased satisfaction, performance and utilization of the adaptive interface, whereas accuracy had more beneficial impacts than predictability.

Usability Testing & Cognitive Walkthrough

Usability testing is a technique in which intended subjects carry out given tasks using the product. The aim of the method is to investigate errors and areas of improvement. Usability testing requires a working product or prototype whereas cognitive walkthrough

is an evaluation technique that does not require. Cognitive walkthrough is a technique used for evaluating design of a user interface and it's mostly performed by systems designers early in the design process before users' testing becomes possible in order to explore design flaws earlier (Rieman et al., 1995).

In their study, Rogers et al. (2005) compared the two techniques: usability testing and cognitive walkthrough by use of aviation maintenance documentation. Results showed that the two evaluation techniques were complementary due to their error finding and information producing ability.

Think-Aloud Method

Think aloud method is a technique in which subjects speak out their thoughts loudly as they perform given tasks and resulting verbalizations are analyzed thereafter. Think aloud method has its roots in psychology. Today, it is used as a popular method for system usability testing to figure out deficiencies in a computer system.

Think aloud method is useful in learning about cognitive processes of users and building computer systems accordingly. It has been utilized in user interface design and has been a useful technique for requirements analysis as shown in literature. In their study, Jaspers et al. (2004) got use of think-aloud method to analyze the way users perform tasks and assess users' reasoning in interaction with prototype systems. This method helped them explore users' needs and source of problems in using the system. Another example of application of the method in literature for user interface design is Jørgensen's study where interviews with system designers were realized and think-aloud method was successfully applied for design practice (1990).

Eye Tracking

Tracking the eye movement is a technique used for measuring the focus of attention by use of an eye tracker tool. In the context of user interfaces, eye tracking is commonly used because experience of users with the interface is captured instantly. Granka et al. (2004) got use of eye movement tracking technique to evaluate how users behave in web search which is useful for improving interface design. Similarly, there have been so many research and studies about this technique and its applications in literature.

Conjoint Analysis

Conjoint analysis is a popular statistical technique widely used in marketing research. It is used to determine what combination of a defined number of attributes of a product better meets market needs since consumers don't have the choice of selecting the product which is best in all attributes.

In conjoint analysis, attributes of a product are selected initially. Afterwards, levels for each attribute are assigned. As attribute number and corresponding attribute level number increase, number of potential product profiles increase exponentially. In order to overcome this, fractional factorial design is used. This experimental design method reduces the number of profiles that are to be evaluated in conjoint analysis by generating carefully chosen set of profiles. After profiles that are going to be evaluated are selected, respondents are asked to rank those profiles. A "part worth utility value", which indicates desirability of an attribute, is computed for each level of each attribute

based on rankings of respondents. Total of part worth values for each attribute gives product utility.

First application of conjoint analysis method in industry has been realized by Green & Rao (1971) who explored most effective combination of ads by use of 8 types of advertisements through 5 magazines.

Rzepakowski (2008) analyzed usage of conjoint analysis in telecommunication in order to explore optimum telecommunication products for customers and found out that conjoint analysis could be preferred by telecommunication operators for customer preference identification.

Statistical Package for the Social Sciences (SPSS) software is predictive analytics software and solutions which provides Conjoint Analysis tool to measure the trade-off between attribute & attribute levels of a product when making purchasing decisions.

Adaptivity

Today's fast evolving information and technology age requires that people spend less time and effort for realizing more work. Hence, technologic devices minimalize in that they become accessible any time at anywhere and users become capable of reaching information and managing it with minimal time and effort. In addition to small, portable devices, systems are getting more intelligent with adaptive features involved. Adaptivity is described as a major characteristic of Intelligent User Interfaces that enhances usability of interactive systems in order to respond to differing user groups' requirements (Karagiannidis et al., 1995). Adaptivity can simplify users' tasks and

meanwhile ensure gain in time and effort for users so long as it is implemented in appropriate form with adequate measure in a way that enhances usefulness and ease of use of the system. Höök (2008) outlined the steps to take in order to create commercially acceptable and useful adaptive user interfaces.

Adaptive Interfaces

There are numerous design and implementation applications of adaptive interfaces in e-commerce, reservation, decision-making and planning systems. Intelligent file manipulator developed by Virvou & Kabassi (2004) is an intelligent application which makes deductions about user actions, plans and errors with respect to their hypothesized intentions through the use of a user modeling component and gives advice accordingly. Castillo et al. (2008) built a user-oriented, adaptive software tool that help users by presenting them a list of activities in different cities and generating plans for them with regard to the past system experience of similar users. Yim et al. (2004) built an adaptive travel planning system that is able to find alternative plans by constraint relaxation, generate decision mechanism and determine the best alternative for the user. Wen (2007) developed a knowledge-based, intelligent e-commerce system for selling agricultural products through which financial analysis and sales forecasting are realized and feasible solutions based on the deductions of rule-based reasoning are provided for managers' use in decision making. According to Georgallides et al. (1997) the key feature of an agent is its ability to learn. They figured out that lack of personalization in software can be handled by developing software which can determine customer preferences by looking at their existing records.

Adaptive behavior and its impacts have also been investigated in applications that people use consistenly such as desktop applications and web browsers. Henricksen & Indulska (2001) explained design and implementation of a Web browser which gets use of adaptation mechanisms that incorporate context aware behavior and interfaces in order to address issues related to download latency and optimization of screen space. Results showed that adaptation put into the prototype improved its performance. Park et al. (2007) compared effectiveness of an adaptable menu and two different adaptive menus (adaptive split & adaptive highlight) in desktop applications by use of an usability evaluation experiment. In adaptive split menu, most frequently selected items are brought on top of the list whereas in adaptive highlight menu most frequently selected items are made bold. The results indicated that adaptable menus are more efficient and preferable than adaptive and traditional menus in terms of performance and satisfaction. For more efficiency, they offered integration of adaptive highlight feature into adaptable menus in order to provide selection frequency information to the users while giving control of reorganizing menus.

Several intelligent e-mail applications have also been developed. Intelligent-Electronic Mail Sorter (I-ems) is an example to adaptive e-mail applications developed by Crawford et al. (2002). I-ems is an e-mail interface that organizes the inbox on the basis of predicted classifications of messages and enables users to have control over acceptance of the classification. Bifrost Inbox Organizer is an add-on to Notes email developed by Bälter & Sidner (2002). It provides an inbox with categories which is obtained by use of a set of general rules that are predefined and can be customized by individual users by use of a form. By use of such an organizer, users' email messages are prioritized for their reading. MailCat is another intelligent e-mail assistant for

organizing e-mail developed by Segal & Kephart (1999). It uses a text classifier which is trained on previous messages to predict the most possible folder for each message in the inbox and which supports incremental learning instead of batch learning algorithms that require periodic trainings.

Adaptive behavior in medical technologies is beneficial in obtaining and organizing health related data accurately. Maglogiannis & Hadjiefthymiades (2007) developed a location aware medical system which gets use of a set of sensors attached to the patient's body, a micro-computing unit that processes measurements of the sensors and a central monitoring unit that displays the data flow. Sutherland et al. (2001) conducted a formative study to collect accurate and complete health history data from patients of all literacy levels. They addressed issues related to questionnaire content and interface design of a web-based data entry form which is adaptive to differing reading and computer skill levels of patients. This research showed the significance of involving target patient population in interactive health communication systems before design and implementing adaptive systems for patient utilization accordingly. In their paper, Johnson & Turley (2005) drew attention to visual displays that should be designed differently according to nurses and doctors in that they use data differently. Their research exhibited that one way of maintaining adaptive behavior is through the effective use of visual displays. Tamminen et al. (2000) developed an adaptive health monitoring device which helps people monitor their health by tracking their physical measurements.

Intelligent Mobile Services

Intelligence has been embedded into mobile technologies as well. Wu et al. (2008) applied intelligent adaptation techniques into mobile information systems by providing a prototype implementation that includes mobile event engine, rule system and database system components. Findlater & McGrenere (2008) investigated adaptivity by comparing it in small screen and desktop devices and measured effect of screen size and adaptive accuracy on awareness and their study revealed that adaptivity is an important design concept that should be included in small screen device applications. With the Personal Assistant for Online Services Project, Nagata et al. (2004) aimed to make user interaction more efficient through personalization and context awareness on a mobile device. Unpredictable adaptive interface adaptations can reduce a system's usability. To decrease this negative effect, Paymans et al. (2004) developed a user support concept which is deployed in a context-aware mobile device with an adaptive user interface. Results indicated that user support improved ease of use whereas it reduced learnability. Similarly, there is a tradeoff between personalization and privacy issues in adaptive information access and such a tradeoff requires getting right balance without over profiling the users (Smyth, 2008). Vos et al. (2008) developed an experimental design to figure out consumer value of location awareness and information presence in mobile services and based on experiment results, some guidelines that take into account privacy issues of consumers, consumer characteristics and concerns and service characteristics (utilitarian/hedonic) were provided for context aware services providers.

Adaptivity as a factor having influence on service adoption has been explored in literature. Goren-Bar & Kuflik (2004) explored adaptivity's impact on mobile service

adoption by use of a cellular-phone based recommender system. Their study showed that adaptive system is more preferable than non-adaptive one despite little interaction with the system. In addition to adaptivity, other factors and their impact on service adoption have been commonly studied in literature.

Service Adoption Models

Technology adoption and acceptance have been explained by a number of models with different determinants in information systems literature. Technology Acceptance Model is the most well known model that explains information systems acceptance (Davis et al., 1989).

Theory of Reasoned Action

Theory of Reasoned Action is a model of individual acceptance that has roots in social psychology. It models behavior as a function of behavioral intention and behavioral intention as a function of attitude toward behavior, defined as "an individual's positive or negative feelings about performing the target behavior" and subjective norm, defined as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein & Ajzen, 1975). Fig. 1 depicts TRA.

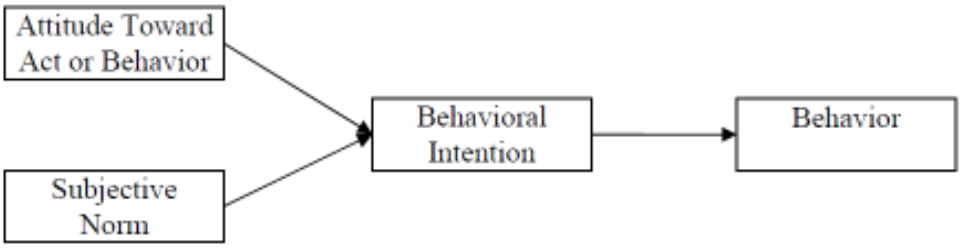


Fig. 1 Theory of Reasoned Action (Fishbein & Ajzen, 1975)

Technology Acceptance Model

Technology Acceptance Model (TAM) explains how information systems users adopt a new technology (Davis et al., 1989). According to TAM, acceptance of a system is modeled as a function of perceived ease of use, defined as "the extent to which a person believes that using a system would be free of mental effort" and perceived usefulness, defined as "the extent to which a person believes that using a system would enhance his or her job performance and effectiveness", which mediate effects of external factors through behavioral intention to system acceptance (Davis et al., 1989). TAM is shown in Fig. 2.

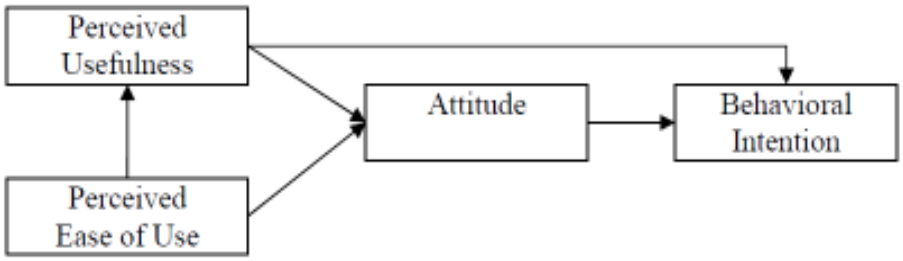


Fig. 2 Technology Acceptance Model (Davis, 1989)

Theory of Planned Behavior

Theory of Planned Behavior (TPB) is successor model of Theory of Reasoned Action proposed by Ajzen (1991) which resulted with addition of perceived behavioral control with the discovery that behavior is not totally under control. Fig. 3 depicts the model.

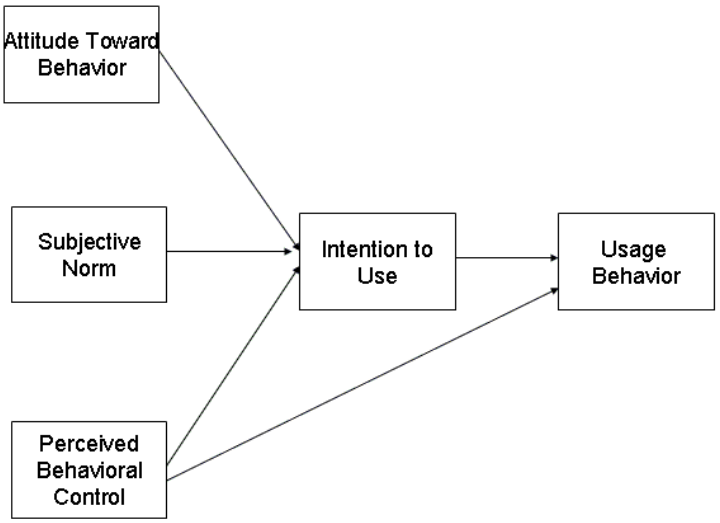


Fig. 3 Theory of Planned Behavior (Ajzen, 1991)

Motivational Model

Motivational Model (MM) depends on general motivation theory in psychology. MM is adapted to technology acceptance by Davis et al. (1992) and is based on users' motivation to explain technology adoption. The core determinants of the model are extrinsic motivation, defined as "the perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions", and intrinsic motivation, defined as "the perception that users will want to perform an

activity for no apparent reinforcement other than the process of performing the activity per se" by Davis et al. (1992).

Combined TAM and TPB

This model combines determinants of TPB with the perceived usefulness construct of TAM (Taylor & Todd, 1995).

TAM2 (Technology Acceptance Model-2000)

Venkatesh & Davis (2000) proposed TAM2 as an extension to TAM by incorporating social influences and the determinants of perceived usefulness. TAM2 is shown in Fig. 4.

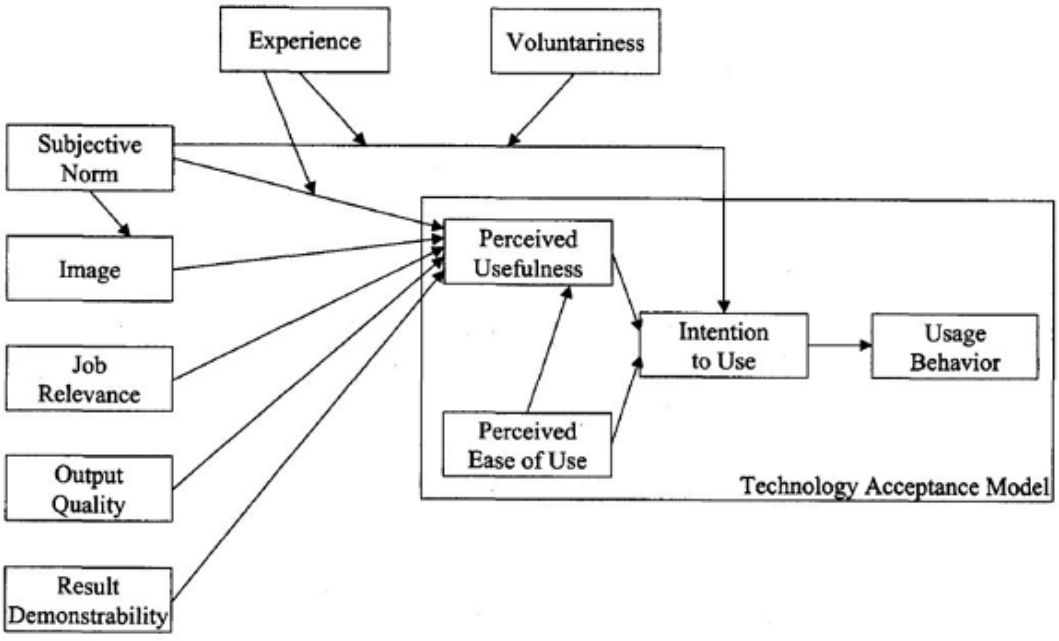


Fig. 4 Technology Acceptance Model 2 (Venkatesh & Davis, 2000)

Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003) examined 8 competing models and proposed a unified theory of acceptance and use of technology (UTAUT) by synthesizing those 8 models. UTAUT presents direct determinants (performance expectancy, effort expectancy, social influence, and facilitating conditions) of usage intention and behavior and moderator constructs (gender, age, experience, and voluntariness) that mediate effects of those four key constructs. UTAUT is shown in Fig. 5.

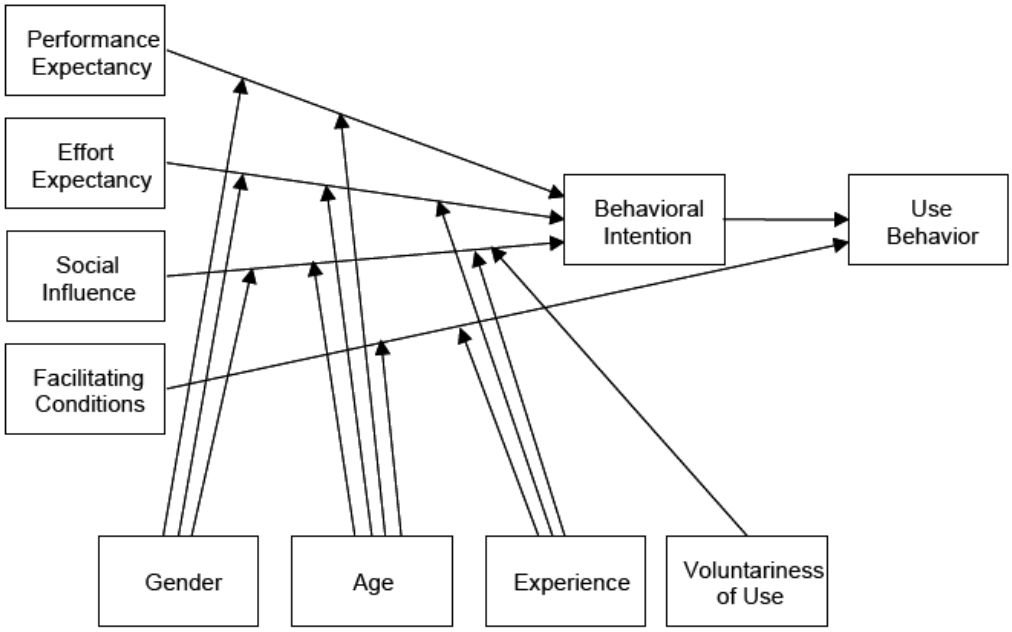


Fig. 5 Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)

Consumer Technology Acceptance

Consumer Technology Acceptance model (C-TAM) is a model that resulted from investigation of TAM in a consumer context and integration of hedonic aspect of technology use in it (Bruner & Kumar, 2005). C-TAM is shown in Fig. 6.

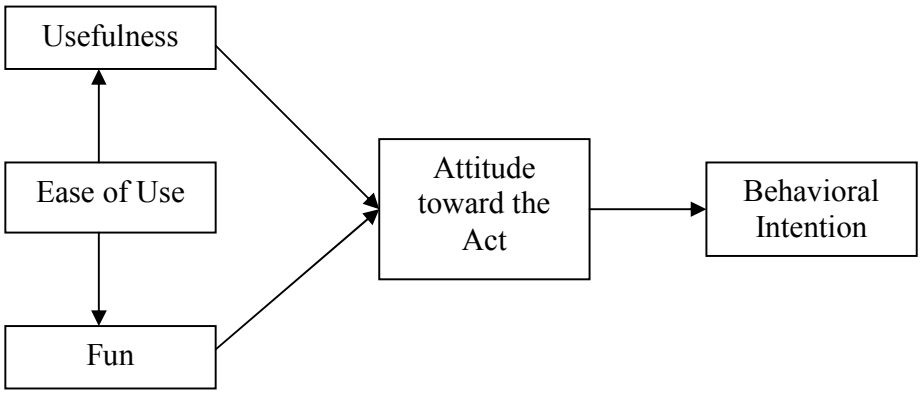


Fig. 6 Consumer Technology Acceptance Model (Bruner & Kumar, 2005)

Adoption Factors

According to prior research, there are several user and service related characteristics that impact users' intentions to use an information system. Pinhanez (2008) proposed a Service Science framework for online service applications in order to explain and predict the differences between traditional interactive software tools and online service applications. Through the framework, 15 important issues for online service interfaces have been identified. Those issues include trust, privacy, security, consistency and personalization which are the constructs derived from our study. Chalmers (2003) proposed that cognitive factors and concepts should be taken into consideration when developing user interfaces. According to Bederson (2004), interfaces should keep us on

the flow by making us concentrate on our work. Wood et al. (2006) mentioned about importance of attention and proposed 8 design issues to consider for developing systems that are aware of user attention. In their research, Seneler et al. (2009) studied five product design features (customization, adaptive behavior, memory load, content density, and speed) that affect user preferences. Murrell (1998) explained design principles that should be taken into account for use in a multi lingual, multi cultural environment. Kamppuri et al. (2006) explored culture-related studies to analyze occurrences and characteristic of culture studies in HCI. Bassam & Mesbah (2007) examined interface style's impact on user perceptions and behavioral intention for technology acceptance and usage. They found out that interface style has indirect effect on behavioral intention through its direct effects on perceived ease of use (PEOU) and perceived usefulness (PU). Ho (2006) explored motivating and inhibiting factors and their effects in switching from current websites to personalized websites. Those factors include experience with current websites (level of involvement & accessibility of relevant information) and perception of personalized websites (perceived usefulness, perceived ease of use & privacy concerns). Kargin et al. (2009) investigated adoption factors in mobile services and figured out that usefulness and ease of use are the most important aspects which can be influenced by service or social aspects that constitute the main determinants of mobile service adoption taxonomy proposed in their paper. Lilley & Barker (2007) explored perceived usefulness of formative assessment and feedback for a computer adaptive test in which difficulty of questions are tailored dynamically to proficiency levels of test takers. Phuangthong & Malisawan (2005) examined factors, the constructs in TAM, which have effects on user adoption of 3G Mobile Internet technologies in mobile learning. Huang & Huang (2005) studied TAM in the women-

centric context and have remarked that perceived usefulness is not a contributory factor for the intention to visit a web site in the women-centric context and perceived ease of use is less important when compared to perceived usefulness and perceived playfulness. Through the use of Eye Tracking Study and Scan path analysis methods, Lorigo et al. (2006) analyzed impact of gender and task on users' search and evaluation behavior. Granka et al. (2004) analyzed user behavior in web search through eye-tracking. Dougan & Bronson (2003) reviewed a case study to see the effects of path dependence, network externalities, and impacted information on the adoption of computer reservation systems.

CHAPTER 3

FRAMEWORK

In this chapter, definition and significance of the study is described, mobile service adoption taxonomy is developed and research framework and hypotheses about mobile service adoption are presented.

Based on literature, we explored the external variables that impact users' intention to use a system and developed a taxonomy structure by classifying those variables with regard to literature and our qualitative analyses. One critical hypothesis we derive through this literature is that "Adaptivity in addition to several other factors cited in the literature is a key factor impacting adoption of mobile services".

In addition to that, conjoint analysis was realized to figure out preference factors of mobile services.

Definition and Significance of the Study

Mobile computing devices, such as Personal Digital Assistants (PDA), handheld computers, Smartphones, have recently been growing extremely. People do not use mobile devices just for keeping in touch with each other. Mobile devices are being enabled to perform anything desktop and laptops are capable of. However, mobile computing brings in some problems which include bandwidth insufficiency, security issues due to dependence on public networks, high power consumption, transmission interruptions and interface design on a limited screen space. The present study focuses

on the very last problem of interface design on small screen sized mobile devices and aims to figure out potential external variables that impact mobile system acceptance, to explore effects of those variables on limited interface of a mobile device, to identify user intention factors and mobile service design factors.

