EXPLORING THE ADOPTION OF TECHNOLOGY ASSISTED SERVICES IN THE HEALTH CARE INDUSTRY

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EXPLORING THE ADOPTION OF TECHNOLOGY ASSISTED SERVICES IN THE HEALTH CARE INDUSTRY

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Thesis Abstract

Ümit Topaçan, "Exploring the Adoption of Technology Driven Services in the Health Care Industry"

With the rapid development of medical technologies, medical industry benefit from various new emergent tools in order to increase quality and lower health expenditures in their services. Telemedicine is one of the recent inventions in the industry. It brings distant and dispersed patients together with their medical providers by means of telecommunication technologies.

Users of medical electronic services, including health care providers and patients, cannot benefit from them in a full capacity unless using them comfortably. The aim of this study is to evaluate determinants of health information service adoption and to assess desirability of an electronic health service prototype.

This study started with a literature survey in order to construct the theoretical background of the technology adoption. Then, two qualitative studies, namely interview and expert focus group; and one quantitative study, namely AHP, were conducted to expand the adoption taxonomy with participants' creative ideas. After these studies experimental study, contains conjoint and regression analysis, was carried out. During conjoint analysis, service attributes that affect users' preferences were explored. In addition, regression analysis results showed the determinants of users' intention toward e-health information service usage.

Electronic health information service researchers and designers can benefit from the results of this study.

Tez Özeti

Ümit Topaçan, “Sağlık Sektöründe Teknoloji Tabanlı Servislerin Adaptasyonunu Etkileyen Faktörler”

Son yıllarda sağlık teknolojilerindeki hızlı gelişmeyle birlikte ortaya çıkan yeni araçlar, sağlık hizmetlerinin kalitesinin artırılması ve harcamaların azaltılması için sektörde sıkça kullanılmaya başlanmıştır. Telemedicine son zamanlarda sağlık sektöründe kullanımı artmış araçlardan biridir. Bu araç sayesinde mesafeden dolayı sağlık hizmeti almakta zorlanan hastalar ile sağlık personeli telekominikasyon teknolojileri vasıtasıyla bir araya getirilmiştir.

Elektronik sağlık servis kullanıcıları, sağlık personeli ve hastalar dahil olmak üzere, bu sistemler kolayca kullanılabilir olmadıkça servislerden tam olarak fayda sağlayamayacaklardır. Bu çalışmanın amacı elektronik sağlık servisinin benimsenmesindeki etkenleri değerlendirmek ve bir elektronik sağlık servis prototipinin istenilme düzeyini belirlemektir.

Bu çalışma, teknoloji uyumu konusunda bugüne kadar yapılmış teorik çalışmaları göstermek için hazırlanmış literatür çalışması ile başlamaktadır. Daha sonra uyum sınıflandırmasını katılımcıların yaratıcı fikirleri ile genişletmek için iki nitel çalışma, görüşme ve uzman odak grup çalışmaları, ve bir nicel çalışma, AHP, yapılmıştır. Bütün bu çalışmalardan sonra, conjoint ve regresyon analizlerini içeren deneysel çalışma gerçekleştirilmiştir. Conjoint analizi sırasında, kullanıcıların tercihlerini etkileyen servis özellikleri belirlenmiş ve regresyon analizi sonucunda kullanıcıların elektronik sağlık servisini kullanmaktaki niyetlerinin faktörler tespit edilmiştir.

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PREFACE

Recent technological improvements enable advancements in delivery of medical services, appropriate healthcare at a reasonable cost, and access to quality healthcare in underserved areas in the medical sector. However, adoption problems encountered by the users of these services still remain unresolved. In order to enhance the usability and expedite diffusion of the e-health service, we need to understand the factors that affect users' preferences and intentions toward using the electronic health services. The aim of this study is to examine determinants of e-health service adoption.

The study consists of six chapters. Chapter 1 contains an introduction section. Chapter 2 includes a literature survey about technology adoption, health information service adoption, definition of telemedicine, and new service development issues. In Chapter 3, research framework and hypotheses about e-health adoption were presented. Chapter 4 involved the research methodology. Findings of the study were illustrated in Chapter 5. Finally, the study was concluded with Chapter 6 by presenting implications, limitations, and further works.

CHAPTER 1

INTRODUCTION

In the health care sector, electronic information and communication technologies are used intensively to provide and support health care operations (Hsieh et al., 2001). Telemedicine, one of these technologies, is generating a vast amount of interest amongst health care providers (Beach et al., 2001). It may change the nature of healthcare operations by bringing time and place independent care to the patients. Wootton and Craig (1999) defined it as "the delivery of healthcare and the exchange of health information across distances, including all medical activities: making diagnosis, treatment, prevention, education and research".

The American Telemedicine Association (ATA), established in 1993 as a non-profit organization to support the diffusion of telemedicine throughout the world, identify five different types of telemedicine services including specialist referral service to assist general practitioners in the diagnosis process by a specialist, patient consultation service to enable communication and data transmission between patient and physician, remote patient monitoring service to collect and send patient data via various devices, medical education service to provide continuing education for health professionals, and consumer health information service to enable peer-to-peer support among patients via online discussion groups.

Remote monitoring services are developed to capture patient data and send them to a medical server in order to observe patients' health status. As an example, data from

insulin dependent diabetes (Biermann et al., 2002) and asthma patients (Glykas & Chytas, 2004) are being captured remotely to follow up patients' health conditions.

Users of these services, including health care providers and patients, cannot benefit from them in a full capacity unless they are used comfortably. Compared to services in other fields, diffusion of such technologies has been slow in the health care sector. This research focuses on this problem and aims at identifying factors that may influence the adoption of such services. Telemedicine and specifically remote monitoring was picked as the case to analyze in this research.

Therefore this research will have the following objectives

- to search and find major determinants of health information service adoption among users (medical staff, administrative staff and patients)
- to find individual, social, service and technological components of adoption
- to assess desirability of an electronic health service prototype

In this study, an electronic health information service prototype was designed for patients suffering from diabetes and obesity. In the proposed hypothetical service, patient data is collected through various devices such as mobile phone, stethoscope, and glucose meter. Collected data is then stored in a medical server. Health care providers can monitor the patients through the service and make suggestions as necessary.

CHAPTER 2

LITERATURE REVIEW

Telemedicine, Telehealth and E-Health

Recent developments in information and communication technologies have resulted in dramatic changes in the health care industry. Telemedicine and telehealth reside in the center of these technological improvements in the sector. The American Telemedicine Association (ATA) defines telemedicine as "the use of medical information exchanged from one site to another via electronic communications to improve patients' health status" (ATA, 2009).

In this study, Al-Qirim defined telemedicine as

Telemedicine means medicine from a distance where distant and dispersed patients are brought closer to their medical providers through the means of telecommunication technologies (Al-Qirim, 2007).

Unlike telemedicine which focuses on clinical services, telehealth covers a broader definition of remote healthcare. It includes both clinical services, like transmission of medical images for diagnostic purposes, and nonclinical applications, such as use of online information and health data management services.

In the 1990s, with the emergence of the Internet, e-health became a popular term that refers to access healthcare services and products via the Internet. Maheu et al. (2001) defined three significant changes in the healthcare environment triggered by e-health development. First of all, patients are better informed and more capable of self-

care. Secondly, patients are more active in their healthcare. Finally, compared to past, healthcare has become more efficient (Maheu et al., 2001).

The History of Telemedicine

Performing medical operations via telecommunication network is an old notion. In the beginning of the 1900s, the telephone was in use and physicians benefited from it for medical purposes (Brown, 1910). After radio communication was established, it was used in remote areas like Australia in order to transfer medical information (Sullivan & Lugg, 1995).

The introduction of television had great impact on the development of telemedicine. In the 1950s, the Nebraska Psychiatric Institute used the first interactive video communication in healthcare by benefiting from the two-way interactive television system for telepsychiatry purposes (Wittson et al., 1961). In the 1960s, physicians at Massachusetts General Hospital used a two-way audiovisual microwave circuit to provide medical care to patients at Logan International Airport Medical Station, located 2.7 miles away (Murphy & Bird, 1974).

The National Aeronautics and Space Administration (NASA) played a crucial role in the early development of telemedicine. During the space flights, NASA needed to monitor the vital signals of astronauts. In the 1960s, the Space Technology Applied to Rural Papago Advanced Health Care (STARPAHC) programme was established by means of satellite based communication and space technology so as to bring medical care to the astronauts and residents of Papago, Arizona (Fuchs, 1979).

Starren et al. (2002) have presented the Informatics for Diabetes Education and Telemedicine (IDEATel) project for management of diabetes in older adults living in

medically underserved areas. Patients in the research group received a home telemedicine unit (HTU), which provided four functions: synchronous videoconferencing, remote monitoring of glucose and blood pressure tests, web-based messaging with healthcare providers or other patients, and web-based educational materials to support patients' self-management (Starren et al., 2002).

Online Services

With the help of rapid development of the internet technologies, online services have become available in the various fields in our lives. Featherman and Pavlou (2003) defined e-services as "interactive software-based information systems received via the Internet". In the literature, researchers have studied different application areas of online services including hotel reservations (Morosan & Jeong, 2008), banking (Yiu et al., 2007), and government (Horst et al., 2007). Online health services are discussed below.

Magrabi et al. (1999) developed a web-based electrocardiogram (ECG) monitoring service to collect at-risk patients' ECG records from the home and facilitate review and analysis of the collected data.

Jen (2009) proposed a mobile healthcare, namely the Mobile Automated Medical Alert (MAMA) system in order to monitor the health status of students and academicians who suffer from overweight or chronic illness and belong to a high risk group. The system had the following functionalities: daily healthcare management service, intelligent dietitian service to deliver calorie analysis to the user, physical activity service, psychotherapy service to communicate with other users and psychotherapists, abnormal message service to be informed in an unusual situation occurred, and healthcare data query and reminding service. A survey was conducted in

order to identify attitudes of students and faculty members towards the proposed mobile service and it was found that the service would improve the healthcare quality in school-based health centers (Jen, 2009).

Yoon & Kim (2008) studied the influence of short message service (SMS) by mobile phone and the Internet on the glycemic control of the patients with type 2 diabetes mellitus. It was found in the study that the mobile phone and the Internet not only improve the quality of medical care for diabetic patients but also provide cost-effective tools in the disease management. The system allows close communication between patients and physicians by enabling the patients to ask questions and receive recommendations from the physician via mobile devices (Yoon & Kim, 2008).

Home monitoring is one of the application areas of telemedicine systems. According to Koch (2006), the absence of standards to integrate incompatible systems, the absence of evaluation framework, and the absence of implementation guidelines are some of restrictions that hinder the expansion of home telehealth. Rialle et al. (2003) described a methodology based on "objects" and "software agents" for development of tele-monitoring applications. They developed a tele-monitoring and alarm raising system by using the proposed approach. The system consists of medical sensors, local area network, home computer, remote server, and health care providers' access units. (Rialle et al., 2003)

Management of diabetes, which is a chronic disease, requires maintaining proper weight, regular exercise, and diet. So, diabetic patients should always be under control. Bellazzi et al. (1998) proposed a telemedicine system for diabetic management. The system consisted of two units: patient unit and medical unit. The former had capabilities

of daily data entry and retrieval, message and alarm posting to the medical unit, and consultation with the educational module. On the other hand, the latter enabled the physician to check patients' up to date information at any time, and to send messages to the patient. (Bellazzi et al., 1998)

Adoption Theories

Information technology has positive effects on job performance of individuals (Maass et al., 2008). But the performance gains are often influenced by the process of information technology adoption and use. Because of the importance of this problem, much research has been conducted to explain user acceptance in Management Information Systems (MIS) field.

Theory of Reasoned Action (TRA)

During the past decades, many theoretical models were developed by researchers to explain the human behaviors in the adoption process. Theory of Reasoned Action (TRA), shown in Fig. 1, (Fishbein & Ajzen, 1975) which has been used to predict wide range of behaviors is one of the well known models. Fishbein and Ajzen (1975) used two main constructs, namely attitude toward behavior and subjective norm, to predict the behaviors. Attitude defined as "the person's beliefs that the behavior leads to certain outcomes and his/her evaluations of these outcomes". Beliefs that a person builds up over his lifetime influence attitude. An attitude, then, is a person's belief about whether the outcome of his action will be positive or negative. If the person has positive beliefs about the outcome of his behavior then he is said to have a positive attitude about the behavior, or vice-versa. Subjective norms defined as "the person's beliefs that specific individuals or groups think he/she should or should not perform the behavior and

his/her motivation to comply with the specific referents" (Fishbein & Ajzen, 1975). Subjective Norms are perceptions about how family and friends will perceive the outcome of the behavior (Ajzen & Fishbein, 1980).

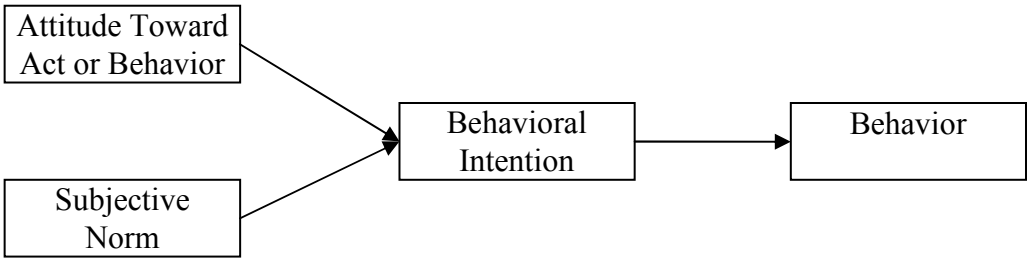


Fig. 1 Theory of reasoned action (Fishbein & Ajzen, 1975)

Theory of Planned Behavior (TPB)

Theory of Planned Behavior (TPB) (Ajzen, 1991) is the successor of the TRA. Fig. 2 illustrates the model. Ajzen (1991) developed it by adding perceived behavioral control, defined as "the perceived ease or difficulty of performing the behavior", to the TRA. These are the beliefs that may assist, or may obstruct the performance of the behavior.