Mobile Service Adoption Taxonomy

Based on literature survey and our qualitative studies; in-depth interviews, think-aloud sessions, questionnaires, brainstorming study and our quantitative experimental study mobile service adoption taxonomy, which classifies factors impacting mobile technology acceptance, was developed. Fig. 7 depicts the proposed taxonomy.

In the adoption taxonomy, service adoption can be analyzed under 3 main classes: service characteristics, social factors and the intermediary.

Service characteristics are composed of 3 categories: system characteristics, design characteristics and system intelligence. System characteristics involve constructs that are related to the state and quality of the mobile reservation system excluding design and implementation issues. Design characteristics are the characteristics that relate to the human computer interaction interface. The last category under service characteristics is system intelligence which is the quality of the system being capable of self-adapting in response to changing environment and different personal information or being adaptable by the user.

Social factors include 2 categories: user characteristics and social environment. User characteristics involve individual demographic differences such as age, gender,

task, etc. and computer skill level. Social environment refers to the culture and cultural environment a user has grown with.

Intermediary categories belong solely neither to service characteristics class nor to social factors class. The categories under intermediary, ease of use (EoU) and usefulness, are the constructs that are either dependent on service characteristics or social characteristics or both. Hence, in the proposed taxonomy it is depicted as a class under the heading intermediary.

All variables in this taxonomy are mentioned both in literature and qualitative studies. Table 1 shows the list of studies used to construct mobile service adoption taxonomy.

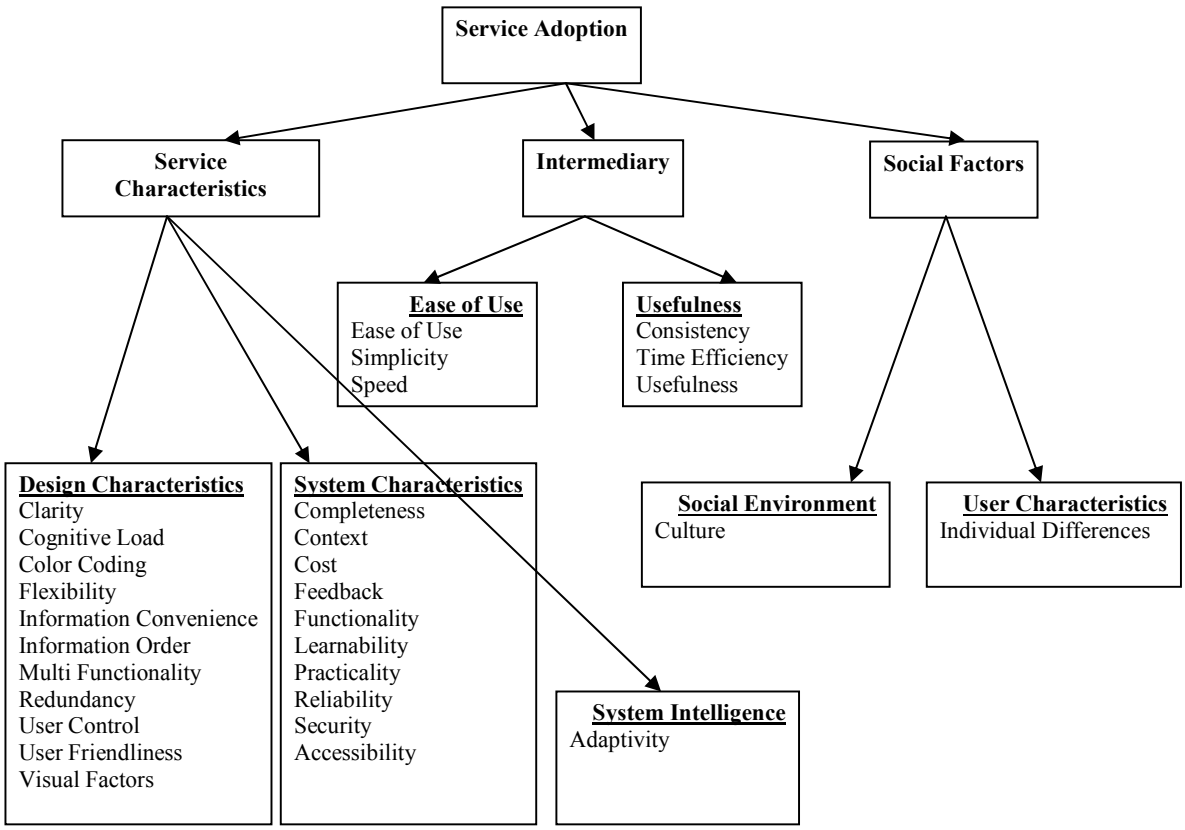


Fig. 7 Mobile service adoption taxonomy

Table 1 Literature List of Taxonomy

Bälter & Sidner, 2002	Lorigo, 2006
Bassam & Mesbah, 2007	Maglogiannis & Hadjiefthymiades, 2007
Castillo, 2008	Michaelides et al., 1997
Chalmers, 2003	Murray & Edmonds, 1994
Crawford et al., 2002	Murrell, 1998
Davis, 1989	Nagata et al., 2004
Dougan & Bronson, 2003	Park et al., 2007
Duray et al., 1999	Paymans et al., 2004
Følstad et al., 2006	Phuangthong & Malisawan, 2005
Granka, 2004	Rieman et al.,1995
Henricksen & Indulska, 2001	Segal & Kephart, 1999
Ho, 2006	Sutherland et al., 2001
Höök, 2000	Virvou & Kabassi, 2004
Huang & Huang, 2005	Wen, 2007
Johnson & Turley, 2005	Wood et al., 2006
Kamppuri, 2006	Wu et al., 2008
Karagiannids et al., 1995	Yim et al., 2004
Liu et al., 2005	

Research Framework and Hypotheses

Based on mobile service adoption taxonomy and literature survey, two models were constructed. Mobile service conjoint framework aimed to figure out factors that have impact on mobile service preferences of users and mobile service intention framework aimed to test users' intention towards mobile service usage.

Mobile Service Conjoint Research Framework

Fig. 8 represents mobile service conjoint research framework. This framework consists of three constructs:

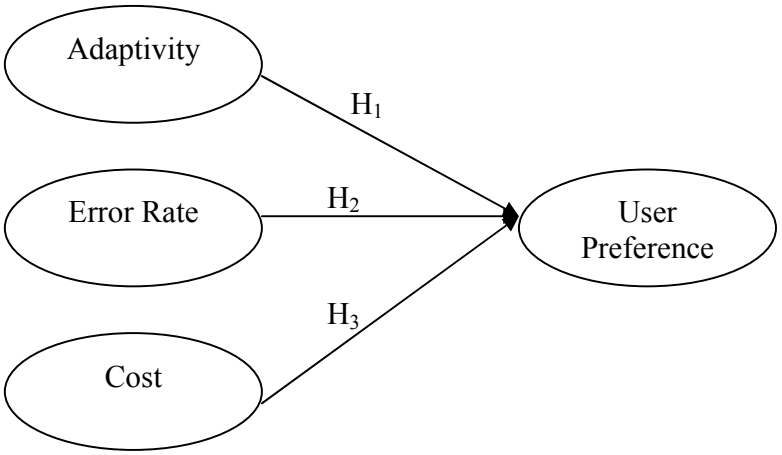


Fig. 8 Mobile service conjoint research framework

Research hypotheses drawn from the mobile service conjoint research framework are formulated in Table 2.

Table 2 Mobile Service Conjoint Research Framework Hypotheses

Hypothesis	Dependent Variable	Independent Variable	Relationship
H_1	User Preference	Adaptivity	Positive
H_2	User Preference	High Error Rate	Negative
H_3	User Preference	High Cost	Negative

As tendency for mobile device usage increases, limited screen space of a mobile device needs to be designed carefully such that it enables the users to find the related information/functionality quickly with minimal effort.

The content and functionality being presented to users via mobile device must not be complex and must meet needs and expectations of the users by anticipating their needs, eliminating unrelated information and structuring the screen design accordingly. Different users may need to access different information of the same service; their needs and usage patterns may change in time. Hence, adaptive user interfaces should be designed and developed in order to deal with evolving nature of user navigation (Weld et al., 2003).

Adaptivity is described as a major characteristic of Intelligent User Interfaces that improves the usability of interactive systems to meet the requirements of heterogeneous user categories (Karagiannidis, 1995). Adaptive interfaces customize themselves based on users' profiles, needs, purposes and prior interactions with the system. Since a mobile device user is in need of focused information, immediate response from the interface and minimal device interaction, adaptive behavior of mobile system improves user performance (Robertson et al., 1996).

In their study, Goren-Bar & Kuflik compared an adaptive mobile phone based recommender system to a non-adaptive one and concluded that users prefer adaptive system over non-adaptive one (2004).

Hence, the study makes the following hypothesis:

H_1: Adaptivity significantly and positively affects user preference of mobile service user.

Jameson (2003) defines predictability as the extent to which a user can predict effects of her actions. Unpredictability due to adaptive behavior may disorient users and user satisfaction may decrease in spite of performance gains adaptivity brings in. Gajos et al. (2008) defines accuracy as the extent to which necessary user interface elements are contained in the adaptive interface. In case that adaptive interface is structured with inaccurate elements, users spend much effort to reach related elements. As a result, user satisfaction and performance drop down. According to the findings of Gajos et al. (2008), as accuracy increases, performance and adaptive interface utilization rise and both accuracy predictability raise user satisfaction.

Accuracy of adaptation of an adaptive user interface defines interface effectiveness and user performance. As adaptation directs users inaccurately, effectiveness and performance decrease. In addition to that, as accuracy decreases, users' ability to use the system lowers in that users' reliance on system suggestions decreases (Tsandilas & Schraefel, 2005). Adaptive interfaces may have design flaws due to inaccuracy and unpredictability of its behavior. Therefore, the control offered by adaptive interfaces may not be preferred when error rate reduces user performance and satisfaction more than adaptivity gains.

So, the following inference is made:

H_2: High error rate significantly and negatively affects user preference of mobile service user.

Another important factor that has major impact on mobile service acceptance is cost. For customers, cost is one of the most essential factors in decision of whether to use a mobile service. In their study, Wu & Wang (2005) integrated cost into TAM to explore its effect on mobile commerce acceptance and concluded that cost is one of the

important factors of mobile commerce adoption that has significantly negative direct effect on behavioral intention. Anckar et al. (2003) found out that high initial and operating costs were key factors that influence non-adoption of mobile services in their study in which factors affecting consumers' adoption decisions and intents in the field of mobile commerce were investigated.

The study hence makes the following inference:

H3: High cost significantly and negatively affects user preference of mobile service user.

Determinants of Mobile Service Intention Framework

Fig. 9 illustrates the second research framework. Mobile service intention framework consists of 9 constructs: adaptivity, customization, information completeness, innovativeness, personalization, EoU, usefulness, attitude and satisfaction.

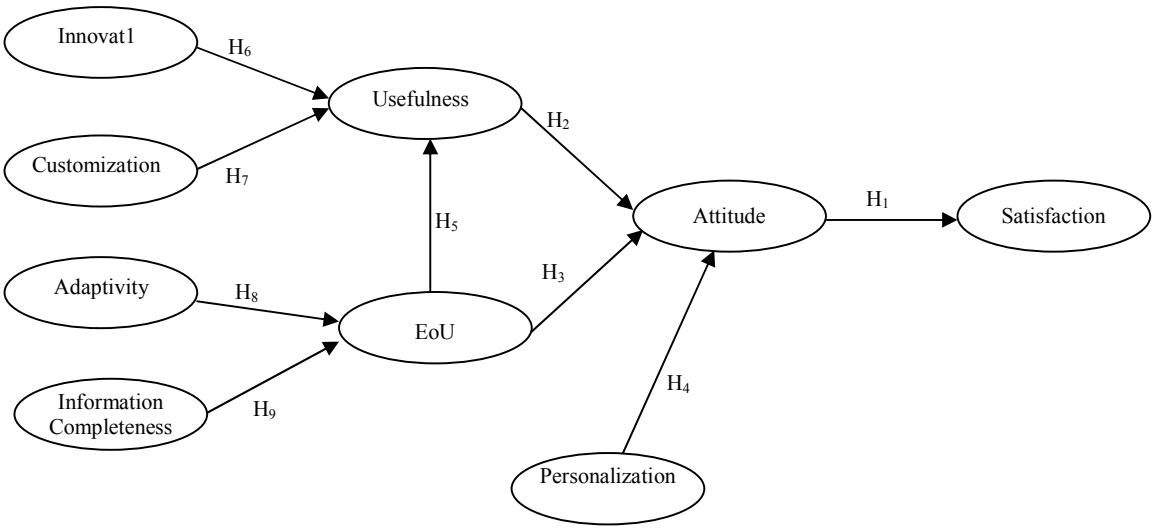


Fig. 9 Mobile service intention framework and its determinants

Research hypotheses based on the mobile service intention framework are depicted in Table 3.

Table 3 Hypotheses of Mobile Service Intention Framework

Hypothesis	Dependent Variable	Independent Variable	Relationship
H_1	Satisfaction	Attitude	Positive
H_2	Attitude	Usefulness	Positive
H_3	Attitude	EoU	Positive
H_4	Attitude	Personalization	Positive
H_5	Usefulness	EoU	Positive
H_6	Usefulness	Innovativeness	Positive
H_7	Usefulness	Customization	Positive
H_8	EoU	Adaptivity	Positive
H_9	EoU	Inf. Completeness	Positive

El-Gamal et al. (2005) indicated in their study that attitude predicted satisfaction with system and system performance by use of an e-learning model. Similarly, Cho (2008) derived out that attitude of users toward mobile phone usage affected user satisfaction.

H_1: Attitude significantly and positively influences satisfaction.

According to Technology Acceptance Model which was developed by Fred Davis and Richard Bagozzi et al. (Bagozzi et al., 1992; Davis et al., 1989), acceptance of a system is modeled as a function of usefulness. Based on TAM, many other models have been developed in which usefulness is one of the determinants of attitude (Venkatesh & Davis, 2000; Bruner & Kumar, 2005). In their study, Karahanna et al. (1999) asserted that both pre-adoption and post-adoption attitude is based on usefulness. Hence, the following inference is made:

H_2: Usefulness significantly and positively influences attitude.

In addition to usefulness, acceptance of a sytem is modeled also as a function of ease of use based on TAM and other models that were derived from TAM. This finding was supported by many researchers in various contexts (Bassam & Mesbah, 2007). So, the study makes the following inference:

H_3: Ease of use significantly and positively influences attitude.

Ho (2006) explored the issue of attraction of internet personalization to web users and one of the results showed that so long as personalization in web sites was useful, people would intend to switch to a personalized website. Effective automatic personalization may greatly improve users' productivity which in turn makes them prefer personalized interfaces (Weld et al., 2003). The study hence conducts the following hypothesis:

H_4: Personalization significantly and positively influences attitude.

According to TAM, ease of use directly and strongly affects usefulness (Davis, 1989). Similar statements have been supported by other researchers thereafter (Venkatesh & Morris, 2000; Çalışır & Çalışır, 2004). As a result, following inference is made:

H_5: Ease of use significantly and positively influences usefulness.

Rogers (1983) defined innovativeness as the extent to which a person adopts new ideas earlier than other individuals of the society. Crespo and Bosque (2008) explored effect of innovativeness on electronic commerce adoption and denoted that personal innovativeness is one of the determinants of electronic commerce acceptance. Legris et al. (2003) suggested integration of TAM into a broader model which included constructs related to innovation model.

H_6: Innovativeness significantly and positively influences usefulness.

Customization is defined as the capability of adapting the user interface by end users to realize their tasks (Rivera, 2005). Hui & Craig (2006) denoted that software customization helped users cope with complexity, intrusiveness, scope and changing nature of information systems. Mass customization due to fast evolving technologies provides quick adaption to changes in customer needs which in turn effects usefulness of the service or product and satisfies the customers (Duray & Milligan, 1999). Based on prior researches, the following inference is conducted:

H_7: Customization significantly and positively influences usefulness.

There have been many researches on adaptivity and applications of adaptive systems (Virvou & Kabassi, 2004; Henricksen & Indulska, 2001; Wu et al., 2008; Nagata et al., 2004; Georgallides et al., 1997; Wen, 2007; Castillo et al., 2008; Yim et al., 2004). The results of those studies proved that adaptivity implemented on systems facilitated quick and efficient user interaction. Paymans et al. (2004) found that user support of adaptive applications improved ease of use. Hence, the study conducts the following hypothesis:

H_8: Adaptivity significantly and positively influences ease of use.

Information completeness is the state of being complete without any deficiency, having all information needed. Topacan et al. (2009) found that information content had impact on health information service adoption.

According to the model of Delone & McLean (1992), information quality influences use and user satisfaction. In the light of researches, incomplete information in a service makes it difficult to use when users can not find what they are seeking. So, the following inference is deduced:

H_9: Information completeness significantly and positively influences ease of use.

CHAPTER 4

METHODOLOGY

This study started in September 2007 with literature review about human computer interaction. Literature review involved a very large scope including topics such as interface design, design guidelines, mobile interfaces, adaptivity, adaptive applications, intelligent systems implementations, usability, service adoption, adoption factors, organic interfaces, multi-touch interfaces, iphone application design and implementations. For three years long, literature review proceeded together with qualitative studies including prototype development, pilot studies, think aloud testings, interviews, questionnaires, audio and video data collection together with click pattern data compilation, qualitative data analysis, and a brainstorming session. Lastly, a quantitative study was conducted. During framework development of this study, a series of empirical studies were performed. Summary of the studies are illustrated in Table 4.

Table 4 Summary of Research Studies

Study	Date	n	# of constructs	Publication
Prototype Design & Development 1	Jan. 2008			
Usability Testings & Interviews 1	Feb. 2008	12	30	HICSS 2008
Prototype Design & Development 2	May. 2009			
Usability Testings & Interviews 2	Sept. 2009	16	60	PICMET 2009
Brainstorming Study	Dec. 2009	9	10	
Experimental Study	Jan. 2010	148	19	

These studies are described in detail in the following section.

Qualitative Studies

The aim of this study is to derive out related constructs, their relationships with each other and dependencies on each other, to explore effects of adaptivity and other constructs in mobile service adoption. In order to reach our aim, qualitative studies were performed initially to explore users' ideas, feelings and views about mobile services. For this, two qualitative studies were realized. In the first one, two prototypes were developed for a mobile service application with additional features integrated into the second prototype to be able to compare effects of external variables. In the second qualitative study, 3rd prototype for the very same mobile service was developed based on findings and results of the first qualitative study and 2nd and 3rd prototypes were utilized in the second study. Prototypes were implemented in Microsoft Visual Studio 2005 and Windows Mobile 5.0 SDK was used for targeting Smartphone devices. Description and details of both studies are explained below.

Qualitative Study 1

Prototype Design and Development 1

As a sample application on mobile device, Mobile Movie Reservation Service was picked and two prototypes were developed in this context. Prototype 1 was the simplest form of a mobile movie reservation system with basic functionalities and Prototype 2 was an improved version of Prototype 1 with adaptive features and other improvements implemented with regard to test users' suggestions of Prototype 1.

Users were given a well defined task to follow in order to realize the testing. The task was defined as buying 2 tickets for movie x at location y between 19:30 and 21:30. Steps of prototypes were as follows:

- User logins to the system. Prototype 1 user has to enter both username and password whereas Prototype 2 user is remembered; he/she just enters password.
- User selects the movie indicated in the task. Prototype 1 user has to go up or down through the list to select the movie. User of Prototype 2 can also enter first letter and list the movies starting with that letter.
- User selects the district indicated in the task. Prototype 1 user has to go up or down through the list to select the district. User of Prototype 2 can also enter first letter and list the districts starting with that letter. As distinct from Prototype 1, the district closest to the system user's location comes on top of the list in Prototype 2. Fig. 10 depicts screenshots of district selection step.

Prototype 1 Prototype 2

Fig. 10 Screenshots of district selection step for Prototype 1 and 2

- User selects the theatre indicated in the task. Prototype 1 user has to go up or down through the list to select the theatre. Prototype 2 user can also enter first letter and list the theatres starting with that letter. As distinct from Prototype 1, the theatre closest to the system user's location comes on top of the list in Prototype 2.

- User selects the session that is appropriate for the time interval indicated in the task. Differently, past sessions are shown in red and can not be selected in Prototype 2.

- User selects seats by entering line number in Prototype 1 while Prototype 2 users are able to select left, middle, right seats.

- Reservation information screen appears where summary of user's reservation choices are shown.

- User enters credit card information and makes the payment. In Prototype 2, user is recognized and his/her credit card number is being brought to the screen based on his/her profile information. Fig. 11 shows the screenshots of payment step.

Prototype 1 Prototype 2

Fig. 11 Screenshots of payment step for Prototype 1 and 2

- System informs the user whether reservation is done successfully or not. User may continue with another reservation or quit.

Basic steps of achieving the task and the improvement of Prototype 2 are summarized in Table 5. Complete screenshots of Prototype 1 and Prototype 2 have been included in Appendix A.

Table 5 Steps of Prototype 1 and Prototype 2

Prototype-1	Prototype-2 (differences)
login to the system (enter username, password)	Only password
Selection process: up, down	*Selection process: up, down, or a key*
select the movie	
select a district in city	Closest district at top
select one of the theatres	Closest theatre at top
movie session (hour)	Past session are shown in red, can not be selected
select seats by line no	may select left, middle, right seats
determine ticket number	Ticket type automatic (adult, student etc.)
do the payment	Card info automatic

Usability Testings and Interviews 1

The goal of the usability testing was to discover adoption factors of mobile services, especially effect of adaptivity on adoption of mobile services, and relationships of those factors with each other and to investigate errors and areas of improvement by observing people using the prototypes and getting feedback afterwards.

For usability testing of both prototypes, think-aloud technique was applied together with an oral question set presented to each user at the end of each think-aloud session. By use of think aloud method in which users were instructed to think aloud as they went through prototype screens, what they said was audio recorded with their permission for use in the data analysis phase. In this way, their thoughts and interactions with each screen were not missed and their cognitive processes were ascertained. With the use of interview question set, answers to typical questions that were derived as part of the study were explored. The question set can be seen in Appendix B (in English and in Turkish respectively). Think aloud session records may bring out what have not been remarked as well. Hence in addition to the question set, think aloud technique was utilized in usability tests. Also, a questionnaire, in which perceived usefulness, perceived ease of use, attitude/intention, satisfaction were interrogated, was prepared and presented to interviewees. However, answers to the closed-end questions in the questionnaire showed that there was not a remarkable variance that might affect the results of data obtained from audio records and interview question set answers. The questionnaire questions can be found in Appendix C (in English and in Turkish respectively).

Before testing started, a pilot study was done on 2 users in order to identify any problematic issues with the process and improve the question set and interview procedure by the way.

Excluding the pilot users, there were 3 groups of users: Group 1(Control Group), Group 2 and Group 3. The groups were similar in terms of gender and age composition. Each group had 4 users with the following profiles: (Male, Young), (Male, Old), (Female, Young), (Female, Old).

Usability testing of the prototypes with group users included the following stages respectively:

- Prototype 1 was developed.
- Pilot test was realized with 2 users.
- Usability testing of Prototype 1 with Group 1 & Group 2 users (a total of 8 participants) was performed.
- Content analysis of Prototype 1 audio records and interview notes and evaluation of suggestions was realized.
- Prototype 2 was designed and developed with regard to suggestions. Not all suggestions were taken into consideration. Some of the suggestions were eliminated due to their relevancy and users' emphasis.
- Usability testing of Prototype 2 with Group 1 & Group 3 users (a total of 8 participants) was performed.
- Content analysis of Prototype 2 audio records and interview notes was realized.

Control Group was used in tests of both prototypes to observe the learning effect. A total of 16 tests were realized one by one with each group member in different days and places. An appointment for prototype testing with each user was arranged according to users' convenient times and a test lasted for about half an hour.