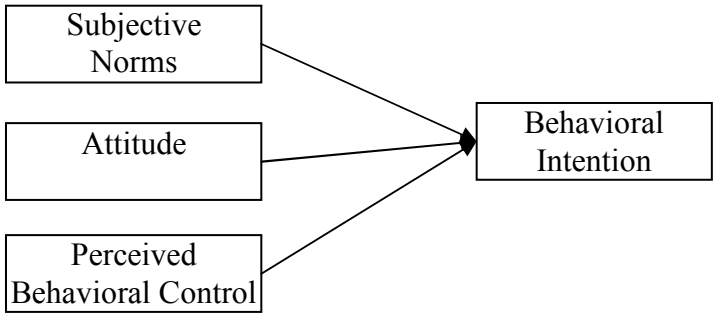


Fig. 2 Theory of Planned Behavior (Ajzen, 1991)

Technology Acceptance Model (TAM)

Following the TRA model, many researchers attempted to expand it by adding new constructs or by applying it in different contexts. Technology Acceptance Model

(TAM) (Davis, 1989) was applied in the IS context to predict technology acceptance. According to Davis, users' intention toward system use is significantly correlated with both of perceived usefulness, defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" and perceived ease of use, defined as "the degree to which a person believes that using a particular system would be free of effort". Fig. 3 shows technology acceptance model.

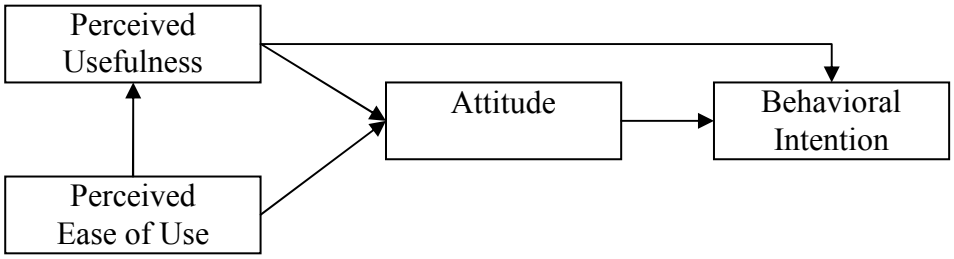


Fig. 3 Technology Acceptance Model (Davis, 1989)

Although TPB is a general model of human behavior, TAM focuses on specific behavior to predict information technology acceptance.

Technology Acceptance Model 2 (TAM2)

Venkatesh and Davis (2000) concluded that TAM explains 40% of usage intention and behavior. They extended the model (TAM) by including additional key determinants namely social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, and result demonstrability) to the base constructs of TAM. Definitions of these variables are as follows

Subjective Norms – “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).

Voluntariness – “the extent to which potential adopters perceive the adoption decision to be non-mandatory” (Moore & Benbasat, 1991).

Image – “the degree to which use of an innovation is perceived to enhance one’s image or status in one’s social system” (Moore & Benbasat, 1991)

Job Relevance – “an individual’s perception regarding the degree to which the target system is applicable to his or her job” (Venkatesh & Davis, 2000).

Output Quality – “how well the system performs tasks” (Venkatesh & Davis, 2000).

Result Demonstrability – “tangibility of the results of using the innovation” (Moore & Benbasat, 1991).

Venkatesh & Davis (2000) found that all of these variables significantly influence user acceptance of information technology and proposed Technology Acceptance Model 2 (TAM2), shown in Fig. 4.

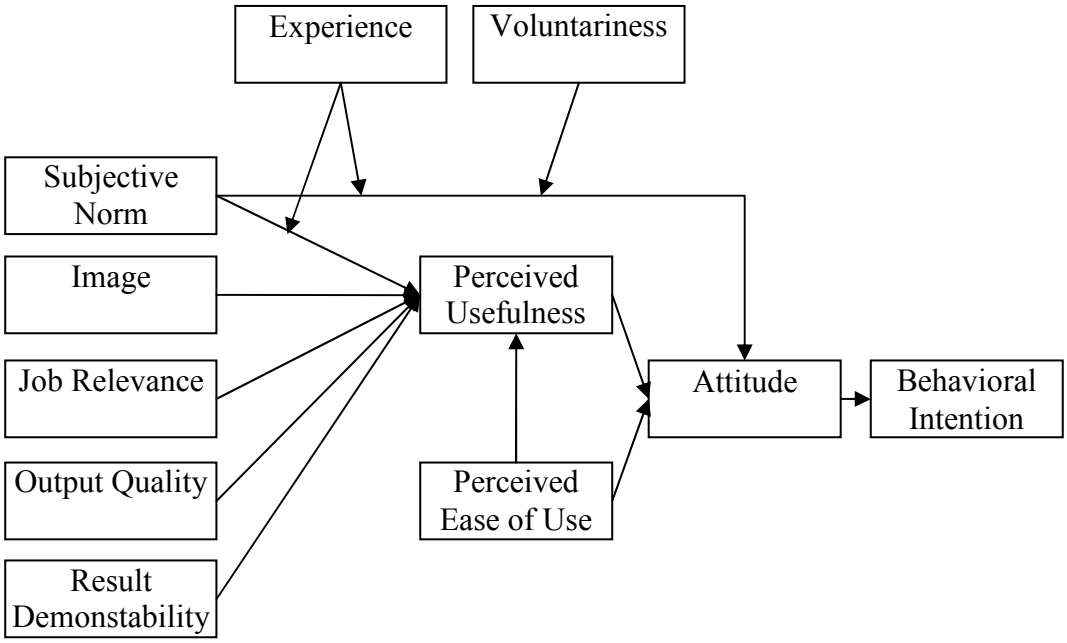


Fig. 4 Technology Acceptance Model 2 (Venkatesh & Davis, 2000)

Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) formulated the UTAUT (See Fig. 5) model by integrating eight predominant user acceptance models, namely theory of reasoned action (Fishbein & Ajzen, 1975), technology acceptance model (Davis, 1989), motivational model (Davis et al., 1992), theory of planned behavior (Ajzen, 1991), combined TAM and TPB (Taylor & Todd, 1995), model of PC utilization (Thompson et al., 1991), innovation diffusion theory (Rogers, 1983), social cognitive theory (Bandura, 1986).

According to UTAUT model, direct determinants of usage intention and behavior are performance expectancy, effort expectancy, social influence, and facilitating conditions. Moreover, mediator variables, gender, age, experience, and voluntariness, have influenced on four key constructs of usage intention (Venkatesh, Morris, Davis, & Davis, 2003).

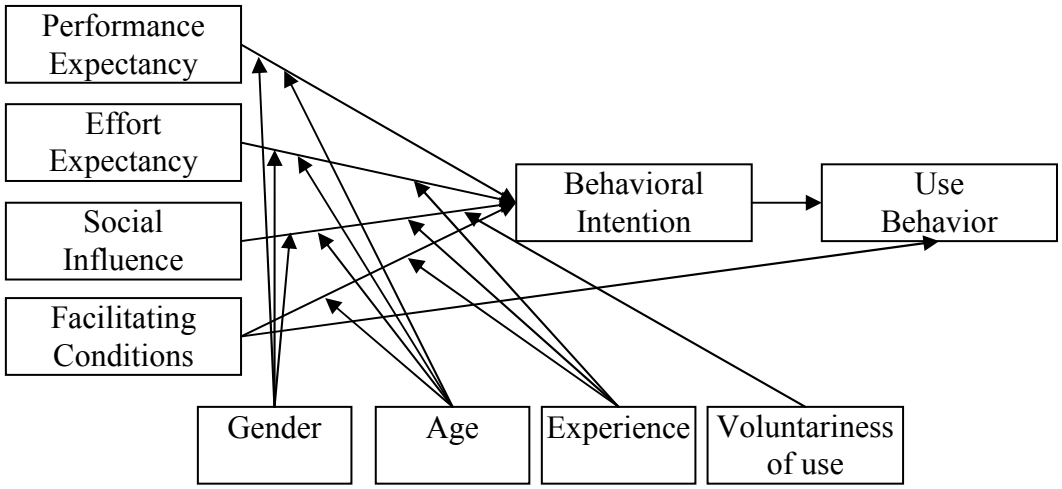


Fig. 5 Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)

Health Information Service Adoption

Maass et al. (2008) studied the usefulness of the Regional Healthcare Information System by applying before-after activity analysis to the appointments of 20 diabetic patients. It was found from the study that access to the system make improvements in workflow, patient care and disease management. The results showed that Regional Information Systems may be useful tools to support performance, improve efficiency and provide net cost savings (Maass et al., 2008).

Kim and Chang (2007) extended original TAM by including some antecedents variables - namely information search, usage support, customization, and purchase & security - to the perceived usefulness and perceived ease of use constructs in order to derive effects of these exogenous variables on user acceptance of health information services and identify the main functional characteristics in designing health information web sites (Fig. 6). They found that usage support and customization are two

significantly important variables that effect user's intention to use health information websites (Kim & Chang, 2007).

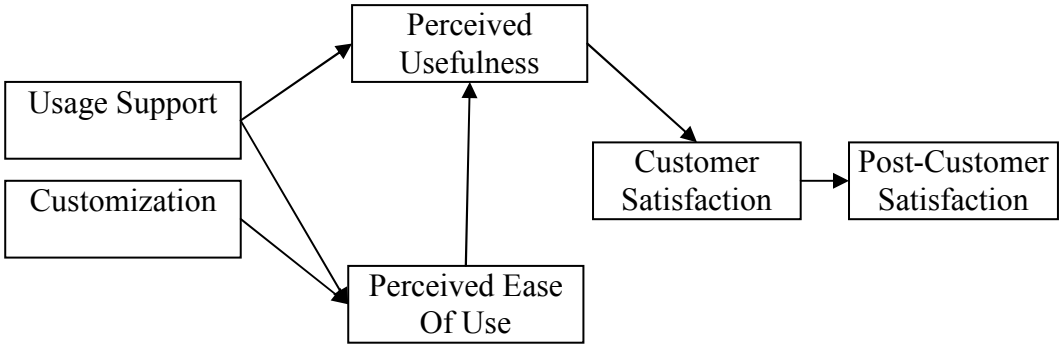


Fig. 6 Extended TAM for health information websites adoption (Kim & Chang, 2007)

Yu et al. (2009) modified TAM2 by adding social influence factors (subjective norm, and image), and demographic factors (age, job level, work experience and computer skills) in order to examine effects of these antecedents variables on medical providers' health IT acceptance. It was found in the research that usefulness, ease of use and computer level has direct positive effects on behavioral intention of medical providers toward health IT application; however image has negatively affects on the intention. Moreover, image, subjective norm, and computer level are antecedents of ease of use. Hence, usefulness is affected from two of the antecedents namely subjective norms and job role. Finally, age and work experience did not have any significant effects on intention of medical providers (Yu et al., 2009).

Fig. 7 explains the model.

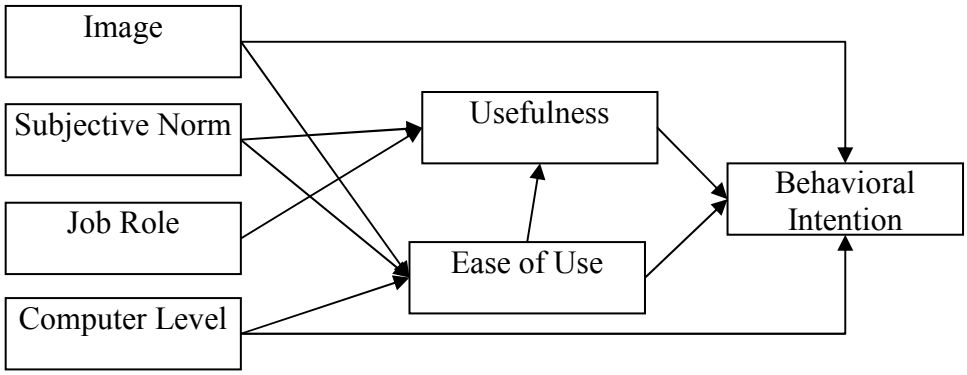


Fig. 7 IT acceptance model for medical providers (Yu et al., 2009)

In another research, technology acceptance model and innovation diffusion theory was combined to examine attitude of nurses toward online courses by adding financial cost and computer self-efficacy variables. The new hybrid theory shows that compatibility, perceived usefulness, perceived ease of use, perceived financial cost and computer self-efficacy were critical factors for nursing students' behavioral intentions to use the online nursing courses (Tung & Chang, 2008).

Nowadays, handheld devices like personal digital assistants (PDAs) have been widely used by the physicians in order to access patient's data. Lu et al. (2005) studied adoption of PDAs and barriers in the PDA adoption in health care. Lu et al. (2005) listed benefits of PDAs as follow; they enable the physicians to access the patient's real-time data whenever and wherever they need, they reduce cost by means of electronic documentation and decrease medical errors, they can save time, and they enhance quality of care. These benefits have positive contributions on the mobile device adoptions. Moreover, uneasy data entry, security issues, personal factors like age and technical difficulties were mentioned as barriers in the PDAs or mobile device adoptions in the health care. (Lu et al., 2005)

Conjoint Analysis

Conjoint analysis was born in 1970s, is popular market research technique that deals with users' preferences in a product or service selection process so that producers can design new products or services that meet customer needs and requirements. Relative importance of product characteristics are calculated based on users' selections among a set of alternatives that contains combination of product attributes.

Green and Srinivasan (1978) illustrated parts involved in conjoint analysis. A detailed list of these parts can be seen in Table 1.

Table 1 Conjoint Analysis Parts (Green & Srinivasan, 1978)

Parts	Alternative Methods
Selection of a model of preference	Vector model, ideal-point model, part-worth function model, mixed model
Data collection method	Two-factor-at-a-time, full-profile
Stimulus set construction for the full-profile method	Fractional factor design, random sampling from multi-variate distribution
Stimulus presentation	Verbal description, paragraph description, pictorial or three-dimensional model representation
Measurement scale for the dependent variable	Paired comparison, rank order, rating scales, constant-sum paired comparison, category assignment
Estimation method	MONANOVA, PREFMAP, LINMAP, Johnson’s nonmetric tradeoff algorithm, multiple regression, LOGIT, PROBIT

Developing a conjoint analysis is explained below.

The first step in conjoint analysis is describing product attributes and attribute levels. Attribute is a common feature of a product like color, price, or screen size. Each

attribute consists of custom levels. As an example, 14.1, or 15.4 inches might be levels of the screen size attribute of a computer product.

The second step is to produce a set of alternatives that composed of different levels of product attributes.

In the third step, users are asked to rank these alternatives by comparing each other according to users' preferences.

In the analysis step, part-worth scores of each attribute levels was calculated. Summation of part-worth scores for an alternative represents the total utility score of it.

In the literature, conjoint was applied in many different studies. A conjoint analysis was designed to measure customer satisfaction with online shopping (Schaupp & Bélanger, 2005). Moreover, Berg et al. (2008) designed four hypothetical insurance options to test preferences of consumers about health insurance products and analyze how customers make trade-off between different features of health insurance.