A qualitative research approach was followed in which think-aloud session and interview content analyses were utilized by user comment extraction which was essential in construction of our taxonomy together with contribution of literature review (Stratton, 1997). In the scope of our analysis, what we realized is summarized below:

- A list of constructs was compiled from literature.

- Audio records and interview notes were read carefully many times.
- Content analysis was applied.
- A matching between each statement and two constructs was realized. It was assumed that a causal relation was present between the constructs, i.e. one dependent construct was determined by another. If statement was not matched with any existing construct, then the statement was conceptualized and put in the construct list.
- Our matching was evaluated by another reviewer and necessary revisions were realized.
- Number of constructs was counted and a percentage for each construct was found by dividing this number to total number of comments. The formula is shown below:

$$\frac{\text{Number of comments about the construct from all interviews}}{\text{Number of comments about all constructs from all interviews}} * 100$$

The results of usability testings and interviews for the first qualitative study will be explained in Findings section.

Qualitative Study 2

Prototype Design and Development 2

The need behind using a service may differ which stands for task diverseness based on conditions that the users are in. Lorigo et al. (2006) compared behavioral variability so as to find out how task differences affect search behavior and discovered that task significantly effects search behavior which is in turn essential for interface design.

Richardson et al. (1998) offered novel and apt design can be achieved via task analysis by focusing on analysis of user goals rather than an existing task implementation and without limiting range of design options by considering user requirements before the design process.

As a guideline for multimodal interface design, it has been presented that multimodal interfaces had better adapt to the needs of diverse users and capture changes in task via dynamic adaptivity (Reeves et al., 2004).

Life modes, predispositions of people based on conditions, designate tasks and depending on their life modes, users may have different tasks in their minds. In order to realize different tasks, users need different types of information and reveal diverse behavioral patterns which in turn require flexibility in the interface. When interface structure and design is not flexible and does not serve users' tasks expectedly, user performance and satisfaction decreases significantly.

Based on findings and results of the first qualitative study, flexibility is one of the most apparent factors in mobile service acceptance. Murray and Edmonds (1994) explained flexibility as follows: "The flexibility is in several forms in the interface: the support for different interaction techniques and, more importantly, the ability to create new and different interface techniques and to combine these into new abstract devices." Stuerzlinger et al. (2006) presented user interface façades which is a system that enables users to change the interface of any application without coding quickly and flexibly. Such a system enhances flexibility by means of adaptable user interfaces that just require drag-and-drop and thus is a good complement to user interface programming. In Prototype 1 and Prototype 2, the only interaction way to be able to perform a ticket reservation task was through following the screen sequence of movie selection,

location/district selection, saloon selection and time selection. The sequential and inflexible design of the service screens caused problems when users' need varied based on their task-behavior pattern or life-mode in other words. Task-behavior pattern is associated with predispositions of people based on conditions and it may require different sequences of actions/decisions to be taken. In Prototype 1 and Prototype 2, in case that users were decisive on saloon and time instead of movie, they had to take redundant steps back and forth through the service screens till they were able to find a proper combination of movie, saloon, and time choices. Taking the flexilibity issue and task-behavior pattern factor into account together with other feedbacks of users which were mostly related with adaptivity and findings from the first qualitative study, Prototype 3 was developed and Prototype 2 was modified slightly in order to remove effects of inconsistencies related to design elements and factors this qualitative study does not dwell upon.

Users were given two well defined tasks to follow in order to realize the testings. Task 1 included Action mode which focused on movie whereas Task 2 included Entertainment mode which focused on time. Each user performed each task on both Prototype 2 and Prototype 3. Details of usability testing are explained in the Usability Testings and Interviews 2 section. Below are the steps users follow in both prototypes:

- User logins to the system. User is remembered by the system and he/she just enters password in both prototypes.

- System welcomes user. Movie date comes default as the current day's date, and user is enabled to change it in both prototypes. Diffrently, in Prototype 3 movie district is default as the place where the user currently locates, and user is enabled to change it.

- Prototype 2 user selects the movie from movie selection screen. Then, he/she selects a district from the district selection screen. After that is saloon selection screen where user selects the saloon and finally, there comes time selection screen in which he/she selects the time to watch the movie. 4 screens are passed by to realize all selections in Prototype 2. However, steps for all decisions are put together in one screen in Prototype 3. Fig. 12 shows screenshots of selection step for Prototype 2 and Fig. 13 shows screenshot of selection step for Prototype 3.

Fig. 12 Screenshots of selection step for Prototype 2

Fig. 13 Screenshot of selection step for Prototype 3

- Prototype 2 users are able to select front, middle, back seats and seat number whereas Prototype 3 users can select the seats by viewing saloon sitting and occupied/empty seats. Fig. 14 shows screenshots of seat selection step for prototypes.

Prototype 2 Prototype 3

Fig. 14 Screenshots of seat selection step for Prototype 2 and 3

- User enters credit card information and makes the payment. At top of the screen, user's reservation choices are shown.

- System informs the user whether reservation is done successfully or not. User may continue with another reservation or quit.

Basic steps of achieving the task and the improvement of Prototype 3 are summarized in Table 6. Complete screenshots of Prototype 2 and Prototype 3 have been included in Appendix D.

Table 6 Steps of Prototype 2 and Prototype 3

Prototype-2	Prototype-3 (differences)
login to the system	
change date or continue	change district option
select the movie	select movie, theatre, movie session (hour)
select a district in city/another city	
select one of the theatres	
select movie session (hour)	
select seat number and seats by front, middle, back	select exact seats from saloon sitting plan
do the payment	

Usability Testings and Interviews 2

As in qualitative study 1, for usability testing of both prototypes, think-aloud technique was applied together with an oral question set presented to each user at the end of each think-aloud session. In addition to audio recordings of users' thoughts during think-aloud sessions, video recordings of users' faces and screens were saved so as to explore where users had difficulty and find out if there was an ambigous part in the screens. For taking videos of users' faces and application screens and audio recordings simultaneously, Camtasia Studio 6 was used. Also, users' clicks were recorded as they went through the screens for click pattern analysis which was helpful in identifying the points where users sticked around, the average spent time per screen, task, action, and users' traversing pattern thorugh the screens. Together with the oral question set, at the end of think aloud session users were given a usability testing construct list that

consisted of 60 related constructs obtained from previous studies for depicting most important 20 constructs that affected mobile service usage and putting first three most important constructs into order.

Before testing started, a pilot study was done on 2 users in order to identify any problematic issues with the process and to improve the question set and interview procedure by the way.

Excluding the pilot users, there were 4 groups of users: Group 1(Control Group), Group 4, Group 5 and Group 6. Each group had 4 users. The distribution of group users was similar in terms of gender, age and technical/social background composition. Each group user was given two tasks (See Appendix E for task descriptions in English and Turkish respectively) to realize by using the two prototypes except Group 6 users. Instead of using prototypes, Group 6 users watched a video in which each prototype was being used for each task and being displayed.

Usability testing of the prototypes with group users includes the following stages respectively:

- Prototype 3 was developed, Prototype 2 was slightly modified.
- Pilot test was realized with 2 users.
- Usability testing of prototypes with each user was performed.
- Content analysis of audio, user video, screen video records, interview notes, construct list preferences, evaluation of suggestions and click pattern analysis is going to be realized as part of future research.

A total of 4(group#) * 4(user # in each group) * 2 (prototypes #)* 2 (tasks#) 64 tests were realized one by one with each group member in different days and places. An appointment for prototype testing with each user was arranged according to users' convenient times and a test lasted for about an hour.

Qualitative Study 3

Brainstorming Session

In 1941, Alex Osborn, American advertising executive, developed the group creativity process called brainstorming in which freedom of mind and sparking of any kind of idea is the key without any inhibitions to the creation of ideas to generate a mass quantity of creative ideas for the solution of a problem (wikipedia.com, 2010).

Before experimental study, a brainstorming session was conducted to identify new constructs about mobile service adoption by the aid of participants' ideas and suggestions on mobile touristic guide service which was designed and used in experimental study later on.

Brainstorming session involved 9 participants who formed a heterogenous group in terms of technical/social background (of education and occupation). 3 participants were female, and 6 participants were male. Average age of the group was 29 years old and participants' education level was high (bachelor's degree or above).

Participants were invited via telephone or e-mail. One of the participants was requested to be facilitator of the session. She was instructed about how to carry out the session and session presentation was explained to her before the brainstorming session

date. After participants were collected, a meeting was scheduled and an e-mail debriefing the users about session details were sent to the participants. The e-mail contained information including aim of the session, expected results, history of our study, session rules and a brief explanation about HCI, mobile applications, adaptivity in addition to session place, date, time and duration.

On session day, the room was prepared and necessary materials were supplied (view of session room is seen in Fig. 15). Post-its, pens, labtop, ppt presentation, projector, audio recorder, foods and drinks were laid out at proper places. Presentation rules were written in a big cardboard and hung at a notable place on the wall. Just before session started, aim of the study and session rules were reminded once more. During the session, notes were taken and participants' speeches were audio recorded. Initially, facilitator mentioned about examples of adaptive mobile applications for inspiring the partipicants. Then, partipicants were asked to write down 3 of their ideas about mobile touristic guide service on a post-it. Each idea was discussed further and written on whiteboard. Session lasted for about three hours. After the session, notes and audio records were analyzed and based on the analysis, a report document which included participants' ideas was prepared. Afterwards, that report was used in constituting design of a mobile touristic travel guide. The documents related to the brainstorming session including brainstorming rules, e-mails sent to participants, some slides used in the study and photographs taken during the session are placed in Appendix F.

Fig. 15 View of brainstorming session room

Quantitative Studies

In order to obtain large amount of data and to explore mobile adoption factors further, an experimental study which included demonstration of a mobile service and collection of data through the use of a survey was realized.

Pilot Study of the Experimental Study

Before the experimental study, 2 pilot studies were realized to be able to find out deficiencies and improve the experimental study. First pilot study, named as Pilot-3, was realized with 3 users and some modifications were done based on their feedbacks. Those modifications were related to removal of complexities and fixation of technical problems. Afterwards, second pilot study, named as Pilot-10, was realized with 10 users.

According to the analysis of their answers to the survey, survey questions were improved and some questions were added. Finally, technical, contextual and visual problems were removed and experimental study was started.

Experimental Study

An experimental study was designed to further investigate factors that have impact on mobile service adoption through the aid of large amount of data. For this, a mobile travel guide service was designed and demonstrated on the Internet via a web site. In addition to the demo presented in the web site as part of data collection instrument, ranking of service alternatives for conjoint analysis and survey questions were also put in the web site for antendees' participation.

Participants were invited to join the survey via e-mail and facebook message which included the web site's link. Participants were also asked to forward the email to the people who might have concern. 148 people attended to the survey.

The web site, developed via Microsoft ASP .NET, included 7 parts. In the entrance page, scope and goal of the survey was stated as first part. In the next part, screenshots of mobile travel guide service that were designed were illustrated. The aim of demonstration of the service was to make attendees watch and experience the service and its features. In the third part, attributes of conjoint analysis and their corresponding levels were summarized. In the fourth part, service alternatives (scenarios) were presented to the attendees for ranking as a conjoint questionnaire form. In the fifth part, questionnaire questions related to factors were directed. In the sixth part, demographic questions which included gender, age, education, occupation and average number of travel times per year were asked. Finally in the last part, attendees were appreciated for

their participation to the study. Screenshots of the website and other experimental study documents can be seen in Appendix G.

In demonstration of mobile travel guide service on the web site, a user's trip from Istanbul to Paris and his interaction with the service was simulated. Each screen of the demonstration is explained as a step below:

Step 1:

Mobile user is at the airport in Istanbul and as soon as he gets on the plane, he shuts down his mobile phone in which the application (mobile travel guide service) is not installed yet.

Step 2:

Mobile user lands on Paris airport and as soon as he turns on his mobile phone, the application is installed automatically.

Step 3:

After installation is complete, service opens and welcomes the user audibly.

Step 4:

Service opens its Maps sub menu and presents the user options about vehicles from the airport to the hotel and their corresponding costs, durations and distances to the hotel and shows traffic condition along the way to the hotel. Service informs the user audibly and visually on the screen.

Step 5:

After leaving baggages at the hotel, user goes to the Paris square to look around. As the user passes by l'Elysee Palace, service opens its Maps sub menu and informs the user about the palace audibly and visually.

Step 6:

As the user goes on looking around and passes by Le Louvre Museum, service opens its Maps sub menu and informs the user about the museum audibly and visually.

Step 7:

When dinner time comes, service opens its Restaurants sub menu and informs the user about the most suitable restaurants audibly and visually and makes suggestions. To do this, service gets use of user's prior preferences and other users' preferences.

Step 8:

The user wants to taste traditional meals, so from the criterias listed in first region of Restaurants sub menu, the user selects "Cuisine" criteria.

Step 9:

Under "Cuisine" criteria, he selects the option "Traditional" and Traditional Restaurants are listed in the second region of the Restaurants sub menu. First region consists of selectable criterias, second region lists Restaurants depending on the selected criteria, and third region lists overall suggestions of the service. Third region suggestions do not change based on selected criteria.

Step 10:

The user selects Le Marquis which is the restaurant listed on top in both second and third regions of the menu.

Step 11:

Detailed information about Le Marquis is displayed.

Step 12:

When the user arrives at Le Marquis, service opens and informs the user about the menu and makes suggestions audibly and visually.

Step 13:

As the user leaves Le Marquis, service opens its Activities sub menu and informs the user about the most suitable activities audibly and visually and makes suggestions. To do this, service gets use of user's prior preferences and other users' preferences.

Step 14:

Since time is late, the user wants to find a suitable activity. So, in the first region of the menu where criterias exist, he selects "NightLife" criteria.

Step 15:

Under "NightLife" criteria, he selects the option "Cabaret" and Cabarets are listed in the second region of the Activities sub menu. First region consists of selectable criterias, second region lists Activities depending on the selected criteria, and third region lists overall suggestions of the service. Third region suggestions do not change based on selected criteria.

Step 16:

The user selects Moulin Rouge which is the activity listed on top in both second and third regions of the menu.

Step 17:

Detailed information about Moulin Rouge is displayed.

Step 18:

The user gets on a taxi and heads toward Moulin Rouge. At that time, service opens its Maps sub menu and informs the route, remaining time and distance to the destination audibly and visually. When the user arrives at Moulin Rouge, the service closes till the next activation.

Participants were enabled to watch the demonstration by using buttons to go forward and back through the screens. Each demo screen consisted of a view of the current state of the service, an explanation about user's current interaction with the service and a clock depicting the time of user's interaction with the service.

By the help of mobile service travel guide demonstration, mobile service conjoint framework was tested via use of conjoint analysis as a statistical method to explore important design characteristics and to determine what combination of attributes better meets customers' needs. The analysis was realized through the use of conjoint module of SPSS Statistics Software. Full-profile approach together with ranking method of SPSS Conjoint analysis was used to differentiate user preferences. Each profile to be ranked described a product or service that was composed of different combinations of attribute levels. The attributes in our study that have been stated in mobile service conjoint framework are adaptivity, error rate and cost. Those attributes were generated based on qualitative studies' results. The attributes and their corresponding levels are shown in Table 7.

Table 7 Conjoint Attributes and Levels

Attribute	Levels
Adaptivity	%0, user/location based, user/location/time based
Error Rate	%0, %5(1 error per 4-5 uses), %20 (1 error per use)
Cost	$0, 15$ per country-1year, 20$ all countries-1year

SPSS conjoint method generated 27 alternatives from the defined attributes and their corresponding levels. To descrease this count to an acceptable level which would allow participants to be able to rank the alternatives, orthogonal factorial design method of SPSS was used. As a result, 9 alternatives out of 27 were produced (Table 8). Each

alternative represented a different service with different attribute levels. Those 9 alternatives were referred as scenarios during the experimental study.

Table 8 Conjoint Alternatives Generated by SPSS

Alternative	Adaptivity	Error Rate	Cost
1	user/location/time	%20	20$ all countries per year
2	user/location	%5	15$ per country per year
3	user/location	%0	20$ all countries per year
4	user/location/time	%0	15$ per country per year
5	user/location	%20	0$
6	non-adaptive	%0	0$
7	non-adaptive	%20	15$ per country per year
8	non-adaptive	%5	20$ all countries per year
9	user/location/time	%5	0$

Participants were asked to rank the alternatives (scenarios) after mobile travel guide service demonstration and presentation of summary of attributes and their corresponding levels. Just above ranking section, participants were informed that other attributes of the alternatives were “held constant”. The reason was to assure that they made the ranking based on only our defined attributes. The alternatives were presented as classical card view where each card was ranked by use of a combo box. Each alternative was to be ranked from 1 (most desirable) to 9 (least desirable). Each participant had to rank all alternatives and any of the two alternatives could not be ranked with the same rank number. Conjoint question form where all alternatives were listed together with their attributes and levels can be seen in Fig 16.

No	Sıra No	Uyarlanabilirlik	Hata Oranı	Ücret
1	Sıra Giriniz	Kullanıcı/Zaman/Mekana göre	%20	20$ (Tüm Ülkeler-Yıllık)
2	Sıra Giriniz	Kullanıcı/Mekana göre	%5	15$ (Ülke Başına-Yıllık)
3	Sıra Giriniz	Kullanıcı/Mekana göre	%0	20$ (Tüm Ülkeler-Yıllık)
4	Sıra Giriniz	Kullanıcı/Zaman/Mekana göre	%0	15$ (Ülke Başına-Yıllık)
5	Sıra Giriniz	Kullanıcı/Mekana göre	%20	Ücretsiz
6	Sıra Giriniz	Uyarlanabilirlik Yok	%0	Ücretsiz
7	Sıra Giriniz	Uyarlanabilirlik Yok	%20	15$ (Ülke Başına-Yıllık)
8	Sıra Giriniz	Uyarlanabilirlik Yok	%5	20$ (Tüm Ülkeler-Yıllık)
9	Sıra Giriniz	Kullanıcı/Zaman/Mekana göre	%5	Ücretsiz

Fig. 16 Conjoint question form

After scenario ranking part, a list of questions were presented to attendees who were requested to answer by taking into account the demonstration which depicted Scenario #1 in which mobile service was adaptive in terms of user, location and time, error-rate was %20 and cost was $20 for all countries per year. The questions were useful for exploring effects of constructs and testing hypotheses of mobile service intention framework. The questions (referred also as items) were composed based on literature review and prior qualitative studies. Those questions were close-ended and five point Likert-scale questions where 1 meant strongly disagreement and 5 meant strongly agreement. The questionnaire items and corresponding constructs are listed in Table 9. Questionnaire items in Turkish can be seen in Appendix H.

Table 9 Questionnaire Constructs and Items

Construct	Item
Adaptivity	Service's adaptivity to different situations is a good feature.
	Service's adaptivity makes it easier for me to use the service.
	Service's adaptivity makes me prefer to use the service.
	Service's adaptivity makes it useful.
Cost	Service cost affects my decision to use the service.
	I use the service more if it costs cheaper.
Error Rate	Error rate in the service affects my preference to use it
	I use the service if error rate is too low or zero.
	High error rate in the service causes time loss.
	High error rate in the service makes me angry.
Flexibility	Flexibility of the service makes it easier to use.
	I expect the service to be flexible.
	Flexibility of the service influences its usage.
	I use the service if it is flexible.
Life Mode	I use different features of the service according to the situation I am in.
	I expect the service to behave differently according to the situation I am in.
Customization	I would like to customize the service according to my preferences.
	Service's customization ability makes it easier to use.
	Service's customization ability makes it useful.
Personalization	Service's personalization ability makes me prefer it.
	Service's personalization ability makes it easier to use.
	Service's personalization ability makes it more attractive.
User Control	Service's uncontrollable behavior during its adaptations affects my decision to use it.
	Service facilities that happen out of my control make the service harder to use.
	Service gets more useful if I am enabled to control everything.
Information Completeness	I expect the information provided by the service to be enough.
	Completeness of the service information affects my decision to use the service.
Innovativeness	It is very attractive for me to try new mobile services.
	I prefer that others have used a new service before I try it.
Ease of Use	Service is quite clear and comprehensible.
	It is easy to use the service.
Usefulness	Service is quite useful.
	Service will make me gain time.
	Service will provide comfort in my trips.

Table 9 Continue

Construct	Item
Attitude & Intention	It is a good idea to use the service
	I use the service and suggest it to other people.
Satisfaction	Overall, I am satisfied with the service.

A total of 148 participants visited the web site and completed the survey. The anwers were collected in a MS Access database file which was transferred to SPSS for analysis at the end of data collection and data arrangement for SPSS. Experimental study documents can be found in Appendix G.

CHAPTER 5

FINDINGS

In this chapter, findings of usability testings and interviews, brainstorming session, and experimental studies are explained. At the end of chapter, implications are given.

Findings of Usability Testings and Interviews

With regard to literature and our content analyses of usability testings and interviews in our initial qualitative study, we explored the external variables that impact users' intention to use a system and developed a taxonomy structure by classifying those variables (Fig. 17). In the development of this taxonomy, think-aloud session and interview data were analyzed deeply for selection and classification of variables.

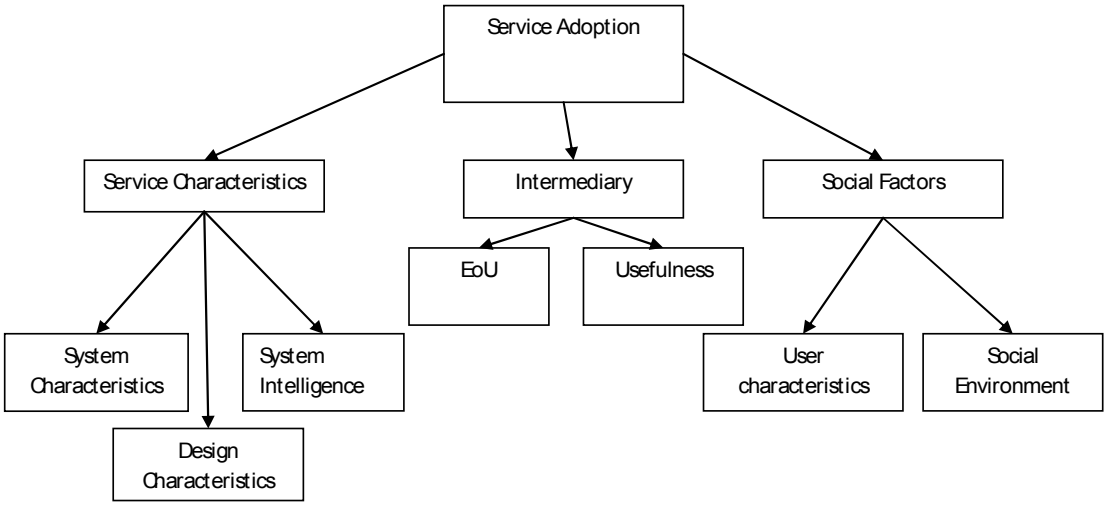


Fig. 17 Technology adoption taxonomy (Polat & Başoğlu, 2008)

In this taxonomy, service characteristics are composed of 3 categories: system characteristics, design characteristics and system intelligence. System characteristics involve constructs that are related to the state and quality of the mobile reservation system excluding design and implementation issues. Design characteristics are the characteristics that relate to the human computer interaction interface. System intelligence is the quality of the system being capable of self-adapting in response to changing environment and different personal information or being adaptable by the user. Social factors include 2 categories: user characteristics and social environment. User characteristics involve individual demographic differences such as age, gender, task, etc. and computer skill level. Social environment refers to the culture a user has grown with and the people/institutions with whom he/she interacts. Intermediary categories belong solely neither to service characteristics class nor to social factors class. The categories under intermediary, ease of use (EoU) and usefulness, are the constructs that are either dependent on service characteristics or social characteristics or both. Hence, in the proposed taxonomy it is depicted as a class under the heading intermediary.

Based on number of user comments about independent variables (constructs) under each category and class, percentages are computed for classes and categories of mobile reservation service adoption taxonomy. Percentages for the two prototypes, named as Prototype 1 and 2, and the overall percentage are given in Table 10. Detailed percentages of constructs are included in Appendix I.