New Service Development

New Service Development (NSD) has a similar development process to product development. Scheuing and Johnson (1989) proposed one of the key models of the new service development field. Table 2 summarizes the sequence of activities for the new service development model proposed by Scheuing and Johnson (1989).

Table 2 New Service Development Steps

1. Formulating of new service objectives and strategy
2. Idea generation
3. Idea screening
4. Concept development
5. Concept testing
6. Business analysis
7. Project authorization
8. Service design and testing
9. Process and system design and testing
10. Marketing program design and testing
11. Personnel training
12. Service testing and pilot run
13. Test marketing
14. Full-scale launch
15. Post-launch review

According to Essen and Conrick (2008), innovation is located at the heart of new e-service development. They proposed a framework for the innovating technology-based services (Edvardsson & Olsson, 1995) (Fig. 8).

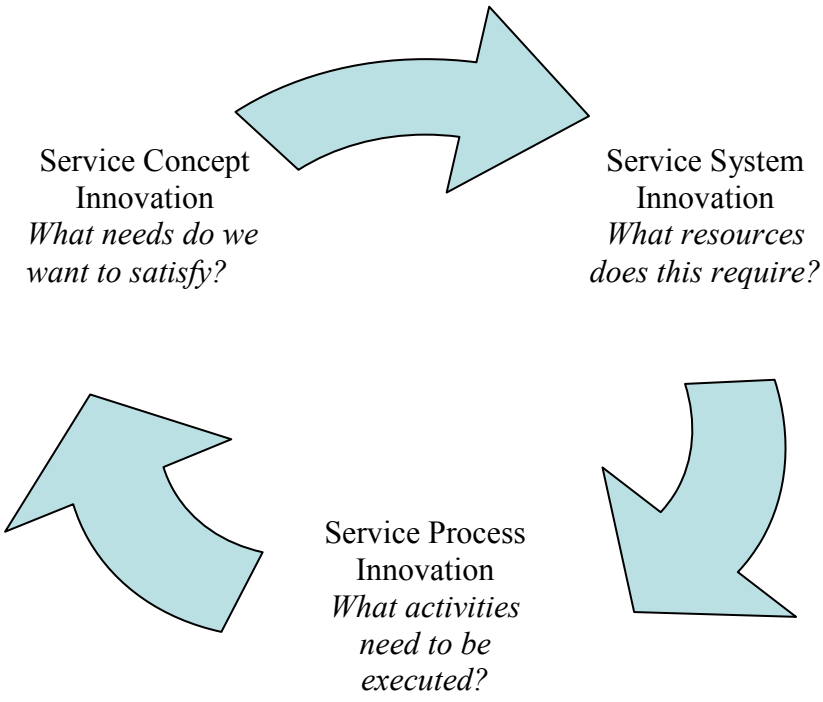


Fig. 8 Process of innovating technology-based services

In the service concept step, needs of the customers are identified and solutions to meet these needs are defined. In the service system step, resources required to generate the service are listed. Finally, the service process step is related to the chain of activities that must occur to function the service properly.

Health Information Seeking Behavior

Health behavior is a complicated phenomenon that was affected by wide range of determinants including social, ethical, and individual variables.

Socioeconomic characteristics of an individual have a significant influence on health information seeking behavior. Variables like educational level, occupation, work hours per week, and taxable income cause changes in general health practice of a person (Shi et al., 2004).

In addition, health status is another determinant of the health information seeking behavior. Shi et al. (2004) found that blood pressure, body mass index (BMI), health status perception, and serious illness in a family member or close friend affect the health behavior of an individual.

Moreover, health motivations, defined as "patients' willingness to perform health behavior", and health ability, defined as "consumers' resources, skills, or proficiencies for performing preventive health behaviors", affect consumers' health behavior (Moorman & Matulich, 1993).

CHAPTER 3

FRAMEWORK

Health Information Service Adoption Taxonomy

Before proposing the models and the hypothesis, health information service adoption taxonomy was created by using the variables collected from literature survey, qualitative studies, and expert focus group study. Fig. 9 shows the proposed taxonomy.

In Fig. 9 letters shown near the variables stand for the indicating source of the variable. Letter “L” represents literature survey, letter “I” refers to interview, and letter “E” denotes expert focus groups. As an example, (L)(E) means that the variable was mentioned in both of literature survey and expert focus group.

Health information service adoption taxonomy was divided into six categories, as follows “social factors”, “service characteristics”, “user characteristics”, “facilitating conditions” , “organizational characteristics”, and “intermediary”. Service characteristics also contain two more sub-categories, like “content”, and “service”. All of these categories include specific variables.

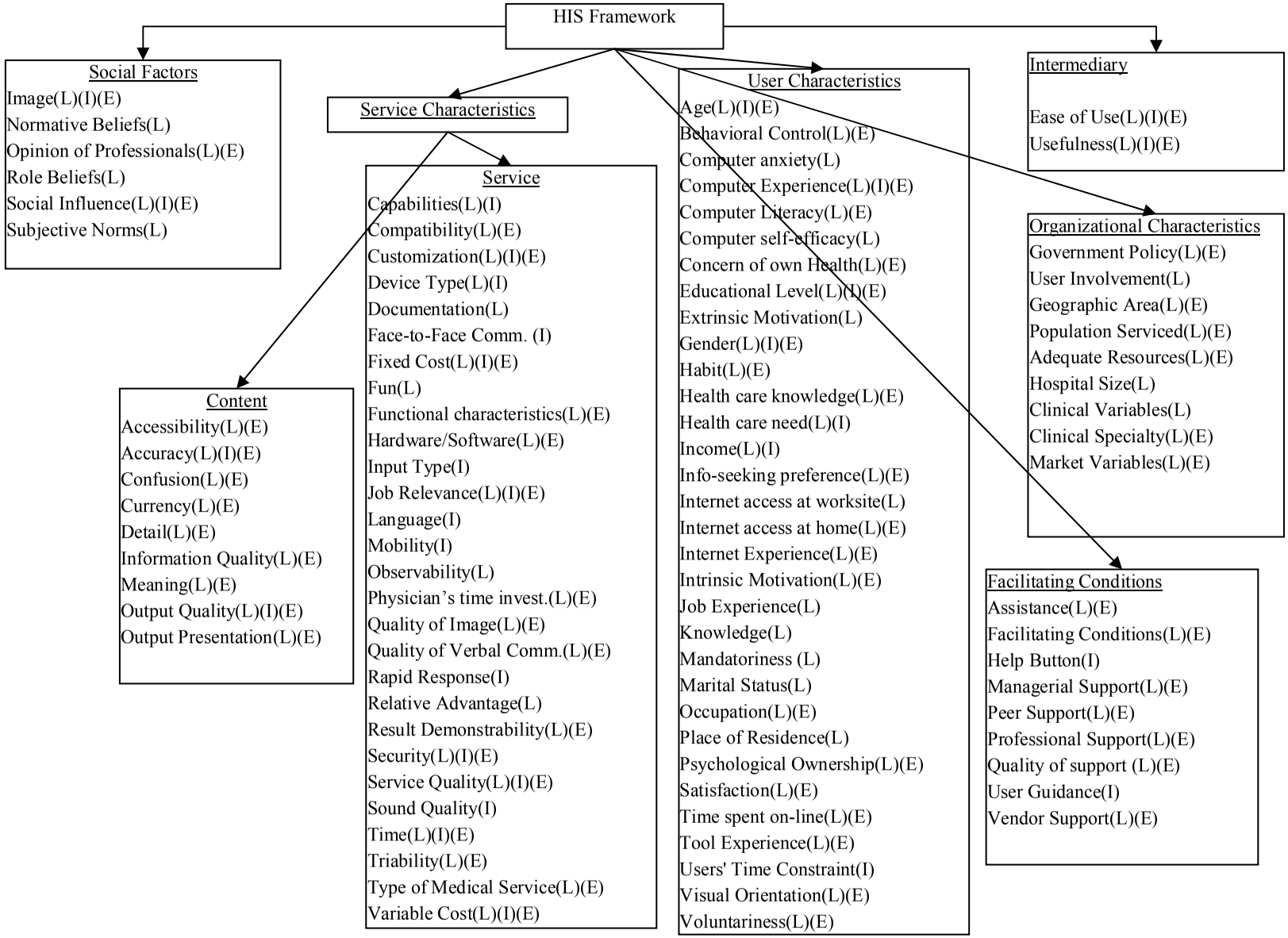


Fig. 9 Health information service adoption taxonomy

Table 3 shows the list of the studies used to construct health information service taxonomy.

Table 3 Literature List of Taxonomy

Al-Qirim, 2007	Lemire et al., 2008
Aubert & Hamel, 2001	Liu & Ma, 2005
Berghout et al., 2007	Liu & Ma, 2006
Bruner & Kumar, 2005	Mathieson et al., 2001
Chae et al., 2001	Pare et al., 2006
Chang et al., 2007	Schaper & Pervan, 2007
Chau & Hu, 2002	Simon et al., 2007
Chen et al., 2006	Taylor & Todd, 1995
Davis, 1989	Thompson et al., 1991
Dishaw & Strong, 1999	Tung et al., 2008
Dixon, 1999	van den Brink et al., 2005
Gagnon et al., 2003	Venkatesh & Davis, 2000
Goodhue, 1995	Venkatesh et al., 2003
Karahanna et al., 1999	Wilson & Lankton, 2004
Kifle et al., 2006	Yu et al., 2009
Kim & Chang, 2007	Yusof, et al., 2007
Lee, et al., 2009	

Research Framework and Hypothesis

Two research models were proposed based on the taxonomy and the literature survey. One of these models aimed to examine e-health information service design characteristics and the other one aimed to test intention of users toward e-health information service.

E-Health Information Service Conjoint Framework

Fig. 10 shows the conjoint framework used to study e-health information service design characteristics. The framework composes of input effort, face-to-face mobile communication, response time, technical support, and constructs that affect users' preferences.

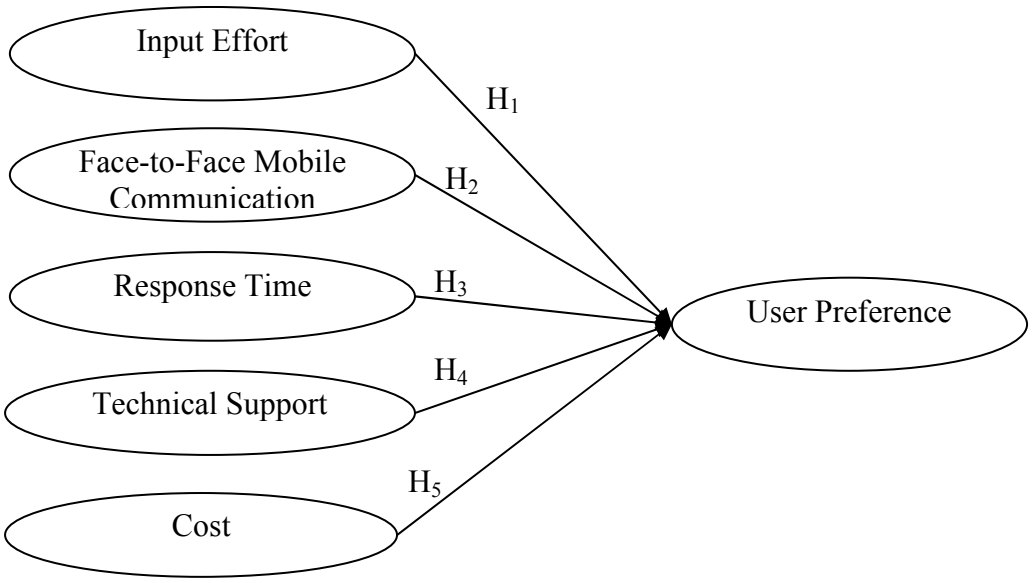


Fig. 10 E-health information service conjoint framework

The following (Table 4) table summarizes the hypothesis drawn from the conjoint framework.

Table 4 E-health Information Service Conjoint Framework Hypothesis

Hypothesis	Dependent Variable	Independent Variable	Relationship
H_1	User Preference	Input Effort	Negative
H_2	User Preference	Face-to-Face Mob. Comm.	Positive
H_3	User Preference	Response Time	Negative
H_4	User Preference	Technical Support	Positive
H_5	User Preference	Cost	Negative

According to AHP study results (see Findings chapter for details), input type is one of the factors that affects users' preferences toward e-health information service usage. The results showed that people prefer less interaction with the service in the data entry process. So, the less effort performed by the user, the more preferred service.

H_1: Input effort significantly and negatively affects user preference concerning the use of the e-health information service.

Face-to-face mobile communication is a functionality of the mobile phone that enables the patient to communicate with a physician. The effects of face-to-face mobile communication on users' preferences were investigated during qualitative studies. It was shown that people prefer to use the services that provide face-to-face interaction with physicians.

H_2:Face-to-face mobile communication significantly and positively affects user preference concerning the use of the e-health information service.

Response time is the duration that passes between user's request and physician's response to the request. In the literature, there are researches that examine speed of a service on user satisfaction (Sears et al., 2000; Ramsay et al., 1998). It is especially more important for the services used in the medical industry.

H_3: Response time significantly and negatively affects user preference concerning the use of the e-health information service.

Users face various difficulties while using a product or service. It is important to solve these problems so that improving the service quality. Technical support means how to assist a user to solve a problem about the service. Kim & Chang (2007) found that usage support have a significant effects on usefulness and ease of use of health information websites. Moreover, it enhances user satisfaction (Kim & Chang, 2007). Besides, vendor support positively influences electronic signature adoption in the hospital environment (Chang et al., 2007).

H_4: Technical support significantly and positively affects user preference concerning the use of the e-health information service.

Cost is the monetary expense paid by the user in order to use the service. Tung et al. (2008) studied the effect of cost on nurses' intention toward e-logistic information systems adoption in the medical industry and it was found that cost has great negative influence on behavioral intention to use. Besides, this finding was also supported by other researches (Kifle et al., 2006; Ad, 2006).

H_5: Cost significantly and negatively affects user preference concerning the use of the e-health information service.

User Intention Framework

Fig. 11 illustrates the e-health information service adoption framework. According to the framework, determinants of intention are attitude, usefulness, ease of use, accessibility, service quality, quality of support, information quality, usage time, image, compatibility, response time, social influence, understandability, and self efficacy.