Table 10 Percentages of Classes and Categories of Mobile Reservation Service Adoption Taxonomy

Class	Category	Prototype 1	Prototype 2	Overall
Intermediary	Ease of Use	17.50%	14.81%	16.27%
	Usefulness	4.38%	7.41%	5.76%
Service Characteristics	Design Characteristics	38.13%	48.89%	43.05%
	System Characteristics	26.88%	19.26%	23.39%
	System Intelligence	10.63%	8.89%	9.83%
Social Factors	Social environment	0.63%	0.00%	0.34%
	User Characteristics	1.88%	0.74%	1.36%
Total		100%	100%	100%

Service characteristics turned out to be the class with highest percentage for both of the prototypes whereas Social Factors have a rather low percentage. On contrary to literature, Social Factors seem not to have a contributory effect on mobile reservation service adoption in that percentage of users' comments on that class is rather low while users' comments are mostly focused on Service Characteristics and Intermediary classes, respectively. The reason is that in configuration of our experiment, we limited our survey to prototype settings and rules. Hence, we did not focus on social factors and put forth an effort to explore its effects. The categories with the highest percentages are Design Characteristics, System Characteristics and Ease of Use, respectively for the two prototypes. This indicates users give more importance to Design Characteristics, System Characteristics and Ease of Use in the adoption process. The most noticeable difference between prototypes 1 and 2 is that percentage of Usefulness increased from 4.38% to 7.41% and percentage of Ease of Use decreased from 17.50% to 14.81% in transition from Prototype 1 to Prototype 2. Such a difference reveals that as intelligence that

mainly maintains ease of use is implemented into the system as a result of feedbacks received from Prototype 1 users, system becomes easier to interact for the users. Hence, usefulness was attached more importance in Prototype 2 usability testing. Another remarkable difference can be seen in Design and System Characteristics. As design drew more attention in Prototype 2 than in Prototype 1, System Characteristics were attached less importance on the contrary. Due to the intelligence added into the system in Prototype 2, users perceived that system functionality gets more complete and leaves design behind. Hence, in Prototype 2 Design Characteristics was more emphasized and System Characteristics was less highlighted.

Findings of Brainstorming Session Study

In brainstorming session, participants' ideas and suggestions on mobile touristic guide service that is to be designed for experimental study were collected. For this, facilitator initially gave examples of mobile service applications so that the examples promoted participants to bring forward creative ideas and a huge quantity of suggestions. Then, participants were asked to write down 3 of their ideas on post-its that were discussed one by one and written on the white board.

According to the brainstorming session ideas' analysis, results showed that participants mostly put emphasis on adaptivity in terms of service's awareness of location, awareness of time, ability of making suggestions, personalization, customization. Error rate, cost, security, privacy, time efficiency, user control and currency of information were other apparent constructs revalealed in the study.

Findings of Experimental Study

Profile of Respondents

Profile of experimental study respondents is summarized in Table 11. The profile was formed based on frequency analysis of demographic variables: gender, age, education, occupation and travel time. Age and travel time were grouped into categories. Age was grouped into 4 categories: 24 or below, 25-29, 30-39, and 40 or above. Travel time was grouped into 4 categories: 3 or below, 4-6, 7-9, and 10 or above. Results show that our sample was predominantly aged between 25 and 29. Gender distribution was 69% male and 31% female. Most of the respondents held either undergraduate (40%) or graduate degree (36%). Occupation distribution was 61% technical and 39% non-technical. The sample predominantly consisted of people who travelled three or less times a year (51%).

Table 11 Profile of Respondents

Range		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Gender	Male	102	69	69	69
	Female	46	31	31	100
Age	24 or below	36	24	24	24
	25-29	75	51	51	75
	30-39	30	20	20	95
	40 or above	7	5	5	100
Education	High School	9	6	6	6
	Univ. Student	26	18	18	24
	Undergraduate	60	40	40	64
	Graduate	53	36	36	100
Occupation	Technical	90	61	61	61
	Non-Technical	58	39	39	100
Travel Times (a year)	3 or below	76	51	51	51
	4-6	45	30	30	82
	7-9	5	4	4	85
	10 or above	22	15	15	100

Reliability Analysis

In order to test the reliability of items (questions) that are brought together under summary constructs (summated scale variables), reliability analysis was used. The internal consistency of summated scale variables were measured via Cronbach's alpha coefficient which should not be below 0.70. Table 12 shows results of reliability analysis. All alpha values are above threshold value.

Table 12 Reliability Analysis

Construct	Number of Items	Cronbach's Alpha
Adaptivity	4	0.932
Cost	2	0.746
Error Rate	4	0.840
Flexbility	4	0.883
Customization	3	0.916
Personalization	3	0.943
User Control	3	0.798
Inf. Completeness	2	0.887
Life Mode	2	0.703
EoU	2	0.890
Usefulness	3	0.912
Attitude	2	0.937

Descriptive Statistics

Table 13 summarizes descriptive statistics of summary constructs including number of respondents, mean values, standard deviation, variance, minimum and maximum values. Mean values indicate that participants mostly agreed with our construct related items in that mean value is above 4.00 for all constructs except Innovat2_R. Participants were in agreement in that they would like to try and use new mobile services and that supports the item, Innovat1. However, they were not in agreement in that they would like to be

the first to try a new mobile service that was stated by the item, Innovat2_R. Furthermore, statistics results show that information completeness, customization and adaptivity were the most important factors out of all factors since respondents gave the highest values for questions related to those factors. Descriptive statistics of questionnaire items have been included in Appendix J.

Table 13 Descriptive Statistics

	N	Mean	Std. Deviation	Variance	Minimum	Maximum
Inf. Completeness	148	4.37	0.919	0.844	1.00	5.00
Customization	148	4.35	0.959	0.919	1.00	5.00
Adaptivity	148	4.33	1.016	1.032	1.00	5.00
ErrorRate	148	4.22	0.907	0.822	1.00	5.00
Personalization	148	4.22	1.006	1.012	1.00	5.00
Flexibility	148	4.19	0.860	0.739	1.25	5.00
Usefulness	148	4.19	0.958	0.918	1.00	5.00
LifeMode	148	4.19	0.930	0.865	1.00	5.00
EoU	148	4.19	1.011	1.022	1.00	5.00
Cost	148	4.19	1.024	1.049	1.00	5.00
Attitude	148	4.16	1.027	1.055	1.00	5.00
UserControl	148	4.14	0.880	0.775	1.67	5.00
Innovat1	148	4.05	1.065	1.134	1.00	5.00
Innovat2_R	148	2.29	1.274	1.622	1.00	5.00

ANOVA Analysis

ANOVA analysis was realized in order to explore participants' differing evaluations about constructs in between groups that were formed based on demographic variables. One-way ANOVA was applied to each demographic factor so as to find out the constructs which were evaluated differently by participants belonging to different factor levels. For this, significance level of 0.05 was accepted and for each demographic factor, dependent constructs that have significance level less than 0.05 were taken into account.

After designating the constructs and corresponding demographic factor, Compare Means analysis was realized to be able to see the diversification between groups of the selected demographic variable on designated dependent construct. According to the results of one-way ANOVA analysis that were executed on gender, age, education, occupation and travel times, constructs do not have significant differentiation between groups of age or groups of occupation or groups of travel times. The results of one-way ANOVA combined with Compare Means analysis for gender is shown in Table 14.

Table 14 ANOVA Results for Gender

Construct	F	Sig	Male	Female
Adaptivity	7.262	0.008	4.18	4.66
Flexibility	5.717	0.018	4.08	4.44
User Control	11.821	0.001	3.97	4.49
Inf. Completeness	6.99	0.009	4.24	4.66
EoU	10.404	0.002	4.01	4.57
Usefulness	7.217	0.008	4.05	4.50
Attitude	6.559	0.011	4.02	4.48

.

It can be seen from the ANOVA results for gender that females gave importance to service being adaptive, flexible, useful and easy to use more than males. Similarly, information completeness in the service was more emphasized by females. They were also more intended to use such a service than males do.

The results of one-way ANOVA combined with Compare Means analysis for education is shown in Table 15.

Table 15 ANOVA Results for Education

Construct	F	Sig	High School	Univ. Student	UnderGrad Degree	Graduate Degree
EoU	2.854	0.039	4.78	4.12	4.36	3.93
Attitude	3.609	0.015	4.83	3.96	4.37	3.91
Satisfaction	3.578	0.016	4.78	3.62	4.25	3.96

ANOVA results for education indicate that participants from high school education level payed more attention to service's being easy to use than participants with graduate degree did. Besides, high school participants were much more inclined to prefer and use the service than university students and participants holding graduate degree did. Similarly, participants having high school degree were more satisfied with the service.

Conjoint Analysis

By use of conjoint module of SPSS Statistics 18 Software, mobile service conjoint framework hypotheses were tested. Conjoint analysis was realized in order to find out which attributes of mobile service are important or unimportant, which attribute levels are the most desirable or the least desirable for the users and to explore market share of the alternative mobile services.

As part of conjoint analysis, average importance values for each of the attributes were derived. Average importance score or value is a measure of an attribute's relative importance. An attribute's importance score is computed by dividing the utility range of the attribute to the sum of utility ranges of all attributes. Table 16 shows average importance scores of attributes which are repsesented by percentages and which sum up to 100.

Table 16 Average Importance Score of Attributes

Attribute	Average Importance Score
Adaptivity	50.837
Error Rate	31.789
Cost	17.375

A greater average importance score of an attribute indicates that it is more important than the other attributes. According to the results, the attribute adaptvitiy has the greatest score whereas the attribute cost has the lowest. That is to say adaptivity plays the most significant role, and cost plays the least important role when compared to overall preferences. Adaptivity is as important as combination of error rate and cost.

Table 17 depicts the part-worth utility scores and standard error for each attribute levels (in the table, fully-adaptive level stands for adaptivity based on user/location/time and partially-adaptive level stands for adaptivity based on user/location). Higher utility indicates greater preference, and vice versa. Desirable level of adaptivity is fully adaptive. Desirable level of error rate is %0 (error-free) and desirable level of cost is costless. As adaptivity descreases and adaptivity level drops down from fully adaptive to non-adaptive, utility also descreases. As error rate increases from %0 to %20, utility decreases. Hence, there is a direct relationship between adaptivity and utility and there is an inverse relationship between error rate and utility.

Table 17 Utility Scores

Attribute	Level	Utility Estimate	Std. Error
Adaptivity	Non-adaptive	-1.671	.129
	Partially-adaptive	.673	.129
	Fully-adaptive	.998	.129
Error Rate	0%	.779	.129
	5%	.110	.129
	20%	-.890	.129
Cost	costless	.556	.129
	15$ per country (1year)	-.356	.129
	20$ all countries (1year)	-.200	.129
(Constant)		5.000	.129

To calculate utility score of an alternative, utility scores of its corresponding levels are summed. As an example, total utility calculation for Alternative 9 is as follows:

$$\text{Total Utility Score}_{\text{Alt.9}} = \text{Utility}_{\text{Adaptivity=non-adaptive}} + \text{Utility}_{\text{error-rate=5\%}} + \text{Utility}_{\text{cost=costless}} + (\text{Constant})$$

$$\text{Total Utility Score}_{\text{Alt.9}} = .998 + .110 + .556 + 5.000 = 6.664$$

Table 18 shows total utility scores of the alternatives sorted by total utility in descending order.

Table 18 Total Utility Scores of the Alternatives

Alternative	Adaptivity	Error Rate	Cost	Total Utility
9	Fully-adaptive	5%	Costless	6.664
4	Fully-adaptive	0%	15$ per country	6.421
3	Partially-adaptive	0%	20$ for all countries	6.252
2	Partially-adaptive	5%	15$ per country	5.428
5	Partially-adaptive	20%	Costless	5.340
1	Fully-adaptive	20%	20$ for all countries	4.908
6	Non-adaptive	0%	Costless	4.664
8	Non-adaptive	5%	20$ for all countries	3.239
7	Non-adaptive	20%	15$ per country	2.083

Table 19 shows market shares of the alternatives sorted by market share in descending order and Fig. 18 depicts market share chart of the alternatives. Market share of an alternative is calculated by dividing total utility of the alternative to the sum of all alternatives' total utilities. An example for market share of Alternative 9 is as follows:

$$\text{Market Share}_{\text{Alt.9}} = \text{Total Utility}_{\text{Alt.9}} / \Sigma \text{ Total Utilities}$$

$$\text{Market Share}_{\text{Alt.9}} = (6.664 / 45) * 100 = \%15$$

Table 19 Market Share of the Alternatives

Alternative	Market Share
Alternative 9	15%
Alternative 4	14%
Alternative 3	14%
Alternative 2	12%
Alternative 5	12%
Alternative 1	11%
Alternative 6	10%
Alternative 8	7%
Alternative 7	5%

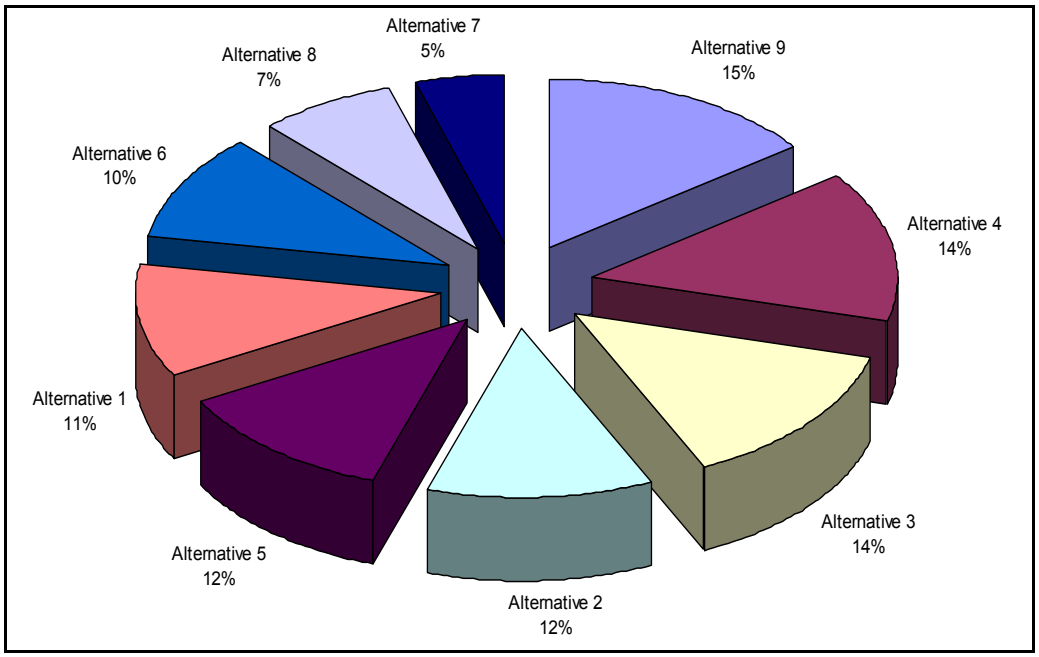


Fig. 18 Market share chart of alternatives

Alternative 9, which is fully-adaptive, has %5 error rate and is costless, has the highest total utility, hence the highest market share. It can be concluded that Alternative 9 would be the most suitable product that would satisfy larger amount of customers in the market. Alternative 7 has the market share which means that participants would intend to use it the least. Also, Alternative 4 and Alternative 5 have very close market shares to Alternative 9.

This method is beneficial for marketers in that they are enabled to identify market opportunities by investigating market share of different product feature combinations which have not been produced yet.

Table 20 shows selection frequencies of the alternatives. As an example of how to comment the table, 68 participants out of 148 participants selected Alternative 9 as their first preference and 18 participants selected Alternative 9 as their second preference. Only 1 participant selected Alternative 7 as his/her first preference.

Table 20 Frequencies of the Alternatives

Alternatives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Alternative 9	68	18	18	10	3	3	4	8	16
Alternative 4	23	28	23	32	13	12	11	5	1
Alternative 3	16	27	36	35	13	8	9	2	2
Alternative 2	2	25	14	28	36	13	14	12	4
Alternative 5	9	18	20	12	30	32	15	9	3
Alternative 1	18	13	13	9	22	25	13	14	21
Alternative 6	9	14	15	8	14	23	44	12	9
Alternative 8	2	4	5	10	11	23	16	53	24
Alternative 7	1	1	4	4	6	9	22	33	68

In Table 21, Pearson's R and Kendal' tau values are displayed. Those two statistics represent measures of correlation between the observed and estimated part-worth utilities. Pearson's R is .996 with .000 significance value and Kendall's tau is .995 with .000 significance value. It may be concluded that the coefficients indicates almost perfect fit.

Table 21 Correlation Coefficients

	Value	Sig.
Pearson's R	.996	.000
Kendall's tau	.944	.000

Correlation Analysis

Correlation is a statistics number that describes the relationship degree between two variables. Correlation analysis was performed to analyze the relationship between constructs. Table 22 shows correlation between summated constructs (dependent constructs) and intermediary constructs (EoU, usefulness, attitude) and satisfaction. Correlations between items are summarized in Appendix J together with other experimental study analysis documents.

Table 22 Correlation Results

	EoU	Usefulness	Attitude	Satisfaction
EoU	1.000**	.845**	.835**	.717**
Usefulness	.845**	1.000**	.898**	.791**
Attitude	.835**	.898**	1.000**	.848**
Adaptivity	.715**	.739**	.747**	.665**
Cost	.437**	.440**	.459**	.473**
Error Rate	.600**	.640**	.632**	.591**
Flexibility	.630**	.669**	.670**	.599**
Life Mode	.568**	.617**	.601**	.517**
Customization	.585**	.677**	.683**	.599**
Personalization	.625**	.685**	.721**	.654**
User Control	.553**	.630**	.616**	.569**
Inf Completeness	.697**	.684**	.685**	.589**
Innovat1	.523**	.649**	.637**	.581**
Innovat2_R	-.484**	-.449**	-.418**	-.464**

** Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis

To explore the relationships among constructs of mobile service adoption taxonomy, linear regression analysis was used. The results of the analysis are shown in Table 23.

Table 23 Results of Regression Analysis

R^2	Dependent	Independent	Beta	Standardized Beta	Sig
0.719	Satisfaction	(Constant)	0.274		0.178
		Attitude	0.911	0.848	0.000
0.843	Attitude	(Constant)	-0.203		0.216
		Usefulness	0.617	0.575	0.000
		Personalization	0.182	0.179	0.000
		EoU	0.241	0.237	0.000
0.795	Usefulness	(Constant)	0.102		0.579
		EoU	0.586	0.618	0.000
		Innovat1	0.196	0.218	0.000
		Customization	0.193	0.194	0.000
0.573	EoU	(Constant)	0.507		0.066
		Adaptivity	0.438	0.440	0.000
		Inf. Completeness	0.408	0.371	0.000

Based on regression results, mobile service intention framework determinants were derived. Fig. 19 illustrates mobile service intention framework. Results of regression analysis indicate that attitude is a direct determinant of users' satisfaction with the system with a coefficient of .848 ($p<0.01$). Attitude explains 71.9% of satisfaction. Usefulness, ease of use and personalization directly determine attitude with coefficients of .575 ($p<0.01$), .237 ($p<0.01$) and .179 ($p<0.01$) respectively. 84.3% of attitude is explained by those three variables. Ease of use is a direct determinant of usefulness with a coefficient of .618 ($p<0.01$).

In addition to ease of use, innovat1 and customization directly explain usefulness with coefficients of .218 ($p<0.01$) and .194 ($p<0.01$). 79.5% of usefulness is explained by ease of use, innovat1 and customization.

Ease of use is directly determined by adaptivity and information completeness with coefficients of .440 ($p<0.01$) and .371 ($p<0.01$) respectively. Those variables explain 57.3% of ease of use.

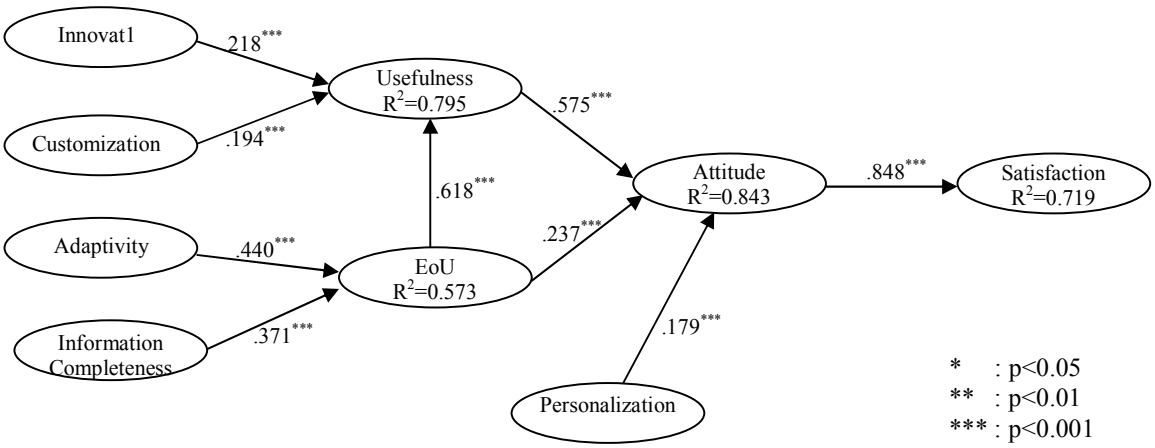


Fig. 19 Mobile service intention framework

Based on regression analysis results, 9 hypotheses are accepted. Those hypotheses are summarized in Table 24.

Table 24 Hypotheses based on Regression Results

Hypothesis	Dependent Variable	Independent Variable	Result
H_1	Satisfaction	Attitude	Supported
H_2	Attitude	Usefulness	Supported
H_3	Attitude	EoU	Supported
H_4	Attitude	Personalization	Supported
H_5	Usefulness	EoU	Supported
H_6	Usefulness	Innovativeness	Supported
H_7	Usefulness	Customization	Supported
H_8	EoU	Adaptivity	Supported
H_9	EoU	Inf. Completeness	Supported

CHAPTER 6

CONCLUSION

As mobile technologies are developing rapidly and new mobile services are penetrating into our daily lives continuously, mobile service adoption and factors affecting mobile service adoption is gaining more importance for researchers, designers, developers, HCI practitioners and marketers. In this study, factors (primarily adaptivity) affecting mobile service adoption, relationships among those factors, users' preferences and intention due to different levels of factors were investigated.

The key determinants of mobile service adoption were found to be attitude, usefulness, and ease of use. This result is compatible with TAM. In addition to key determinants, adaptivity and information completeness have indirect effects through ease of use; innovativeness and customization have indirect effects through usefulness; personalization has indirect effect through attitude on mobile service intention to use.

According to results of conjoint analysis, adaptivity is the most important attribute when overall preferences are taken into consideration. Conjoint analysis also revealed that users preferred fully adaptive, error-free and costless services.

Market share analysis showed that most preferable alternative was the one which is fully adaptive in terms of user, location and time, which is costless and which has 5% error rate. People would tolerate a small error rate in return for full-adaptivity and receiving the service for free.

When demographic differences of participants were taken into account, analyses showed that participants that have high school degree were more satisfied with the service, more intended to use the service and found the service easier to use than other participants having higher degrees. Besides, female participants were more inclined to prefer an adaptive, flexible service which is controllable by them and which provides all information that is required.

In addition, statistics showed that participants gave higher importance to adaptivity, customization and information completeness due to the scores they gave for each item.

Though 148 is a sufficient number for sample size, enlargement of sample size will be beneficial so as to obtain more generalized findings. In addition to that, more than half of the participants were aged between 25 and 29. With equal distribution of participants according to age categories, more results based on age may be deducted.

Mobile service adoption may be further studied by investigating different constructs from literature and mobile service adoption taxonomy may be restructured with those constructs. Furthermore, effect of culture may be eliminated by realizing the study with participants from different cultures.

APPENDICES

A. Steps in Prototype 1 and Prototype 2

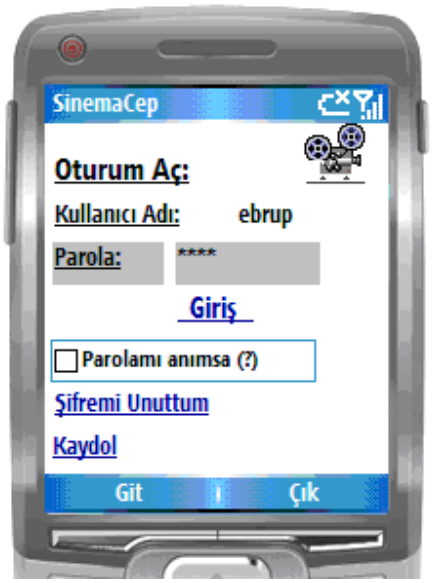


Fig. 20 Step 1 of Prototype 1 and Prototype 2

Prototype 1 Prototype 2

Fig. 21 Step 2 of Prototype 1 and Prototype 2

Fig. 22 Step 3 of Prototype 1 and Prototype 2

Prototype 1 Prototype 2

Fig. 23 Step 4 of Prototype 1 and Prototype 2

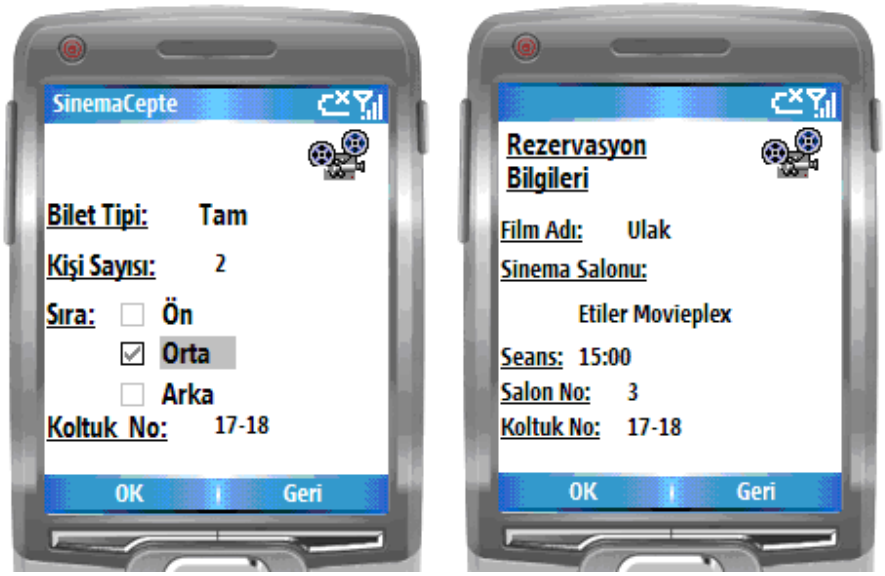
Prototype 1 Prototype 2

Fig. 24 Step 5 of Prototype 1 and Prototype 2

Prototype 1 Prototype 2

Fig. 25 Step 6 of Prototype 1 and Prototype 2

Prototype 1



Prototype 2

Fig. 26 Step 7 of Prototype 1 and Prototype 2

Fig. 27 Step 8 of Prototype 1 and Prototype 2

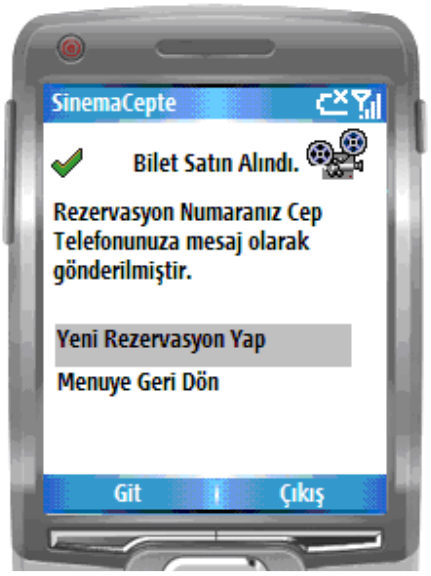


Fig. 28 Step 9 of Prototype 1 and Prototype 2

B. Interview Questions

Interview Questions (English)

1a) What are important in the usage of such a system? (Asked before test)

1b) What are important in the usage of such a system? What are the advantages and disadvantages? Which user interface characteristics are important in the usage of such a system?

2) What are the important variables in such an application? Can you put in order the most important 3 variables?

3) What is your opinion about this application? What do you advise for the next application?

4) Which adaptive behaviour implementations will be beneficial in this system according to you? What are your offers?

Interview Questions (Turkish)

1a) Böyle bir servisin kullanımında neler önemlidir? (test öncesi soruldu)

1b) Böyle bir servisin kullanımında neler önemlidir? Nelerin olumlu/olumsuz katkısı vardır? Böyle bir servisin kullanımında hangi kullanıcı arayüzü özellikleri önemlidir?

2) Sizce böyle bir uygulamadaki önemli değişkenler nelerdir? En önemli 3 değişkeni sıralayabilir misiniz?

3) Uygulama hakkındaki görüşleriniz nelerdir? Bir sonraki uygulama için neler önerirsiniz?

4) Sistemde olması size göre faydalı olacak akıllı davranışlar (adaptive behaviour) neler olabilir ? Önerileriniz nelerdir?

C. Questionnaire Questions

Questionnaire Questions (English)

☐1 I totally don't agree - ☐ 7 I totally agree

Perceived Usefulness

Using this system would enable me to accomplish them more quickly.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Using this system would make it easier to do my task.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
I would find system useful in my task.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Perceived Ease of Use

Learning to operate system would be easy for me.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
I would find it easy to get system to do what I want it to do	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
My interaction with system is clear and understandable.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Information provided in the system is easy to understand.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Recovering mistakes is easy and quick.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Attitude/Intention

I would use the system for movie reservations.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
I prefer this system to other methods.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
I advise the system to other users.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Satisfaction

Overall, I am satisfied with the system.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Questionnaire Questions (Turkish)

☐1 Kesinlikle Katılmıyorum - ☐ 7 Kesinlikle Katılıyorum

Algılanan Kullanılışlılık

Bu sistemi kullanarak yapacaklarımı daha çabuk gerçekleştirebilirim.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Bu sistemi kullanmak işimi kolaylaştırır.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Bu sistem yapacağım iş için oldukça kullanışlı.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Algılanan Kullanım Kolaylığı

Bu sistemi kullanmayı öğrenmek benim için kolay.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Yapmak istediğimi bu sistem üzerinden gerçekleştirmek benim için kolay.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Sistemi kullanmak net ve anlaşılır.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Sistem içerisindeki bilgiler ve veriler kolay anlaşılır.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Sistemi kullanırken hata yapınca düzeltmesi hem kolay, hem hızlı.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Tutum/Niyet

Bu sistemi sinema rezervasyonları için kullanırım.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Bu sistemi ilgili diğer yöntemlere tercih ederim.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7
Bu sistemi diğer kullanıcılara tavsiye ederim.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

Memnuniyet

Sistemden genel olarak memnunum.	☐ 1 ☐2 ☐3 ☐ 4 ☐5 ☐6 ☐ 7

D. Steps in Prototype 2 and Prototype 3

Fig. 29 Step 1 of Prototype 2 and Prototype 3

Prototype 2 Prototype 3

Fig. 30 Step 2 of Prototype 2 and Prototype 3

Prototype 2

Prototype 3

Fig. 31 Step 3 of Prototype 2 and Prototype 3

Prototype 2 Prototype 3

Fig. 32 Step 4 of Prototype 2 and Prototype 3

Fig. 33 Step 5 of Prototype 2 and Prototype 3

Fig. 34 Step 6 of Prototype 2 and Prototype 3

E. Tasks of Qualitative Study 2

Tasks of Qualitative Study 2 (English)

1. Action Mode Task:

Assume that you are sitting at Starbucks Coffee in Bağdat Caddesi (Suadiye - Istanbul Anadolu) and the time is around 16:00. You want to watch a specific movie, named Nefes, which is exhibited in only a few saloons. No matter where the saloon is and what time it is, you aim to watch that movie and look for that movie.

2. Entertainment Mode Task:

Assume that you are sitting at Starbucks Coffee in Bağdat Caddesi (Suadiye - Istanbul Anadolu) and the time is around 16:00. You want to go to a cinema and watch a movie but you have to catch up dinner with your friend at 20:00 in Bağdat Caddesi. Hence, you look for a cinema saloon nearby and a movie to watch between 17:00-17:30 in the case that you spend the time in between and not be late for the dinner meanwhile.

Tasks of Qualitative Study 2 (Turkish)

1.Action Mode Task:

Farzedelim ki Bağdat Caddesindeki Starbucks Kafe'de (Suadiye - Istanbul Anadolu) oturuyorsun ve saat 16:00 civarında. Sadece birkaç salonda gösterimde olan Nefes adlı filmi izlemek istiyorsun. Filmin hangi salonda gösterildiğinin ve seans saatlerinin önemi olmaksızın, amacın bu filmi izlemek ve bu filmi arıyorsun.

2.Entertainment Mode Task:

Farzedelim ki Bağdat Caddesindeki Starbucks Kafe'de (Suadiye - Istanbul Anadolu) oturuyorsun ve saat 16:00 civarında. Sinemaya gidip bir film izlemek istiyorsun ancak saat 20:00'de yine Bağdat Caddesinde arkadaşınla akşam yemeğine gitmen gerekiyor. Bu yüzden, aradaki vakti değerlendirebileceğin ve yemeğe geç kalmayacağın şekilde yakınlarda bir sinema salonu ve saat 17:00-17:30 arası izleyebileceğin film arıyorsun.

F. Brainstorming Session Study Documents

Emails of Brainstorming Session Study

Invitation Email (English)

Hello,

First of all, I would like to thank you for accepting my invitation to brainstorming session about mobile touristic guide service that will be developed soon.

The session will be done in the following location, date and time:

Location: Boğaziçi University Hisar Campus
Date: 19.12.2009 – Saturday Time: 13:00

Attached document explains topic of the sudy. Please do not hesitate to call me if you have any questions.

Looking forward to seeing you on Saturday.

Yours Sincerely,

Ebru Polat

Yönetim Bilişim Sistemleri
Yüksek Lisans Öğrencisi
GSM: 532 6640353

Invitation Email (Turkish)

Merhabalar,

Öncelikle, geliştirilecek olan "Mobil Turistik Rehberlik Servisi" uygulaması üzerine yapacağımız beyin fırtınası çalışmasına katılmayı kabul ettiğiniz için hepinize teşekkür ederim.

Çalışmanın yapılacağı yer, tarih ve saat bilgileri aşağıdaki gibidir:

Yer: Boğaziçi Üniversitesi Hisar Kampüs
Tarih: 19.12.2009 – Cumartesi Saat: 13:00

Çalısmanın konusunu anlatan döküman ektedir. Çalışma ile ilgili sorularınız olursa, her zaman arayabilirsiniz.

Cumartesi günü görüşmek üzere,

Saygılarımla,

Ebru Polat

Yönetim Bilişim Sistemleri
Yüksek Lisans Öğrencisi
GSM: 532 6640353

Thanks Email (English)

Dear participants,

I would like to thank you for your contribution to the study.

Yours Sincerely,
Ebru Polat

Management Information Systems
Graduate Student
GSM: 532 6640353

Thanks Email (Turkish)

Değerli Katılımcılar,

Çalışmaya katkılarınızdan dolayı hepinize teşekkür ederim.

Saygılarımla,
Ebru Polat

Management Information Systems
Graduate Student
GSM: 532 6640353

Brainstorming Rules

1. Postpone and withold your judgement of ideas.
2. Encourage wild and exaggerated ideas.
3. Quantity count at this stage, not the quality.
4. Build on the ideas put forward by others.
5. Every person and every idea has equal worth.

Slides Used in Brainstorming Session Study

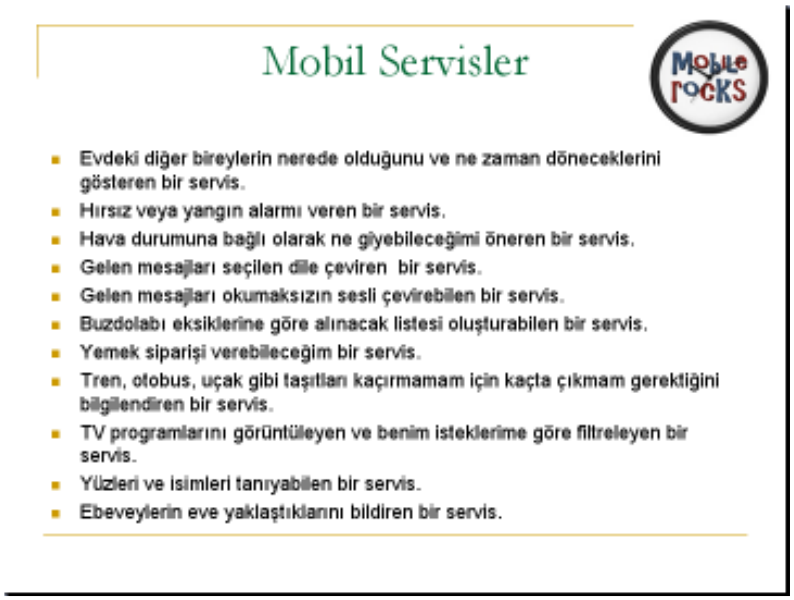


Fig. 35 Examples of adaptive mobile services

Fig. 36 Mobile maps and navigation service

Fig. 37 Mobile weather forecast service

Fig. 38 Mobile SMS chat service

Fig. 39 Mobile touristic guide service ideas

Photographs of Brainstorming Session Study

Fig. 40 View of brainstorming session study - 1

Fig. 41 View of brainstorming bession study – 2

Fig. 42 View of brainstorming session study - 3

(Participants writing down their ideas)

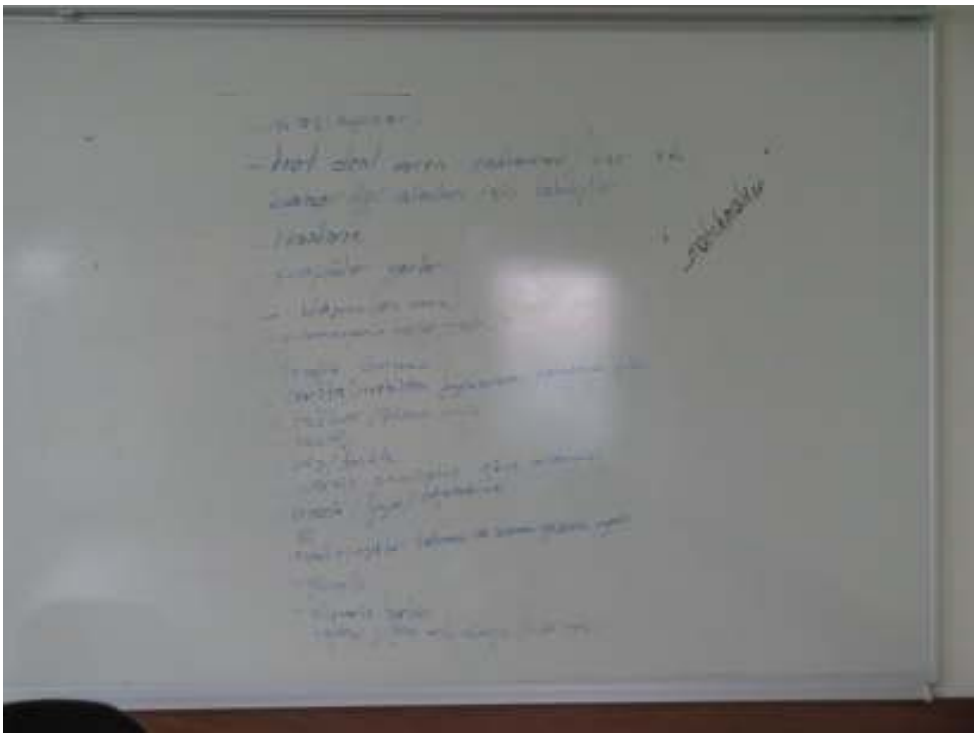


Fig. 43 View of brainstorming session study ideas (written on board)

G. Experimental Study Documents

Emails of Experimental Study

Email of Experimental Study (English)

Hello,

With the leadership of Bogaziçi University Management Information Systems Professor A. Nuri Basoglu, we are studying on a thesis titled "Effects of Adaptivity and Other Factors on Mobile Service Adoption".

Within the context of the thesis, your contribution to our survey by watching the demo and answering the questions will donate our study. The average amount of time to realize the survey is 15 minutes. Your identity information is not demanded. In advance, thank you for spending your valuable time.

Survey Link: http://www.mis.boun.edu.tr/Paris/default.aspx

Sincerely,

Ebru Polat

Email of Experimental Study (Turkish)

Merhaba,

Boğaziçi Üniversitesi, Yönetim Bilişim Sistemleri Bölümü öğretim üyesi A. Nuri Başoğlu yönetiminde "Uyarlanabilirlik ve Diğer Faktörlerin Mobil Servis Kullanımına Etkisi" konulu tez çalışmasını yürütüyoruz.

Bu çerçevede hazırlamış olduğumuz sunumu izlemeniz ve akabinde anketi cevaplandırmanız değerli bir katkı sağlayacaktır. Anketin ortalama cevaplama süresi 15 dakikadır. Kimlik bilgileriniz istenmemektedir. Değerli zamanınızı ayırdığınız için şimdiden teşekkür ederiz.

Anket Linki: http://www.mis.boun.edu.tr/Paris/default.aspx

Saygılarımla,

Ebru Polat

Main Screens of Experimental Study:

Fig. 44 Experimental study's main screen – 1

Fig. 45 Experimental study's main screen – 2

Fig. 46 Experimental study's main screen – 3

Fig. 47 Experimental study's main screen – 4

Fig. 48 Experimental study's main screen – 5

Fig. 49 Experimental study's main screen – 6

Fig. 50 Experimental study's main screen – 7

Fig. 51 Experimental study's main screen – 8

Fig. 52 Experimental study's main screen – 9

Fig. 53 Experimental study's main screen – 10

Fig. 54 Experimental study's main screen – 11

Fig. 55 Experimental study's main screen – 12

Fig. 56 Experimental study's main screen – 13

Fig. 57 Experimental study's main screen – 14

Fig. 58 Experimental study's main screen – 15

Fig. 59 Experimental study's main screen – 16

Fig. 60 Experimental study's main screen – 17

Fig. 61 Experimental study's main screen – 18

Fig. 62 Experimental study's main screen – 19

Anket sonuçlarının verimliliği için aşağıdaki bilgilendirmeyi lütfen detaylıca okuyunuz.

Mobil Servis ve Uygulamalarını Kullanmayı Etkileyen Faktörler

Uyarlanabilirlik (Adaptivity)	**Servisin kullanıcı profiline, kullamcı tercihlerine ve servis ile olan önceki etkileşimlerine göre servis içeriğini ve fonksiyonalitesini uyarlayabilmesi.**
Hata Oranı (Error Rate)	**Servisin kullanıcıya sunduğu içerik, bilgi ve yönlendirmelerin hata içerme oranı.**
Ücret (Cost)	**Servisi temin etmenin ve servisin fonksiyonlarından faydalanmanın ücreti.**

Faktörlerin Derecelendirilmesi

Uyarlanabilirlik (Adaptivity)	• **Uyarlanabilme Özelliği Yok. (%0)** • **Kullanıcıya, Mekana Göre Uyarlanabilme. (%50)** • **Kullanıcıya, Mekana ve Zamana Göre Uyarlanabilme. (%100)**	**Kullanıcıya ve Mekana göre uyarlanabilme (%50):** *Kullanıcı Paris'e iner inmez uygulamanın cep telefonuna yüklenerek, açılması. *Kullanıcı bir yerin yakınından geçerken uygulamanın o yer hakkında sesli/görüntülü tavsiyede bulunması. *Kullanıcının bulunduğu noktaya en yakın yerlerin sıralanması. *Kullanıcı restorana gelince, bulunduğu restoranın menusunu açarak tavsiyede bulunması. *Bulunduğu lokasyondan gideceği noktaya olan rotayı, yol tarifi için gerekli yönlendirmeleri, kalan mesafe ve süreyi bilgilendirmesi. *Kullanıcı dilerse cep telefonunun sesli yönlendirmelerini kapatabilir, dilini değiştirebilir. **Zamana göre uyarlanabilme eklenmesi ile gelen diğer uyarlamalar (%100):** *Zamanı dikkate alarak, o andaki trafik yoğunluğuna göre gidilecek yere vasıta önerisinde bulunması. *Kullanıcının yemek saati yaklaşınca Restoranlar menusunden tavsiyede bulunması.