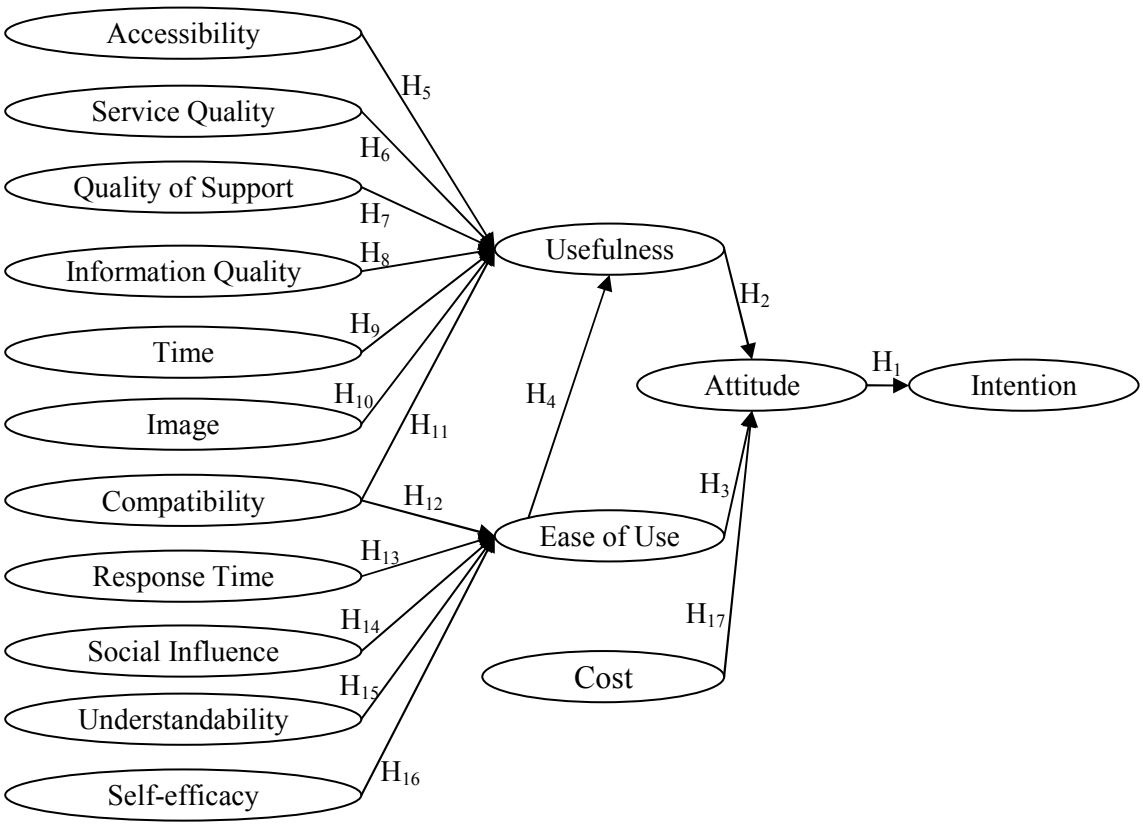


Fig. 11 Determinants of e-health service intention framework

Fishbein and Ajzen (1975) defined attitude as "the individual's positive or negative feelings about performing a behavior". Attitude toward using a system is strongly effects user intention to use the system (Ajzen, 1991; Bruner & Kumar, 2005; Dishaw & Strong, 1999;). In addition, studies conducted in the health informatics field have supported a strong relationship between attitude and behavioral intention toward using the system (Chau & Hu, 2002; Pare et al., 2006).

H_1: Attitude significantly and positively affects user intention.

Usefulness is one of the core constructs of TAM (Davis, 1989), which is a key theoretical model for technology adoption theories, and it was defined as "the degree to

which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). It was found in the Davis (1989) research that usefulness has significant effect on behavioral intention. This finding were tested and supported by many other researchers in different contexts and situations. (Venkatesh & Davis, 2000; Yu et al., 2009; Karahanna et al., 1999).

H_2: Usefulness significantly and positively affects attitude.

Ease of use is another core construct of TAM (Davis, 1989). In the TAM model, ease use strongly effects both of usefulness and behavioral intention. Although there is a general belief about the importance of ease of use in predicting technology adoption, some researchers did not find a strong relationship between ease of use and usefulness (Liu & Ma, 2005); and ease of use behavioral and intention (Liu & Ma, 2005; Hung & Chang, 2005).

H_3: Ease of Use significantly and positively affects attitude.

H_4: Ease of Use significantly and positively affects usefulness.

Accessibility is used to describe the degree of how users access data presented in a service with ease. Participants of the qualitative research in this study thought that users should access the health related information in an easy way and participants of expert focus groups emphasized the importance of accessibility. Moreover, Goodhue (1995) studied accessibility in the task-technology fit context that indirectly effect the usefulness of a service.

H_5: Accessibility significantly and positively affects usefulness.

Service quality can be measured through many different variables like technical support, assurance, or quick responsiveness. Quality of the service has an impact on

service use and user satisfaction (Yusof et al., 2007). In the expert focus group study, it was proposed that there is a positive relationship between service quality and usefulness.

H_6: Service quality significantly and positively affects usefulness.

Quality of support is described as users' perceptions about accessibility, rapidity, and how the support is provided (Aubert & Hamel, 2001). Aubert and Hamel (2001) studied the effects of support quality on the innovation adoption, but the influence of support quality on smart card adoption was not found significant in the medical sector.

H_7: Quality support significantly and positively affects usefulness.

Information quality is a broader definition and it may contain many aspects of information like, currency or relevancy. In this research, detail of the presented information represents the level of quality. Yusof et al., (2007) studied relevancy and completeness aspects of the information quality and they found that these aspects effect system use and user satisfaction. Although Lemire et al. (2008) did not find significant effects of quality of information presented in a health-related web-site on the frequency of the web-site visits, participants of the expert focus group thought that it has a positive influence on usefulness of an e-health information service.

H_8: Information quality significantly and positively affects usefulness.

In some situations, even if users want to use a service they are obstructed by lack of resources like time, or money. During the qualitative study, it was emphasized by the participants that users prefer less interaction time with a service or product. Mathieson et al. (2001) extended technology acceptance model (Davis, 1989) by

adding perceived resource antecedents containing seven variables like time, data, hardware/software, knowledge, someone's help, financial resources, documentation, and data. They concluded that compared to other ones, time and knowledge are two most important resources in extended TAM (Mathieson et al., 2001).

H_9: Usage time significantly and positively affects usefulness.

Moore and Benbasat (1991) defined image as "the degree to which use of an innovation is perceived to enhance one's … status in one's social system". According to Venkatesh and Davis (2000), the increased power resulted from status enhancement in a social environment causes advancements on job performance (which is usefulness) of individual.

H_{10}: Image significantly and positively affects usefulness.

In his research, Rogers (1983) found that an innovative system has some key characteristics that determine the rate and pattern of adoption. According to him, compatibility is one of these characteristics and he defined compatibility as "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters". The more an innovation fits with user's norms, the easier the adoption process occurs. Aubert and Hamel (2001) studied factors that influence adoption of smart cards, a micro-processor storing patient data, in the hospital environment. The results show that compatibility has an indirect positive effect on the adoption process. Besides, compatibility is a significant antecedent of perceived usefulness. It also directly and indirectly effects behavioral intention through the determinant of attitude (Chau & Hu, 2002). In the medical context, it was found that compatibility has significant effects on performance expectancy, effort expectancy and

the behavioral intention of occupational therapists in the information and communication technology acceptance and utilization process (Schaper & Pervan, 2007).