Fig. 63 Experimental study's main screen – 20

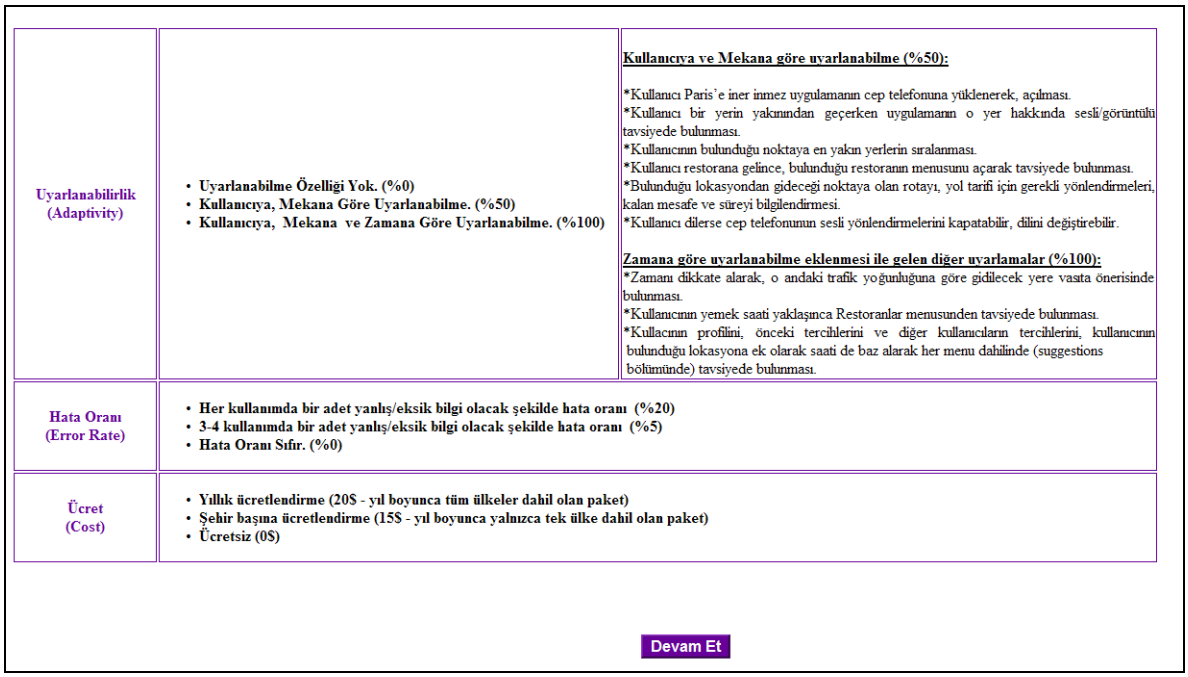


Fig. 64 Experimental study's main screen – 20 (scrolled down)

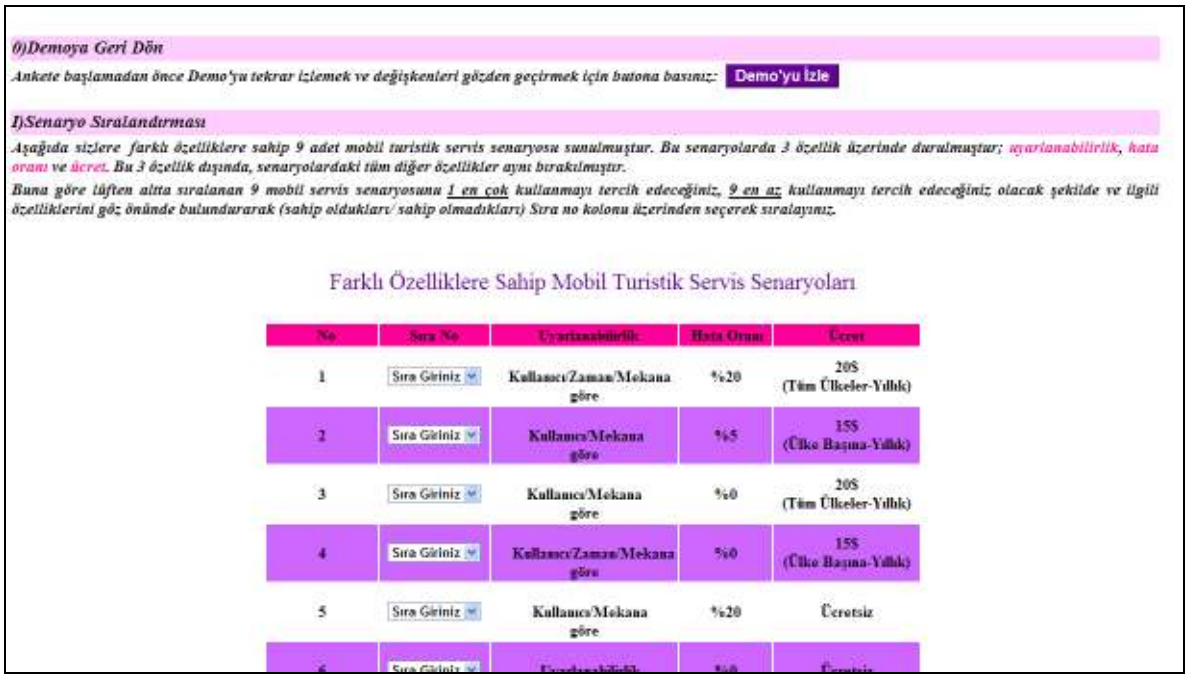
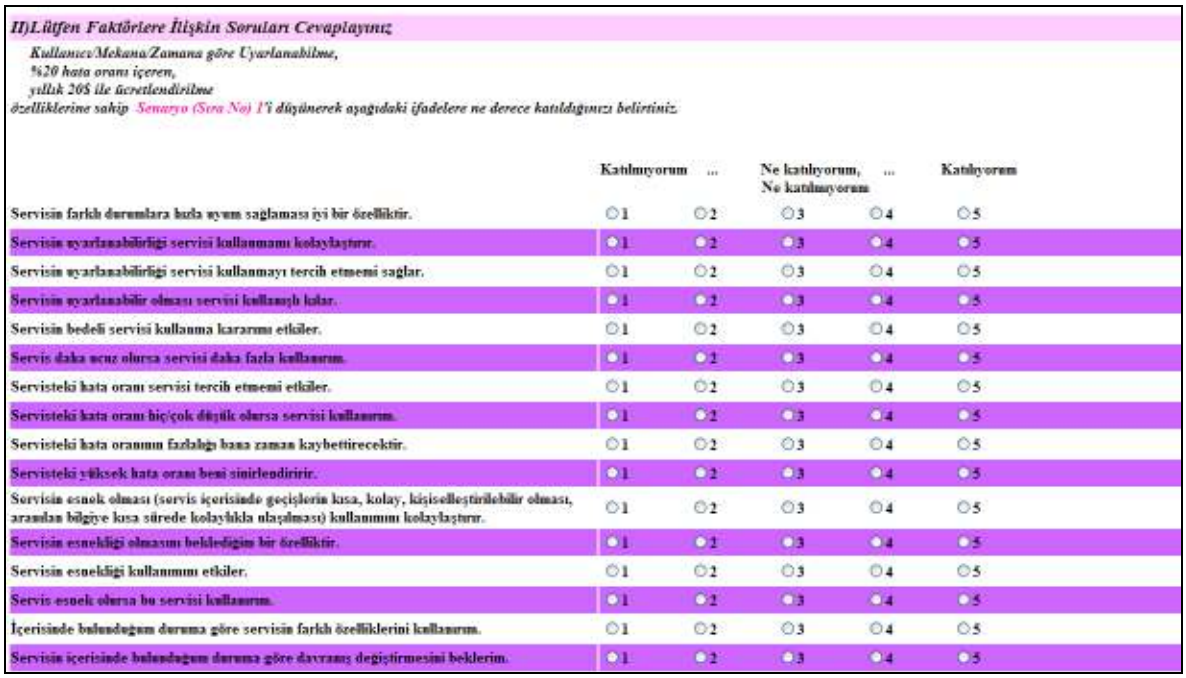


Fig. 65 Experimental study's main screen – 21

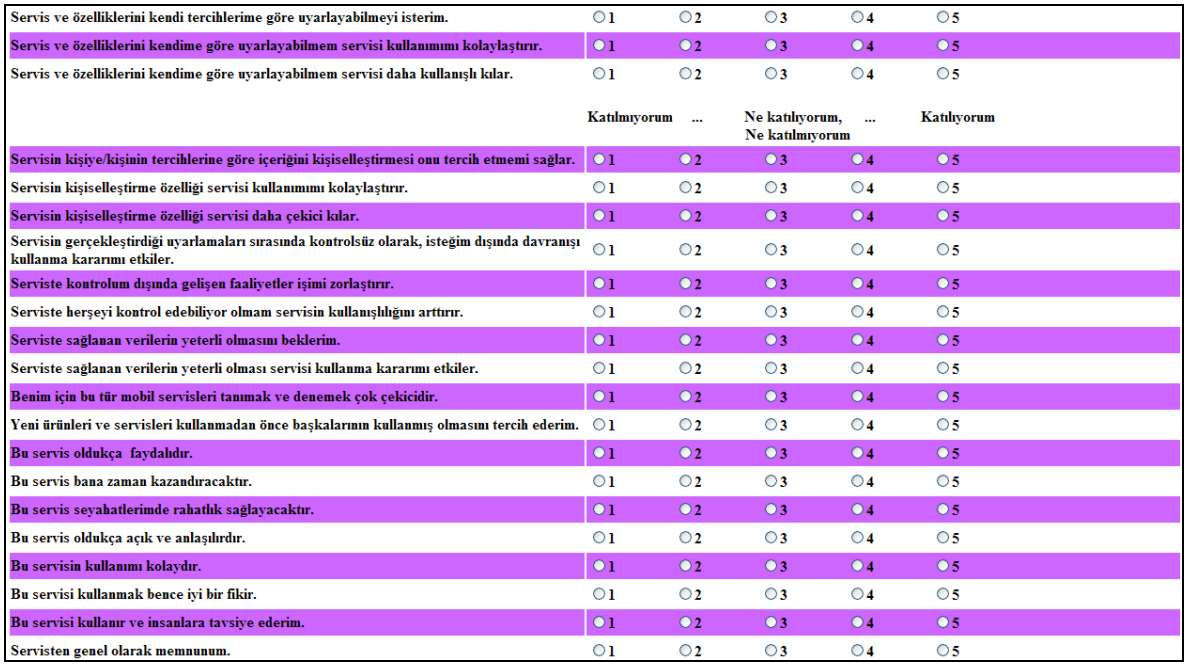


II)Lütfen Faktörlere İlişkin Soruları Cevaplayınız

Kullanıcı/Mekana/Zamana göre Uyarlanabilme,
%20 hata oranı içeren,
yıllık 20$ ile ücretlendirilme
özelliklerine sahip Senaryo (Sora No) 1'i düşünerek aşağıdaki ifadelere ne derece katıldığınızı belirtiniz.

	Katılmıyorum	...	Ne katılıyorum, Ne katılmıyorum	...	Katılıyorum
Servisin farklı durumlara hızla uyum sağlaması iyi bir özelliktir.	1	2	3	4	5
Servisin uyarlanabilirliği servisi kullanımını kolaylaştırır.	1	2	3	4	5
Servisin uyarlanabilirliği servisi kullanmayı tercih etmemi sağlar.	1	2	3	4	5
Servisin uyarlanabilir olması servisi kullanışlı kılar.	1	2	3	4	5
Servisin bedeli servisi kullanma kararımı etkiler.	1	2	3	4	5
Servis daha ucuz olursa servisi daha fazla kullanırım.	1	2	3	4	5
Servisteki hata oranı servisi tercih etmemi etkiler.	1	2	3	4	5
Servisteki hata oranı hiç/çok düşük olursa servisi kullanırım.	1	2	3	4	5
Servisteki hata oranının fazlalığı bana zaman kaybettirecektir.	1	2	3	4	5
Servisteki yüksek hata oranı beni sinirlendiririr.	1	2	3	4	5
Servisin esnek olması (servis içerisinde geçişlerin kısa, kolay, kişiselleştirilebilir olması, aranılan bilgiye kısa sürede kolaylıkla ulaşılması) kullanımını kolaylaştırır.	1	2	3	4	5
Servisin esnekliği olmasını beklediğim bir özelliktir.	1	2	3	4	5
Servisin esnekliği kullanımını etkiler.	1	2	3	4	5
Servis esnek olursa bu servisi kullanırım.	1	2	3	4	5
İçerisinde bulunduğum duruma göre servisin farklı özelliklerini kullanırım.	1	2	3	4	5
Servisin içerisinde bulunduğum duruma göre davranış değiştirmesini beklerim.	1	2	3	4	5

Fig. 66 Experimental study's main screen – 21 (scrolled down)



Servis ve özelliklerini kendi tercihlerime göre uyarlayabilmeyi isterim.	1	2	3	4	5
Servis ve özelliklerini kendime göre uyarlayabilmem servisi kullanımımı kolaylaştırır.	1	2	3	4	5
Servis ve özelliklerini kendime göre uyarlayabilmem servisi daha kullanışlı kılar.	1	2	3	4	5

	Katılmıyorum	...	Ne katılıyorum, Ne katılmıyorum	...	Katılıyorum
Servisin kişiye/kişinin tercihlerine göre içeriğini kişiselleştirmesi onu tercih etmemi sağlar.	1	2	3	4	5
Servisin kişiselleştirme özelliği servisi kullanımımı kolaylaştırır.	1	2	3	4	5
Servisin kişiselleştirme özelliği servisi daha çekici kılar.	1	2	3	4	5
Servisin gerçekleştirdiği uyarlamaları sırasında kontrolsüz olarak, isteğim dışında davranışı kullanma kararımı etkiler.	1	2	3	4	5
Serviste kontrolum dışında gelişen faaliyetler işimi zorlaştırır.	1	2	3	4	5
Serviste herşeyi kontrol edebiliyor olmam servisin kullanışlılığını arttırır.	1	2	3	4	5
Serviste sağlanan verilerin yeterli olmasını beklerim.	1	2	3	4	5
Serviste sağlanan verilerin yeterli olması servisi kullanma kararımı etkiler.	1	2	3	4	5
Benim için bu tür mobil servisleri tanımak ve denemek çok çekicidir.	1	2	3	4	5
Yeni ürünleri ve servisleri kullanmadan önce başkalarının kullanmış olmasını tercih ederim.	1	2	3	4	5
Bu servis oldukça faydalıdır.	1	2	3	4	5
Bu servis bana zaman kazandıracaktır.	1	2	3	4	5
Bu servis seyahatlerimde rahatlık sağlayacaktır.	1	2	3	4	5
Bu servis oldukça açık ve anlaşılırdır.	1	2	3	4	5
Bu servisin kullanımı kolaydır.	1	2	3	4	5
Bu servisi kullanmak bence iyi bir fikir.	1	2	3	4	5
Bu servisi kullanır ve insanlara tavsiye ederim.	1	2	3	4	5
Servisten genel olarak memnunum.	1	2	3	4	5

Fig. 67 Experimental study's main screen – 21 (scrolled down)

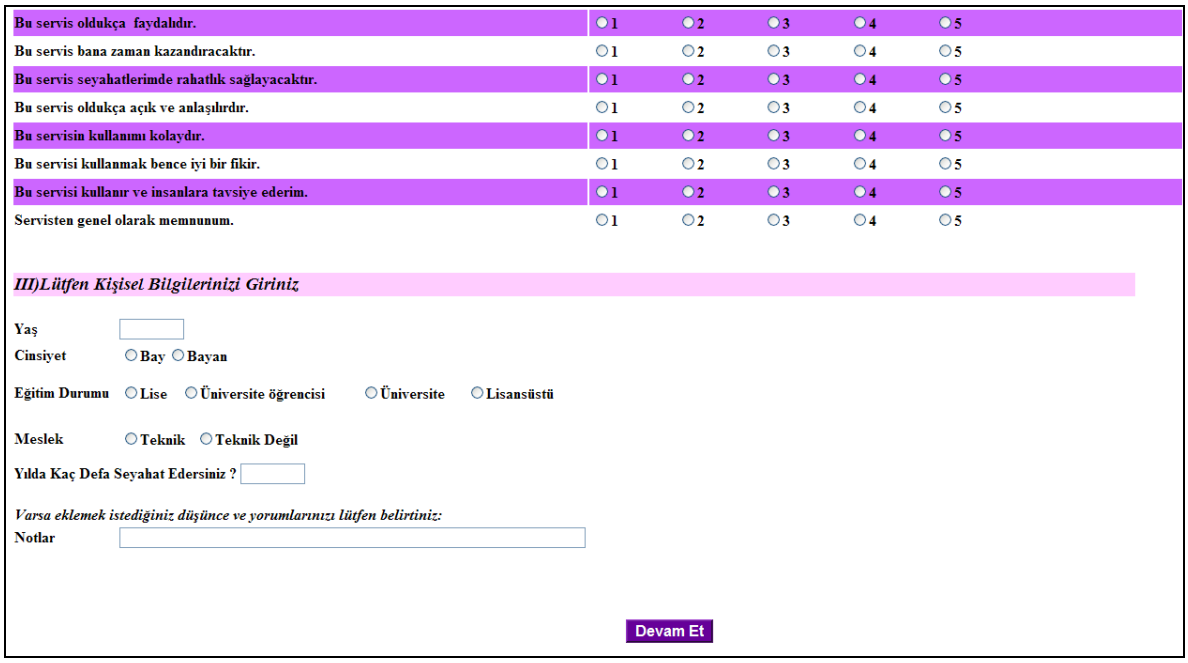


Fig. 68 Experimental study's main screen – 21 (scrolled down)

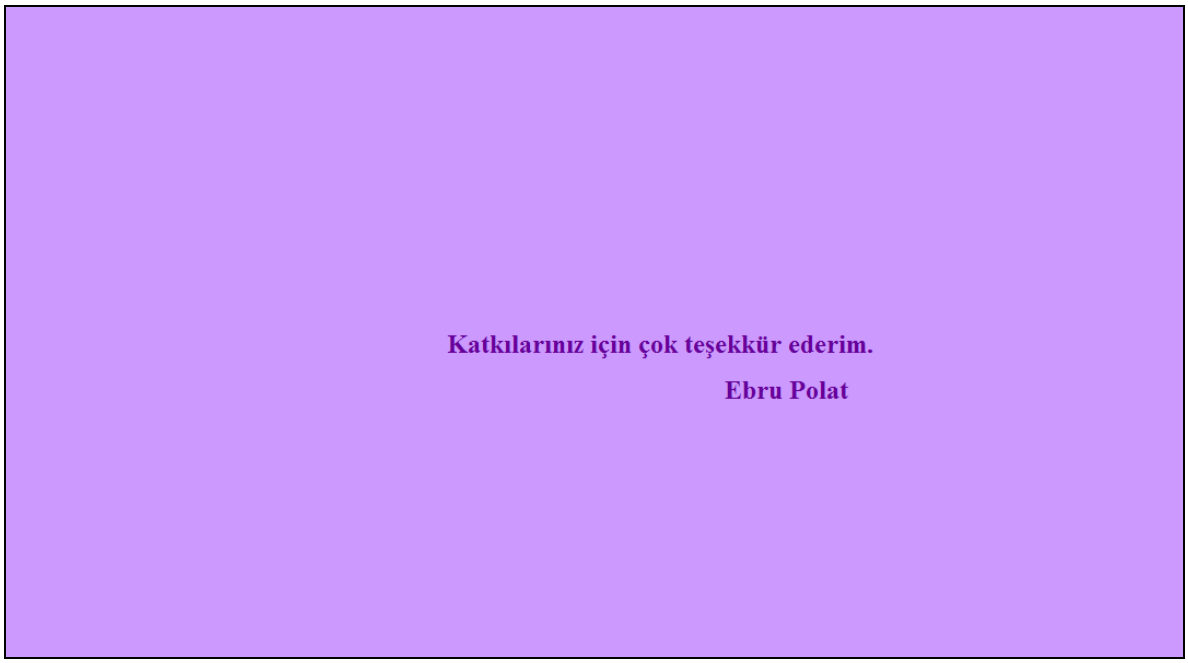


Fig. 69 Experimental study's main screen – 22

H. Deneysel Çalışma Anket Soruları

Uyarlanabilirlik (Adaptivity)

- Servisin farklı durumlara hızla uyum sağlaması iyi bir özelliktir.
- Servisin uyarlanabilirliği servisi kullanmamı kolaylaştırır.
- Servisin uyarlanabilirliği servisi kullanmayı tercih etmemi sağlar.
- Servisin uyarlanabilir olması servisi kullanışlı kılar.

Ücret (Cost)

- Servisin bedeli servisi kullanma kararımı etkiler.
- Servis daha ucuz olursa servisi daha fazla kullanırım.

Hata Oranı (Error Rate)

- Servisteki hata oranı servisi tercih etmemi etkiler.
- Servisteki hata oranı hiç/çok düşük olursa servisi kullanırım.
- Servisteki hata oranının fazlalığı zaman kaybettirecektir.
- Servisteki yüksek hata oranı beni sinirlendiririr.

Esneklik (Flexibility)

- Servisin esnek olması (servis içerisinde geçişlerin kısa. kolay. kişiselleştirilebilir olması aranılan bilgiye kısa sürede kolaylıkla ulaşılması) kullanımını kolaylaştırır.
- Servisin esnekliği olmasını beklediğim bir özelliktir.
- Servisin esnekliği kullanımını etkiler.
- Servis esnek olursa bu servisi kullanırım.

Hayat Modu (Life Mode)

- İçerisinde bulunduğum duruma göre servisin farklı özelliklerini kullanırım.
- Servisin içerisinde bulunduğum duruma göre davranış değiştirmesini beklerim.

Özelleştirme (Customization)

- Servis ve özelliklerini kendi tercihlerime göre uyarlayabilmeyi isterim.
- Servis ve özelliklerini kendime göre uyarlayabilmem servisi kullanımımı kolaylaştırır.
- Servis ve özelliklerini kendime göre uyarlayabilmem servisi daha kullanışlı kılar.

Kişiselleştirme (Personalization)

- Servisin kişiye ve kişinin tercihlerine göre içeriğini kişiselleştirmesi onu tercih etmemi sağlar.
- Servisin kişiselleştirme özelliği servisi kullanımımı kolaylaştırır.
- Servisin kişiselleştirme özelliği servisi daha çekici kılar.

Kullanıcı Kontrolü (User Control)

- Servisin gerçekleştirdiği uyarlamaları sırasında kontrolsüz olarak, isteğim dışında davranışı kullanma kararımı etkiler.
- Serviste kontrolum dışında gelişen faaliyetler işimi zorlaştırır.
- Serviste herşeyi kontrol edebiliyor olmam servisin kullanışlılığını arttırır.

Bilgi Bütünlüğü (Information Completeness)

- Serviste sağlanan verilerin yeterli olmasını beklerim.
- Serviste sağlanan verilerin yeterli olması servisi kullanma kararımı etkiler.

Kullanım Kolaylığı (Ease of Use)

- Bu servis oldukça açık ve anlaşılırdır.
- Bu servisin kullanımı kolaydır.

Kullanışlılık (Usefulness)

- Bu servis oldukça faydalıdır.
- Bu servis bana zaman kazandıracaktır.
- Bu servis seyahatlerimde rahatlık sağlayacaktır.

Tutum & Niyet (Attitude & Intention)

- Bu servisi kullanmak bence iyi bir fikir.
- Bu servisi kullanır ve insanlara tavsiye ederim.

Memnuniyet (Satisfaction)

- Servisten genel olarak memnunum.

I. Percentages of Constructs for Prototype 1 and Prototype 2

Table 25 Percentages of Constructs for Prototype 1 and Prototype 2

Class	Category	Independent	Prototype-1	Prototype-2	Overall
Intermediary	EoU	Ease of Use	6.88%	8.89%	7.80%
		Simplicity	8.13%	3.70%	6.10%
		Speed	2.50%	2.22%	2.37%
	Usefulness	Consistency	0.00%	1.48%	0.68%
		Time Efficiency	3.13%	2.22%	2.71%
		Usefulness	1.25%	3.70%	2.37%
Service Characteristics	Design Characteristics	Clarity	5.00%	7.41%	6.10%
		Cognitive Load	0.63%	0.00%	0.34%
		Color Coding	1.25%	5.19%	3.05%
		Flexibility	8.13%	8.89%	8.47%
		Information convenience	4.38%	1.48%	3.05%
		Information order	0.63%	2.96%	1.69%
		Multi functionality	5.00%	3.70%	4.41%
		Redundancy	0.63%	0.00%	0.34%
		User Control	3.13%	9.63%	6.10%
		User Friendliness	0.63%	0.00%	0.34%
		Visual Factors	8.75%	9.63%	9.15%
	System Characteristics	Completeness	12.50%	5.19%	9.15%
		Context	0.00%	3.70%	1.69%
		Cost	0.00%	0.74%	0.34%
		Feedback	0.00%	0.74%	0.34%
		Functionality	0.00%	0.74%	0.34%
		Learnability	0.63%	0.00%	0.34%
		Practicality	1.25%	0.00%	0.68%
		Reliability	3.75%	2.22%	3.05%
		Security	6.88%	4.44%	5.76%
		Accessibility	1.88%	1.48%	1.69%
	System Intelligence	Adaptivity	10.63%	8.89%	9.83%
Social Factors	Social environment	Culture	0.63%	0.00%	0.34%
	User Characteristics	Individual differences	1.88%	0.74%	1.36%
		Total	100%	100%	100%

J. Experimental Study Analysis Documents

Descriptive Statistiscs

Table 26 Descriptive Statistics of Questionnaire Items

	N	Mean	Std. Deviation	Variance	Minimum	Maximum
Adaptivity1	148	4.50	1.128	1.272	1	5
Adaptivity2	148	4.32	1.132	1.282	1	5
Adaptivity3	148	4.22	1.104	1.218	1	5
Adaptivity4	148	4.28	1.093	1.195	1	5
Attitude1	148	4.20	1.017	1.033	1	5
Attitude2	148	4.12	1.100	1.210	1	5
Cost1	148	4.16	1.141	1.302	1	5
Cost2	148	4.22	1.152	1.327	1	5
Customization1	148	4.32	1.038	1.078	1	5
Customization2	148	4.28	1.101	1.211	1	5
Customization3	148	4.45	0.964	0.929	1	5
EoU1	148	4.20	1.104	1.220	1	5
EoU2	148	4.18	1.024	1.048	1	5
ErrorRate1	148	4.22	1.112	1.236	1	5
ErrorRate2	148	4.08	1.097	1.204	1	5
ErrorRate3	148	4.34	1.099	1.207	1	5
ErrorRate4	148	4.24	1.104	1.219	1	5
Flexibility1	148	4.44	1.038	1.078	1	5
Flexibility2	148	4.16	0.960	0.921	1	5
Flexibility3	148	4.14	0.994	0.988	1	5
Flexibility4	148	4.04	1.003	1.005	1	5
InfCompleteness1	148	4.43	0.919	0.845	1	5
InfCompleteness2	148	4.32	1.017	1.035	1	5
Innovat1	148	4.05	1.065	1.134	1	5
Innovat2_R	148	2.29	1.274	1.622	1	5
LifeMode1	148	4.30	1.066	1.136	1	5
LifeMode2	148	4.08	1.053	1.109	1	5
Personalization1	148	4.23	1.031	1.063	1	5
Personalization2	148	4.23	1.095	1.199	1	5
Personalization3	148	4.21	1.058	1.119	1	5
Satisfaction	148	4.07	1.104	1.220	1	5
Usefulness1	148	4.21	0.985	0.969	1	5
Usefulness2	148	4.12	1.094	1.196	1	5
Usefulness3	148	4.24	1.034	1.070	1	5
UserControl1	148	4.07	1.057	1.117	1	5
UserControl2	148	4.10	1.015	1.030	1	5
UserControl3	148	4.23	1.057	1.117	1	5

Factor Analysis

Table 27 Factor Analysis of External Constructs

Rotated Component Matrixa

	Component				
	1	2	3	4	5
Adaptiv4	.973	-.107	-.011	.184	.019
Adaptiv2	.947	.193	-.013	-.005	-.068
Adaptiv3	.947	.193	-.013	-.005	-.068
ErrorRate4	.907	-.218	.077	.016	.254
Flex1	.907	-.218	.077	.016	.254
InComplete1	.907	-.218	.077	.016	.254
Adaptiv1	.872	-.037	-.147	-.260	-.298
Flex2	.857	-.131	.076	.428	.214
LifeMode1	.844	.185	.094	.224	.300
ErrorRate1	.809	.109	-.025	-.363	.372
Flex3	.641	-.330	-.111	.360	.442
LifeMode2	.618	.356	-.126	.166	.507
Custom1	.599	.597	.177	.167	.385
Custom2	.018	.983	.021	.022	-.059
Custom3	-.076	.921	-.075	.091	-.096
Person2	-.098	.917	.144	.187	.235
Person3	.064	.808	-.146	-.399	-.292
InComplete2	-.073	.807	.261	-.222	.365
UserControl2	-.052	.224	.958	-.027	.064
Flex4	-.008	-.191	.941	-.015	.028
Person1	.064	.200	.921	-.104	-.240
ErrorRate3	.228	-.425	.835	.043	.000
UserControl1	-.101	.319	.635	-.141	.245
Cost1	-.190	-.008	-.133	.921	-.057
Cost2	.405	-.012	-.106	.895	.052
ErrorRate2	.508	-.083	.007	-.264	.780
UserControl3	.299	.242	.057	.502	.647

Table 28 Factor Analysis of Intermediate Constructs

Rotated Component Matrixa		
	Component	
	1	2
Useful1	.961	.152
Useful3	.878	.177
Useful2	.837	-.289
Attitude1	.176	.792
EoU1	-.193	.791
Attitude2	.488	.780
EoU2	-.054	.773

Rotated Component Matrixa			
	Component		
	1	2	3
Useful1	.960	.042	.221
Useful3	.877	.197	.131
Useful2	.823	-.019	-.331
Attitude1	.122	.847	.335
Satisfaction	.347	.831	-.240
EoU1	-.262	.720	.396
EoU2	-.058	.084	.942
Attitude2	.454	.411	.697

Table 29 Factor Analysis of All Constructs

Rotated Component Matrixa							
	Component						
	1	2	3	4	5	6	7
Adaptiv4	.976	-.088	-.011	-.024	-.041	.172	-.057
Adaptiv2	.932	.199	-.051	-.146	-.193	.018	-.005
Adaptiv3	.932	.199	-.051	-.146	-.193	.018	-.005
InComplete1	.929	-.217	.082	.165	-.034	-.020	.078
ErrorRate4	.929	-.217	.082	.165	-.034	-.020	.078
Flex1	.929	-.217	.082	.165	-.034	-.020	.078
Flex2	.883	-.094	.097	.184	.043	.386	-.024
LifeMode1	.875	.202	.109	.231	.179	.123	.060
Adaptiv1	.836	-.052	-.182	-.350	-.164	-.222	-.093
ErrorRate1	.811	.121	-.043	.289	-.252	-.351	.067
Flex3	.668	-.263	-.053	.485	-.125	.365	-.168
LifeMode2	.662	.368	-.103	.476	.372	.030	.134
Custom1	.631	.609	.165	.284	.092	.078	.174
Custom2	.004	.986	-.021	-.091	.057	-.013	.047

Table 29 Continue

Rotated Component Matrixa

	Component						
	1	2	3	4	5	6	7
Person2	-.080	.931	.125	.194	.142	.112	.139
Custom3	-.097	.928	-.113	-.111	-.121	.109	-.024
InComplete2	-.062	.790	.188	.216	-.333	-.190	.361
Person3	.029	.775	-.183	-.315	.197	-.460	-.031
Flex4	-.009	-.119	.969	.044	-.027	-.028	-.096
Person1	.045	.242	.916	-.265	.043	-.136	-.065
UserControl2	-.041	.227	.910	-.066	-.135	-.022	.305
ErrorRate3	.230	-.353	.879	.029	.046	.014	-.158
EoU2	-.091	-.067	-.387	.901	.106	.067	.082
ErrorRate2	.543	-.041	.038	.749	-.132	-.292	.069
UserControl3	.352	.285	.062	.617	-.004	.475	.212
Useful1	-.307	-.046	.151	.114	.921	.049	-.018
Useful3	-.130	.207	-.189	-.096	.915	.088	.010
Attitude2	.311	-.183	-.202	.440	.698	.268	.211
Useful2	-.286	-.155	.594	-.311	.654	-.022	.094
Cost1	-.163	-.010	-.140	-.036	.053	.957	.125
Cost2	.443	.007	-.075	.076	.315	.828	.006
Attitude1	.082	.378	-.063	.402	.276	.073	.772
EoU1	.490	-.278	-.120	.268	-.018	.261	.717
UserControl1	-.069	.235	.528	-.017	-.288	-.096	.714
Satisfaction	-.141	.338	-.283	-.336	.383	.178	.655

ANOVA Analysis

One-Way ANOVA Analyses of Summated Constructs

Table 30 One-Way ANOVA Analysis Results for Age (summated)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptivity	.007	.999	.023	3	.008
Cost	.253	.859	.807	3	.269
Error Rate	.171	.916	.428	3	.143
Flexibility	.620	.603	1.385	3	.462
Life Mode	.297	.828	.782	3	.261
Customization	.071	.975	.199	3	.066
Personalization	.195	.900	.601	3	.200
User Control	.885	.450	2.064	3	.688
Inf. Completeness	1.371	.254	3.446	3	1.149
Innovat1	1.372	.254	4.632	3	1.544
Innovat2_R	.415	.743	2.043	3	.681
EoU	.290	.832	.903	3	.301
Usefulness	.077	.973	.215	3	.072
Attitude	.196	.899	.630	3	.210

Table 31 One-Way ANOVA Analysis Results for Education (summated)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptivity	2.139	.098	6.474	3	2.158
Cost	.451	.717	1.435	3	.478
Error Rate	.562	.641	1.399	3	.466
Flexibility	1.172	.323	2.589	3	.863
Life Mode	.911	.437	2.370	3	.790
Customization	1.103	.350	3.033	3	1.011
Personalization	1.158	.328	3.505	3	1.168
User Control	1.926	.128	4.397	3	1.466
Inf. Completeness	1.352	.260	3.400	3	1.133
Innovat1	1.150	.331	3.899	3	1.300
Innovat2_R	.734	.533	3.592	3	1.197
EoU	2.854	.039	8.429	3	2.810
Usefulness	2.479	.064	6.626	3	2.209
Attitude	3.609	.015	10.845	3	3.615

Table 32 One-Way ANOVA Analysis Results for Occupation (summated)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptivity	.004	.948	.004	1	.004
Cost	.752	.387	.790	1	.790
Error Rate	.039	.844	.032	1	.032
Flexibility	1.800	.182	1.323	1	1.323
Life Mode	.034	.853	.030	1	.030
Customization	.081	.777	.075	1	.075
Personalization	.262	.609	.267	1	.267
User Control	.049	.825	.038	1	.038
Inf. Completeness	.663	.417	.560	1	.560
Innovat1	1.504	.222	1.700	1	1.700
Innovat2_R	.597	.441	.971	1	.971
EoU	.008	.930	.008	1	.008
Usefulness	.075	.785	.069	1	.069
Attitude	.004	.947	.005	1	.005

Table 33 One-Way ANOVA Analysis Results for Travel Time (summated)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptivity	.078	.972	.247	3	.082
Cost	.288	.834	.919	3	.306
Error Rate	.245	.865	.614	3	.205
Flexibility	.301	.824	.678	3	.226
Life Mode	1.066	.365	2.764	3	.921
Customization	.840	.474	2.324	3	.775
Personalization	1.280	.284	3.862	3	1.287
User Control	.048	.986	.115	3	.038
Inf. Completeness	.062	.980	.160	3	.053
Innovat1	.959	.414	3.265	3	1.088
Innovat2_R	2.009	.115	9.583	3	3.194
EoU	.351	.789	1.090	3	.363
Usefulness	.261	.853	.731	3	.244
Attitude	.273	.845	.878	3	.293

Table 34 One-Way ANOVA Analysis Results for Gender (summated)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptivity	7.262	.008	7.190	1	7.190
Cost	1.914	.169	1.995	1	1.995
Error Rate	3.329	.070	2.695	1	2.695
Flexibility	5.717	.018	4.094	1	4.094
Life Mode	1.954	.164	1.680	1	1.680
Customization	2.125	.147	1.938	1	1.938
Personalization	2.048	.155	2.058	1	2.058
User Control	11.821	.001	8.536	1	8.536
Inf. Completeness	6.990	.009	5.668	1	5.668
Innovat1	.092	.762	.105	1	.105
Innovat2_R	3.013	.085	4.823	1	4.823
EoU	10.404	.002	9.991	1	9.991
Usefulness	7.217	.008	6.355	1	6.355
Attitude	6.559	.011	6.669	1	6.669

One-Way ANOVA Analyses of All Constructs

Table 35 One-Way ANOVA Analysis Results for Age (all)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptiv1	0.193	0.901	0.750	3	0.250
Adaptiv2	0.089	0.966	0.349	3	0.116
Adaptiv3	0.031	0.993	0.117	3	0.039
Adaptiv4	0.024	0.995	0.088	3	0.029
Cost1	0.467	0.706	1.845	3	0.615
Cost2	0.149	0.930	0.606	3	0.202
ErrorRate1	0.280	0.840	1.053	3	0.351
ErrorRate2	0.088	0.967	0.323	3	0.108
ErrorRate3	0.382	0.766	1.400	3	0.467
ErrorRate4	0.167	0.918	0.623	3	0.208
Flex1	0.306	0.821	1.005	3	0.335
Flex2	0.548	0.650	1.528	3	0.509
Flex3	1.890	0.134	5.503	3	1.834
Flex4	0.395	0.757	1.205	3	0.402
LifeMode1	0.062	0.980	0.215	3	0.072
LifeMode2	0.938	0.424	3.124	3	1.041

Table 35 Continue

	F	Sig.	Sum of Squares	df	Mean Square
Custom1	0.266	0.850	0.873	3	0.291
Custom2	0.146	0.932	0.541	3	0.180
Custom3	0.266	0.850	0.752	3	0.251
Person1	0.364	0.779	1.174	3	0.391
Person2	0.142	0.935	0.519	3	0.173
Person3	0.358	0.783	1.219	3	0.406
UserControl1	0.720	0.541	2.427	3	0.809
UserControl2	1.005	0.393	3.107	3	1.036
UserControl3	1.006	0.392	3.369	3	1.123
InComplete1	1.615	0.189	4.042	3	1.347
InComplete2	1.006	0.392	3.122	3	1.041
Innovat1	1.372	0.254	4.632	3	1.544
Innovat2_R	0.415	0.743	2.043	3	0.681
EoU1	0.475	0.700	1.759	3	0.586
EoU2	0.178	0.911	0.570	3	0.190
Useful1	0.256	0.857	0.757	3	0.252
Useful2	0.086	0.968	0.313	3	0.104
Useful3	0.058	0.982	0.189	3	0.063
Attitude1	0.431	0.731	1.351	3	0.450
Attitude2	0.167	0.919	0.615	3	0.205
Adaptivity	0.007	0.999	0.023	3	0.008
Cost	0.253	0.859	0.807	3	0.269
ErrorRate	0.171	0.916	0.428	3	0.143
Flexibility	0.620	0.603	1.385	3	0.462
LifeMode	0.297	0.828	0.782	3	0.261
Customization	0.071	0.975	0.199	3	0.066
Personalization	0.195	0.900	0.601	3	0.200
UserControl	0.885	0.450	2.064	3	0.688
Inf.Completeness	1.371	0.254	3.446	3	1.149
EoU	0.290	0.832	0.903	3	0.301
Usefulness	0.077	0.973	0.215	3	0.072
Attitude	0.196	0.899	0.630	3	0.210
Satisfaction	0.739	0.530	2.720	3	0.907

Table 36 One-Way ANOVA Analysis Results for Education (all)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptiv1	2.186	0.092	8.145	3	2.715
Adaptiv2	3.117	0.028	11.489	3	3.830
Adaptiv3	1.579	0.197	5.703	3	1.901
Adaptiv4	2.155	0.096	7.546	3	2.515
Cost1	1.474	0.224	5.702	3	1.901
Cost2	0.483	0.694	1.945	3	0.648
ErrorRate1	2.430	0.068	8.753	3	2.918
ErrorRate2	0.086	0.968	0.315	3	0.105
ErrorRate3	1.450	0.231	5.203	3	1.734
ErrorRate4	0.988	0.400	3.616	3	1.205
Flex1	0.386	0.763	1.264	3	0.421
Flex2	0.551	0.648	1.536	3	0.512
Flex3	1.143	0.334	3.380	3	1.127
Flex4	2.637	0.052	7.694	3	2.565
LifeMode1	0.399	0.754	1.375	3	0.458
LifeMode2	1.471	0.225	4.847	3	1.616
Custom1	0.858	0.465	2.781	3	0.927
Custom2	1.084	0.358	3.934	3	1.311
Custom3	1.113	0.346	3.094	3	1.031
Person1	1.813	0.147	5.686	3	1.895
Person2	0.424	0.736	1.544	3	0.515
Person3	1.880	0.136	6.199	3	2.066
UserControl1	2.222	0.088	7.265	3	2.422
UserControl2	1.234	0.299	3.798	3	1.266
UserControl3	2.267	0.083	7.406	3	2.469
InComplete1	0.947	0.420	2.403	3	0.801
InComplete2	1.519	0.212	4.664	3	1.555
Innovat1	1.150	0.331	3.899	3	1.300
Innovat2_R	0.734	0.533	3.592	3	1.197
EoU1	1.765	0.157	6.358	3	2.119
EoU2	3.646	0.014	10.878	3	3.626
Useful1	4.817	0.003	12.997	3	4.332
Useful2	0.464	0.708	1.685	3	0.562
Useful3	2.628	0.053	8.163	3	2.721
Attitude1	3.125	0.028	9.287	3	3.096
Attitude2	3.749	0.012	12.883	3	4.294

Table 36 Continue

	F	Sig.	Sum of Squares	df	Mean Square
Adaptivity	2.139	0.098	6.474	3	2.158
Cost	0.451	0.717	1.435	3	0.478
ErrorRate	0.562	0.641	1.399	3	0.466
Flexibility	1.172	0.323	2.589	3	0.863
LifeMode	0.911	0.437	2.370	3	0.790
Customization	1.103	0.350	3.033	3	1.011
Personalization	1.158	0.328	3.505	3	1.168
UserControl	1.926	0.128	4.397	3	1.466
Inf.Completeness	1.352	0.260	3.400	3	1.133
EoU	2.854	0.039	8.429	3	2.810
Usefulness	2.479	0.064	6.626	3	2.209
Attitude	3.609	0.015	10.845	3	3.615
Satisfaction	3.578	0.016	12.440	3	4.147

Table 37 One-Way ANOVA Analysis Results for Occupation (all)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptiv1	0.089	0.766	0.113	1	0.113
Adaptiv2	0.224	0.637	0.288	1	0.288
Adaptiv3	0.055	0.815	0.067	1	0.067
Adaptiv4	0.088	0.767	0.106	1	0.106
Cost1	1.071	0.302	1.395	1	1.395
Cost2	0.266	0.606	0.355	1	0.355
ErrorRate1	0.806	0.371	0.998	1	0.998
ErrorRate2	0.039	0.843	0.048	1	0.048
ErrorRate3	0.849	0.358	1.025	1	1.025
ErrorRate4	0.193	0.661	0.237	1	0.237
Flex1	0.802	0.372	0.866	1	0.866
Flex2	1.976	0.162	1.808	1	1.808
Flex3	1.090	0.298	1.077	1	1.077
Flex4	1.658	0.200	1.659	1	1.659
LifeMode1	0.189	0.665	0.215	1	0.215
LifeMode2	0.013	0.911	0.014	1	0.014
Custom1	0.707	0.402	0.763	1	0.763

Table 37 Continue

	F	Sig.	Sum of Squares	df	Mean Square
Custom2	0.050	0.824	0.060	1	0.060
Custom3	0.039	0.844	0.037	1	0.037
Person1	0.582	0.447	0.620	1	0.620
Person2	0.066	0.798	0.080	1	0.080
Person3	0.205	0.651	0.231	1	0.231
UserControl1	0.012	0.913	0.013	1	0.013
UserControl2	0.653	0.420	0.675	1	0.675
UserControl3	1.501	0.223	1.670	1	1.670
InComplete1	0.946	0.332	0.800	1	0.800
InComplete2	0.350	0.555	0.364	1	0.364
Innovat1	1.504	0.222	1.700	1	1.700
Innovat2_R	0.597	0.441	0.971	1	0.971
EoU1	0.129	0.720	0.159	1	0.159
EoU2	0.315	0.576	0.331	1	0.331
Useful1	0.432	0.512	0.421	1	0.421
Useful2	0.021	0.885	0.025	1	0.025
Useful3	0.000	0.986	0.000	1	0.000
Attitude1	0.042	0.838	0.044	1	0.044
Attitude2	0.098	0.754	0.120	1	0.120
Adaptivity	0.004	0.948	0.004	1	0.004
Cost	0.752	0.387	0.790	1	0.790
ErrorRate	0.039	0.844	0.032	1	0.032
Flexibility	1.800	0.182	1.323	1	1.323
LifeMode	0.034	0.853	0.030	1	0.030
Customization	0.081	0.777	0.075	1	0.075
Personalization	0.262	0.609	0.267	1	0.267
UserControl	0.049	0.825	0.038	1	0.038
Inf.Completeness	0.663	0.417	0.560	1	0.560
EoU	0.008	0.930	0.008	1	0.008
Usefulness	0.075	0.785	0.069	1	0.069
Attitude	0.004	0.947	0.005	1	0.005
Satisfaction	2.307	0.131	2.789	1	2.789

Table 38 One-Way ANOVA Analysis Results for Travel Time (all)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptiv1	0.355	0.785	1.374	3	0.458
Adaptiv2	0.230	0.875	0.900	3	0.300
Adaptiv3	0.258	0.855	0.959	3	0.320
Adaptiv4	0.332	0.802	1.207	3	0.402
Cost1	0.200	0.896	0.795	3	0.265
Cost2	0.328	0.805	1.324	3	0.441
ErrorRate1	0.136	0.938	0.514	3	0.171
ErrorRate2	0.330	0.804	1.209	3	0.403
ErrorRate3	0.074	0.974	0.274	3	0.091
ErrorRate4	0.344	0.793	1.276	3	0.425
Flex1	0.121	0.948	0.398	3	0.133
Flex2	0.666	0.574	1.853	3	0.618
Flex3	0.381	0.767	1.143	3	0.381
Flex4	0.134	0.940	0.410	3	0.137
LifeMode1	0.442	0.723	1.525	3	0.508
LifeMode2	1.329	0.267	4.393	3	1.464
Custom1	0.758	0.520	2.462	3	0.821
Custom2	0.685	0.562	2.506	3	0.835
Custom3	1.240	0.297	3.440	3	1.147
Person1	1.249	0.294	3.961	3	1.320
Person2	1.252	0.293	4.477	3	1.492
Person3	1.156	0.329	3.869	3	1.290
UserControl1	0.580	0.629	1.960	3	0.653
UserControl2	0.418	0.741	1.306	3	0.435
UserControl3	0.178	0.911	0.608	3	0.203
InComplete1	0.075	0.973	0.193	3	0.064
InComplete2	0.259	0.855	0.817	3	0.272
Innovat1	0.959	0.414	3.265	3	1.088
Innovat2_R	2.009	0.115	9.583	3	3.194
EoU1	0.519	0.670	1.918	3	0.639
EoU2	0.312	0.817	0.994	3	0.331
Useful1	0.729	0.536	2.131	3	0.710
Useful2	0.297	0.828	1.080	3	0.360
Useful3	0.100	0.960	0.328	3	0.109
Attitude1	0.391	0.760	1.227	3	0.409
Attitude2	0.203	0.894	0.749	3	0.250
Adaptivity	0.078	0.972	0.247	3	0.082

Table 38 Continue

	F	Sig.	Sum of Squares	df	Mean Square
Cost	0.288	0.834	0.919	3	0.306
ErrorRate	0.245	0.865	0.614	3	0.205
Flexibility	0.301	0.824	0.678	3	0.226
LifeMode	1.066	0.365	2.764	3	0.921
Customization	0.840	0.474	2.324	3	0.775
Personalization	1.280	0.284	3.862	3	1.287
UserControl	0.048	0.986	0.115	3	0.038
Inf.Completeness	0.062	0.980	0.160	3	0.053
EoU	0.351	0.789	1.090	3	0.363
Usefulness	0.261	0.853	0.731	3	0.244
Attitude	0.273	0.845	0.878	3	0.293
Satisfaction	0.774	0.510	2.847	3	0.949

Table 39 One-Way ANOVA Analysis Results for Gender (all)

	F	Sig.	Sum of Squares	df	Mean Square
Adaptiv1	3.635	0.059	4.542	1	4.542
Adaptiv2	3.656	0.058	4.604	1	4.604
Adaptiv3	13.680	0.000	15.342	1	15.342
Adaptiv4	5.531	0.020	6.411	1	6.411
Cost1	2.373	0.126	3.061	1	3.061
Cost2	0.870	0.352	1.156	1	1.156
ErrorRate1	2.986	0.086	3.641	1	3.641
ErrorRate2	0.476	0.491	0.575	1	0.575
ErrorRate3	3.934	0.049	4.655	1	4.655
ErrorRate4	2.516	0.115	3.036	1	3.036
Flex1	2.844	0.094	3.028	1	3.028
Flex2	1.614	0.206	1.481	1	1.481
Flex3	5.370	0.022	5.155	1	5.155
Flex4	8.592	0.004	8.212	1	8.212
LifeMode1	1.937	0.166	2.186	1	2.186
LifeMode2	1.119	0.292	1.240	1	1.240
Custom1	1.923	0.168	2.060	1	2.060
Custom2	0.920	0.339	1.115	1	1.115

Table 39 Continue

	F	Sig.	Sum of Squares	df	Mean Square
Custom3	3.099	0.080	2.839	1	2.839
Person1	1.647	0.201	1.742	1	1.742
Person2	1.883	0.172	2.243	1	2.243
Person3	1.985	0.161	2.207	1	2.207
UserControl1	6.218	0.014	6.706	1	6.706
UserControl2	9.749	0.002	9.482	1	9.482
UserControl3	9.052	0.003	9.586	1	9.586
InComplete1	5.953	0.016	4.865	1	4.865
InComplete2	6.554	0.011	6.533	1	6.533
Innovat1	0.092	0.762	0.105	1	0.105
Innovat2_R	3.013	0.085	4.823	1	4.823
EoU1	6.873	0.010	8.061	1	8.061
EoU2	12.474	0.001	12.128	1	12.128
Useful1	3.556	0.061	3.389	1	3.389
Useful2	6.493	0.012	7.486	1	7.486
Useful3	8.774	0.004	8.914	1	8.914
Attitude1	6.835	0.010	6.794	1	6.794
Attitude2	5.580	0.019	6.546	1	6.546
Adaptivity	7.262	0.008	7.190	1	7.190
Cost	1.914	0.169	1.995	1	1.995
ErrorRate	3.329	0.070	2.695	1	2.695
Flexibility	5.717	0.018	4.094	1	4.094
LifeMode	1.954	0.164	1.680	1	1.680
Customization	2.125	0.147	1.938	1	1.938
Personalization	2.048	0.155	2.058	1	2.058
UserControl	11.821	0.001	8.536	1	8.536
Inf.Completeness	6.990	0.009	5.668	1	5.668
EoU	10.404	0.002	9.991	1	9.991
Usefulness	7.217	0.008	6.355	1	6.355
Attitude	6.559	0.011	6.669	1	6.669
Satisfaction	3.112	0.080	3.742	1	3.742

Correlation Analysis

Table 40 Correlation Results between Summated Constructs

	EoU	Usefulness	Attitude	Satisfaction
EoU	1.000**	.845**	.835**	.717**
Usefulness	.845**	1.000**	.898**	.791**
Attitude	.835**	.898**	1.000**	.848**
Adaptivity	.715**	.739**	.747**	.665**
Cost	.437**	.440**	.459**	.473**
Error Rate	.600**	.640**	.632**	.591**
Flexibility	.630**	.669**	.670**	.599**
Life Mode	.568**	.617**	.601**	.517**
Customization	.585**	.677**	.683**	.599**
Personalization	.625**	.685**	.721**	.654**
User Control	.553**	.630**	.616**	.569**
Inf Completeness	.697**	.684**	.685**	.589**
Innovat1	.523**	.649**	.637**	.581**
Innovat2_R	-.484**	-.449**	-.418**	-.464**

** Correlation is significant at the 0.01 level (2-tailed).

Table 41 Correlation Results between Items

	EoU1	EoU2	Useful1	Useful2	Useful3	Attitude1	Attitude2	Satisfaction
EoU1	1.000**	.804**	.656**	.729**	.851**	.776**	.742**	.692**
EoU2	.804**	1.000**	.738**	.673**	.799**	.794**	.772**	.669**
Useful1	.656**	.738**	1.000**	.715**	.771**	.814**	.806**	.744**
Useful2	.729**	.673**	.715**	1.000**	.846**	.779**	.751**	.686**
Useful3	.851**	.799**	.771**	.846**	1.000**	.846**	.841**	.766**
Attitude1	.776**	.794**	.814**	.779**	.846**	1.000**	.884**	.800**
Attitude2	.742**	.772**	.806**	.751**	.841**	.884**	1.000**	.844**
Adaptiv1	.685**	.592**	.610**	.634**	.723**	.664**	.686**	.666**
Adaptiv2	.656**	.571**	.573**	.605**	.693**	.681**	.651**	.624**
Adaptiv3	.607**	.561**	.503**	.649**	.627**	.634**	.595**	.540**
Adaptiv4	.653**	.617**	.597**	.563**	.680**	.690**	.690**	.593**
Cost1	.440**	.389**	.340**	.410**	.429**	.436**	.446**	.477**
Cost2	.362**	.289**	.284**	.319**	.389**	.375**	.339**	.368**
ErrorRate1	.457**	.484**	.460**	.436**	.538**	.502**	.540**	.464**
ErrorRate2	.408**	.465**	.450**	.508**	.450**	.497**	.477**	.467**
ErrorRate3	.544**	.536**	.455**	.520**	.644**	.534**	.545**	.530**
ErrorRate4	.452**	.406**	.397**	.443**	.526**	.465**	.474**	.483**
Flex1	.524**	.449**	.502**	.546**	.622**	.585**	.561**	.543**
Flex2	.517**	.428**	.426**	.565**	.544**	.532**	.530**	.458**
Flex3	.589**	.504**	.471**	.504**	.576**	.612**	.595**	.562**

Table 41 Continue

	EoU1	EoU2	Useful1	Useful2	Useful3	Attitude1	Attitude2	Satisfaction
Flex4	.570**	.530**	.474**	.541**	.587**	.526**	.538**	.495**
LifeMode1	.557**	.449**	.472**	.564**	.557**	.490**	.532**	.468**
LifeMode2	.448**	.434**	.469**	.440**	.494**	.518**	.508**	.440**
Custom1	.472**	.424**	.539**	.534**	.579**	.588**	.585**	.503**
Custom2	.536**	.521**	.541**	.610**	.620**	.605**	.623**	.577**
Custom3	.601**	.537**	.503**	.600**	.682**	.643**	.648**	.585**
Person1	.570**	.579**	.623**	.603**	.624**	.663**	.677**	.620**
Person2	.542**	.533**	.536**	.607**	.587**	.642**	.638**	.595**
Person3	.599**	.555**	.578**	.595**	.643**	.681**	.680**	.646**
UserControl1	.331**	.383**	.397**	.463**	.438**	.423**	.460**	.404**
UserControl2	.413**	.401**	.414**	.430**	.475**	.382**	.482**	.437**
UserControl3	.585**	.546**	.581**	.547**	.664**	.609**	.661**	.599**
InComplete1	.654**	.640**	.585**	.578**	.685**	.642**	.655**	.534**
InComplete2	.629**	.591**	.558**	.534**	.663**	.615**	.616**	.580**
Innovat1	.461**	.535**	.646**	.556**	.601**	.620**	.617**	.581**
Innovat2_R	-.476**	-.443**	-.434**	-.431**	-.379**	-.424**	-.390**	-.464**

** Correlation is significant at the 0.01 level (2-tailed).

T-TEST Analysis

Table 42 Group Statistics based on Gender

	Cinsiyet	N	Mean	Std. Deviation
Adaptiv1	Male	102	4.38	1.243
	Female	46	4.76	0.766
Adaptiv2	Male	102	4.21	1.221
	Female	46	4.59	0.858
Adaptiv3	Male	102	4	1.177
	Female	46	4.7	0.726
Adaptiv4	Male	102	4.14	1.186
	Female	46	4.59	0.777
Cost1	Male	102	4.06	1.184
	Female	46	4.37	1.019
Cost2	Male	102	4.16	1.175
	Female	46	4.35	1.1
ErrorRate1	Male	102	4.12	1.196
	Female	46	4.46	0.862
ErrorRate2	Male	102	4.04	1.098
	Female	46	4.17	1.102
ErrorRate3	Male	102	4.23	1.168
	Female	46	4.61	0.881
ErrorRate4	Male	102	4.15	1.147
	Female	46	4.46	0.982
Flex1	Male	102	4.34	1.085
	Female	46	4.65	0.9
Flex2	Male	102	4.09	1.016
	Female	46	4.3	0.813
Flex3	Male	102	4.01	1.048
	Female	46	4.41	0.805
Flex4	Male	102	3.88	1.027
	Female	46	4.39	0.856
LifeMode1	Male	102	4.22	1.149
	Female	46	4.48	0.836
LifeMode2	Male	102	4.02	1.099
	Female	46	4.22	0.941
Custom1	Male	102	4.25	1.076
	Female	46	4.5	0.937
Custom2	Male	102	4.23	1.125
	Female	46	4.41	1.045
Custom3	Male	102	4.35	1.011
	Female	46	4.65	0.822

Table 42 Continue

	Cinsiyet	N	Mean	Std. Deviation
Person1	Male	102	4.16	1.041
	Female	46	4.39	1
Person2	Male	102	4.15	1.103
	Female	46	4.41	1.066
Person3	Male	102	4.13	1.078
	Female	46	4.39	1
UserControl1	Male	102	3.93	1.083
	Female	46	4.39	0.93
UserControl2	Male	102	3.93	1.092
	Female	46	4.48	0.691
UserControl3	Male	102	4.06	1.106
	Female	46	4.61	0.829
InComplete1	Male	102	4.3	0.993
	Female	46	4.7	0.662
InComplete2	Male	102	4.18	1.085
	Female	46	4.63	0.771
Innovat1	Male	102	4.03	1.038
	Female	46	4.09	1.132
Innovat2_R	Male	102	2.41	1.292
	Female	46	2.02	1.202
EoU1	Male	102	4.04	1.185
	Female	46	4.54	0.808
EoU2	Male	102	3.99	1.076
	Female	46	4.61	0.745
Useful1	Male	102	4.11	1.043
	Female	46	4.43	0.807
Useful2	Male	102	3.97	1.181
	Female	46	4.46	0.78
Useful3	Male	102	4.08	1.123
	Female	46	4.61	0.682
Attitude1	Male	102	4.06	1.07
	Female	46	4.52	0.809
Attitude2	Male	102	3.98	1.177
	Female	46	4.43	0.834

Regression Analysis

Model1

Table 43 Model Summary of Regression 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.848[a]	.719	.717	.588	1.917

a.Predictors: (Constant). Attitude
b.Dependent Variable: Satisfaction

Table 44 Coefficients of Regression 1

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.274	.202		1.353	.178
	Attitude	.911	.047	.848	19.309	.000

a.Dependent Variable: Satisfaction

Model 2

Table 45 Model Summary of Regression 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.898[a]	.806	.805	.45346	
2	.910[b]	.828	.825	.42954	
3	.918[c]	.843	.840	.41071	

a.Predictors: (Constant). Usefulness
b.Predictors: (Constant). Usefulness. Personalization
c.Predictors: (Constant). Usefulness. Personalization. EoU
d.Dependent Variable: Attitude

Table 46 Coefficients of Regression 2

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.126	.168		.752	.453
	Usefulness	.963	.039	.898	24.664	.000
2	(Constant)	-.120	.169		-.707	.481
	Usefulness	.817	.051	.762	16.092	.000
	Personalization	.203	.048	.199	4.208	.000
3	(Constant)	-.203	.163		-1.243	.216
	Usefulness	.617	.071	.575	8.641	.000
	Personalization	.182	.047	.179	3.916	.000
	EoU	.241	.063	.237	3.822	.000

a.Dependent Variable: Attitude

Model 3

Table 47 Model Summary of Regression 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.845[a]	.714	.712	.51384	
2	.879[b]	.773	.770	.45910	
3	.892[c]	.795	.791	.43847	1.855

a.Predictors: (Constant). EoU
b.Predictors: (Constant). EoU. Innovat1
c.Predictors: (Constant). EoU. Innovat1. Customization
d.Dependent Variable: Usefulness

Table 48 Coefficients of Regression 3

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.836	.181		4.628	.000
	EoU	.801	.042	.845	19.104	.000
2	(Constant)	.389	.177		2.198	.030
	EoU	.660	.044	.696	15.014	.000
	Innovat1	.257	.042	.285	6.155	.000
3	(Constant)	.102	.185		.555	.579
	EoU	.586	.046	.618	12.704	.000
	Innovat1	.196	.043	.218	4.580	.000
	Customization	.193	.050	.194	3.869	.000

a.Dependent Variable: Usefulness

Model 4

Table 49 Model Summary of Regression 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.715[a]	.511	.507	.70943	
2	.757[b]	.573	.567	.66480	

a.Predictors: (Constant). Adaptivity
b.Predictors: (Constant). Adaptivity. Inf.Completeness
c.Dependent Variable: EoU

Table 50 Coefficients of Regression 4

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.111	.256		4.338	.000
	Adaptivity	.711	.058	.715	12.347	.000
2	(Constant)	.507	.273		1.853	.066
	Adaptivity	.438	.080	.440	5.471	.000
	Inf.Completeness	.408	.089	.371	4.611	.000

a.Dependent Variable: EoU

Cluster Analysis

Table 51 Cluster Typology I – Number of Cases for Four Clusters

Clusters No	Number of Cases
1	29
2	69
3	81
4	12

Table 52 Cluster Typology I - Analysis Results for Four Clusters

			Cluster			
	F	Sig.	1	2	3	4
Adaptivity	200.482	.000	2.98	4.58	4.80	1.77
ErrorRate	71.657	.000	3.79	4.37	4.55	1.98
Cost	179.892	.000	4.27	3.48	4.88	1.92

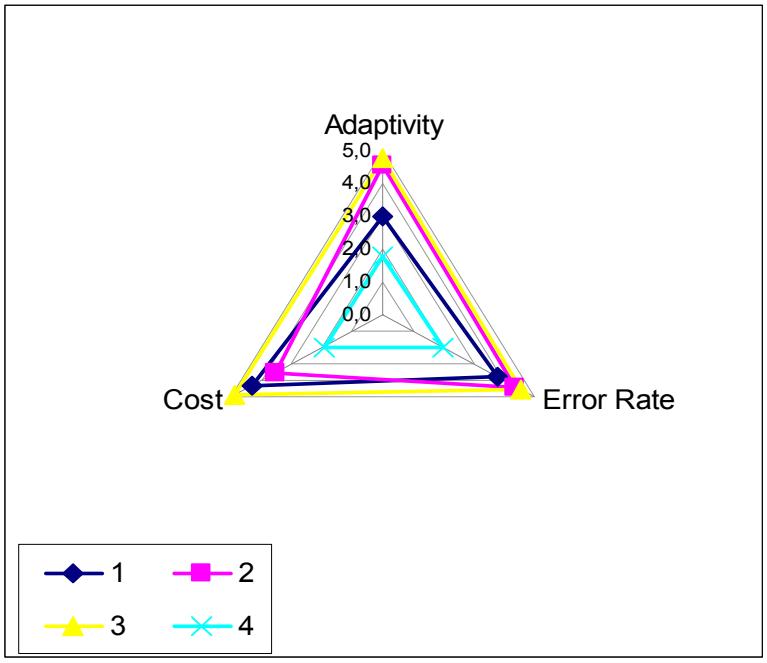


Fig. 70 Cluster typology I - analysis results for four clusters

Table 53 Cluster Typology I – Number of Cases for Three Clusters

Clusters No	Number of Cases
1	46
2	86
3	16

Table 54 Cluster Typology I - Analysis Results for Three Clusters

			Cluster		
	F	Sig.	1	2	3
Adaptivity	190.140	.000	4.47	4.71	1.88
ErrorRate	78.960	.000	4.35	4.50	2.36
Cost	222.994	.000	3.54	4.88	2.31

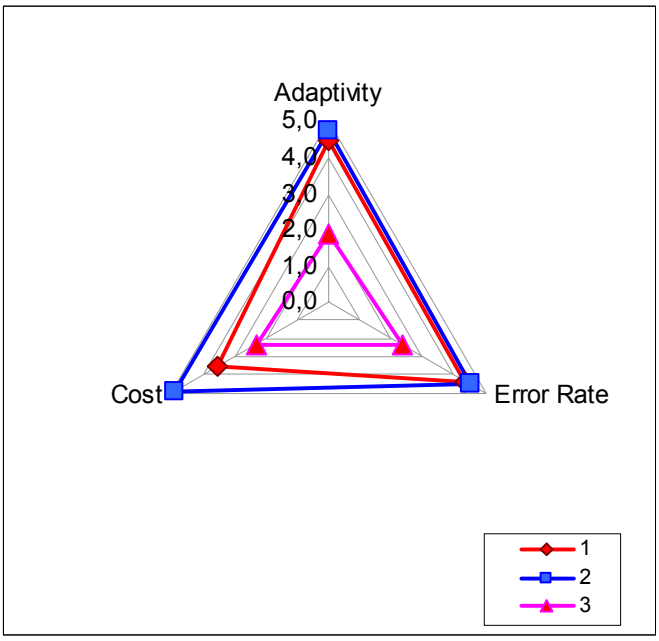


Fig. 71 Cluster typology I - analysis results for three clusters

Table 55 Cluster Typology I – Number of Cases for Two Clusters

Clusters No	Number of Cases
1	17
2	131

Table 56 Cluster Typology I - Analysis Results for Two Clusters

			Cluster	
	F	Sig.	1	2
Adaptivity	333.353	.000	1.99	4.63
ErrorRate	134.614	.000	2.49	4.45
Cost	124.300	.000	2.26	4.44

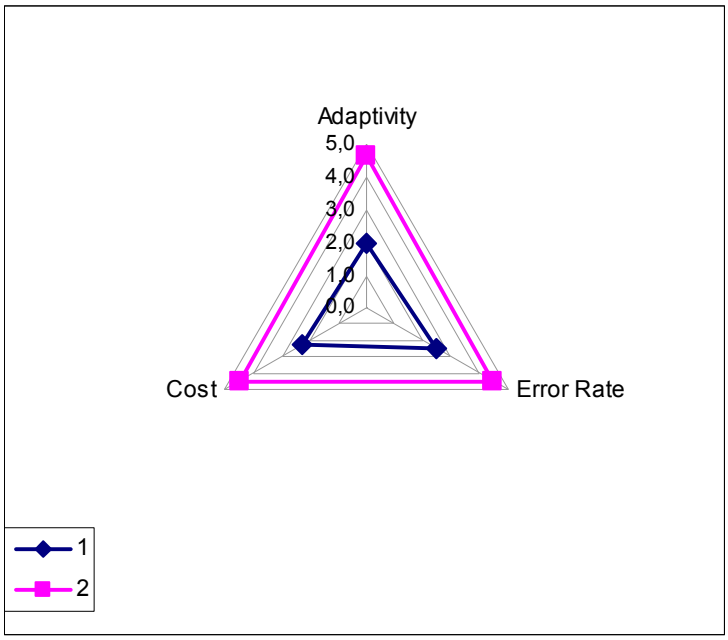


Fig. 72 Cluster typology I - analysis results for two clusters

Table 57 Cluster Typology II - Number of Cases for Four Clusters

Clusters No	Number of Cases
1	15
2	39
3	83
4	11

Table 58 Cluster Typology II - Analysis Results for Four Clusters

			Cluster			
	F	Sig.	1	2	3	4
Personalization	273.498	.000	2.978	4.085	4.847	1.697
Customization	200.576	.000	3.4	4.274	4.896	1.818
Flexibility	90.683		3.533	3.981	4.675	2.205
User Control	68.804	.000	3.756	3.658	4.659	2.394

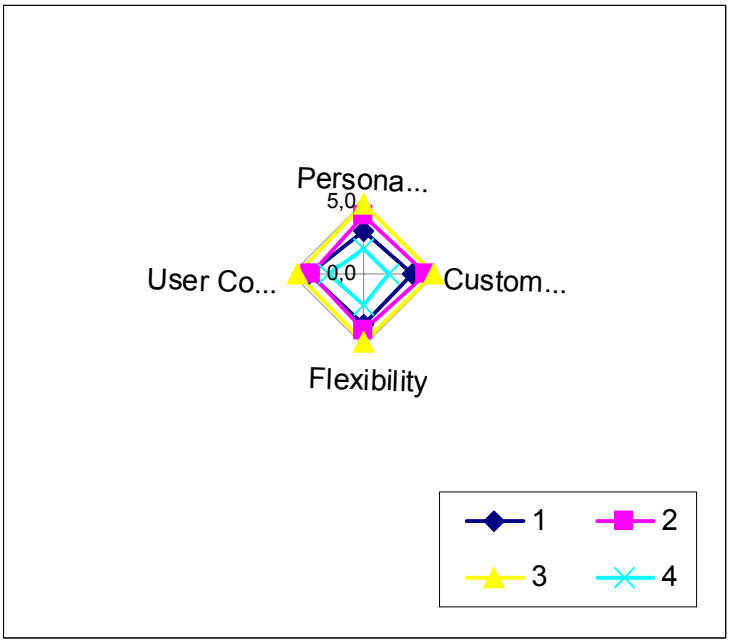


Fig. 73 Cluster typology II - analysis results for four clusters

Table 59 Cluster Typology II – Number of Cases for Three Clusters

Clusters No	Number of Cases
1	15
2	85
3	48

Table 60 Cluster Typology II - Analysis Results for Three Clusters

			Cluster		
	F	Sig.	1	2	3
Personalization	271.686	.000	2.00	4.86	3.79
Customization	255.758		2.11	4.91	4.07
Flexibility	129.644	.000	2.42	4.66	3.92
User Control	98.751	.000	2.49	4.62	3.80

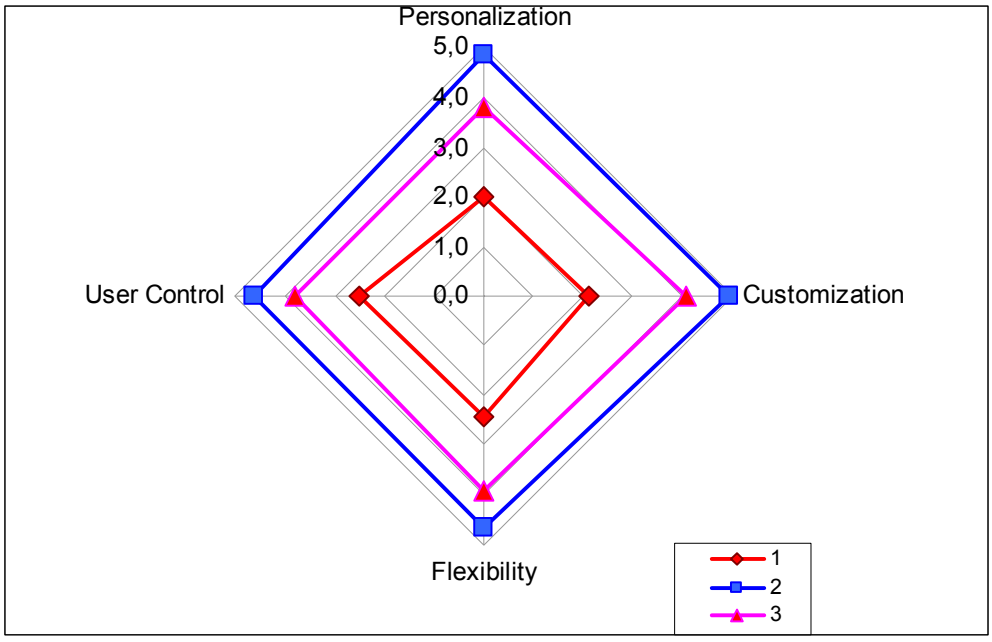


Fig. 74 Cluster typology II - analysis results for three clusters

Table 61 Cluster Typology II – Number of Cases for Two Clusters

Clusters No	Number of Cases
1	27
2	121

Table 62 Cluster Typology II - Analysis Results for Two Clusters

			Cluster	
	F	Sig.	1	2
Personalization	175.795	.000	2.65	4.57
Customization	264.166		2.73	4.71
Flexibility	156.064	.000	2.89	4.48
User Control	128.478	.000	2.86	4.42

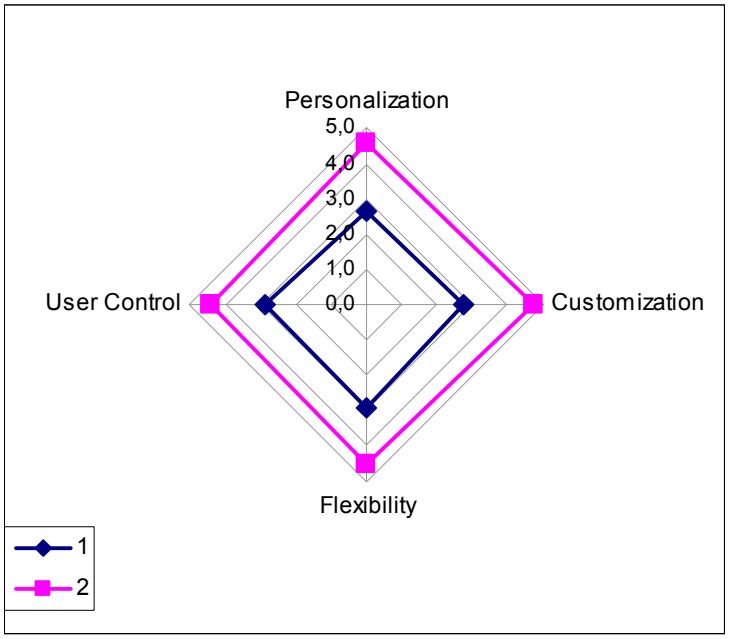


Fig. 75 Cluster typology II - analysis results for two clusters

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