H_{11}: Compatibility significantly and positively affects usefulness.

H_{12}: Compatibility significantly and positively affects ease of use.

Response time means the ability of the service how it quickly responds user requests. Users require rapid responses for their requests (Ramsay et al., 1998). Experts participating in the focus group proposed that response time of the e-health service plays a crucial role in the adoption process.

H_{13}: Response time significantly and positively affects ease of use.

TRA, which was a key theoretical model for most of the adoption theories, contains social influence variable in its subjective norm construct, 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). Subjective norm was found a direct determinant of behavioral influence in both TRA (Fishbein & Ajzen, 1975) and TPB (Ajzen, 1991). Moreover, Venkatesh and Davis (2000) found that subjective norms have direct positive effects on behavioral intention and usefulness. In the acceptance of health IT applications researches, subjective norms were found to be the strongest determinants of usefulness and ease of use (Yu et al., 2009). So, social influence facilitates the successful implementation of new IT services in the medical industry, it fosters performance gained by the service, and decreases effort required to use it.

H_{14}: Social influence significantly and positively affects ease of use.

Understandability refers to how the data, lists, and figures in the service are comprehensible and interpretable. It is one of the key variables in task-technology fit context and has great positive effects on user evaluations in information systems (Goodhue, 1995). In the interview part of this study, participants comment that clearness of items in content makes it easy to understand and use.

H_{15}: Understandability significantly and positively affects ease of use.

Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances". It was found in the previous researches (Seyal & Pijpers, 2004; Chen et al., 2004) that self-efficacy has a positive effect on ease of use.

H_{16}: Self efficacy significantly and positively affects ease of use.

Perceived financial cost is defined as "the extent to which a person believes that using a service will cost money" (Luarn & Lin, 2005). In the previous studies perceived financial resources, namely cost, was found to be the significant antecedent of the behavioral intention to use a service (Mathieson et al., 2001; Tung et al., 2008).

H_{17}: Cost significantly and negatively affects attitude.

Research hypothesis drawn from the framework is summarized in the following table (Table 5).

Table 5 Determinants of E-Health Service Intention Framework

Hypothesis	Dependent Variable	Independent Variable	Relationship
H_1	Intention	Attitude	Positive
H_2	Attitude	Usefulness	Positive
H_3	Attitude	Ease of Use	Positive
H_4	Usefulness	Ease of Use	Positive
H_5	Usefulness	Accessibility	Positive
H_6	Usefulness	Service Quality	Positive
H_7	Usefulness	Quality Support	Positive
H_8	Usefulness	Information Quality	Positive
H_9	Usefulness	Usage Time	Positive
H_{10}	Usefulness	Image	Positive
H_{11}	Usefulness	Compatibility	Positive
H_{12}	Ease of Use	Compatibility	Positive
H_{13}	Ease of Use	Response Time	Positive
H_{14}	Ease of Use	Social Influence	Positive
H_{15}	Ease of Use	Understandability	Positive
H_{16}	Ease of Use	Self-Efficacy	Positive
H_{17}	Attitude	Cost	Negative

CHAPTER 4

METHODOLOGY

The study started in September 2007 by reviewing the literature about technology adoption and telemedicine. For two years, lots of work has carried out. In the development process of the framework, a series of empirical studies have been conducted. Table 6 summarizes these studies.

Table 6 Research Studies

Study	Date	Description
Interview	Feb.,2008	The interview was conducted by asking 17 participants from three main target groups of the study namely physicians, nurses, and potential users 14 questions. 41 constructs were extracted and the results were published in PICMET 2008 conference. After, interview part I was expanded with 8 new participants
AHP Study	July,2008	Relationships among 16 constructs were examined by asking 69 pair-wise comparison questions to 14 potential users. The results will be published in PICMET 2009 conference.
Expert Focus Group	Mar.,2009	The participants, 10 physicians, were assigned to select the most important 25 constructs out of 80 in order to reduce the number to a reasonable level.
Pilot Study	Apr.,2009	8 ranking questions for 5 conjoint constructs and 53 questions for 35 regression constructs were asked to 8 participants so as to test the research instrument.
Experimental Study	May,2009	8 ranking questions for 5 conjoint constructs and 53 questions for 35 regression constructs were asked to 162 participants.

Relationships among these studies are illustrated in Fig. 12.

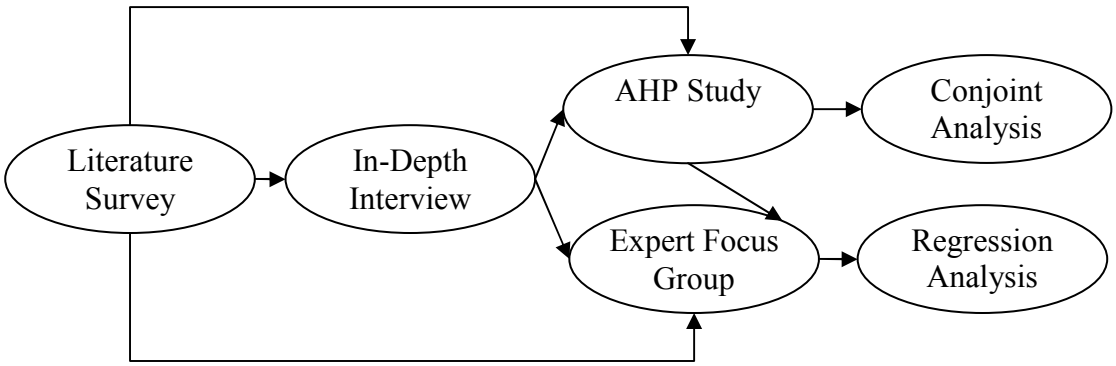


Fig. 12 Relationships among research studies

According to the Fig. 12, the study started with the literature survey. The output of survey was used in the in-depth interview in order to benefit from participants' creative ideas and considerations about the constructs derived from the literature. Forty-one constructs that affect health information service adoption were extracted from the in-depth interview. After the interview, the study was continued in two directions.

The first one of them was related to conjoint analysis. It is difficult to examine lots of variables in conjoint. So, AHP study was used in order to reduce the number of variables in a reasonable level. Sixteen variables from the literature survey and the in-depth interview were ranked in the AHP study. Five of them were selected for conjoint analysis.

The second one was about regression analysis. Eighty variables from the literature survey, the in-depth interview, and the AHP study were used in the expert focus group study. After the study, thirty five constructs were selected to study in the regression analysis.

In-Depth Interview

Qualitative research method was applied in the study in order to understand the topic and to take advantage of interviewees' creative ideas, feelings and perspectives about health information services. Prior to the interview, a health information service prototype was developed for patients and physicians. The proposed service was designed to

- Collect patient data via various devices like stethoscope, treadmill, bascule, mobile phone
- Provide patient information to the health care providers
- Facilitate the early detection of health problems by means of monitoring patient data

The service mainly consisted of

- Hypothetical devices that were capable of sending data via Bluetooth technology (treadmill for cardio information, bascule for weight information, stethoscope for blood pressure, glucose meter for blood glucose level)
- Prototypes of the patients' application developed for mobile devices to collect information about patient.
- Prototypes of the physicians' application developed for mobile devices to get patient information.
- Prototype of the PC application installed in the desktop computer of the physicians to monitor patient status
- A medical server in order to store and manage patient data collected from various sources

Fig. 13 illustrates the proposed e-health service.

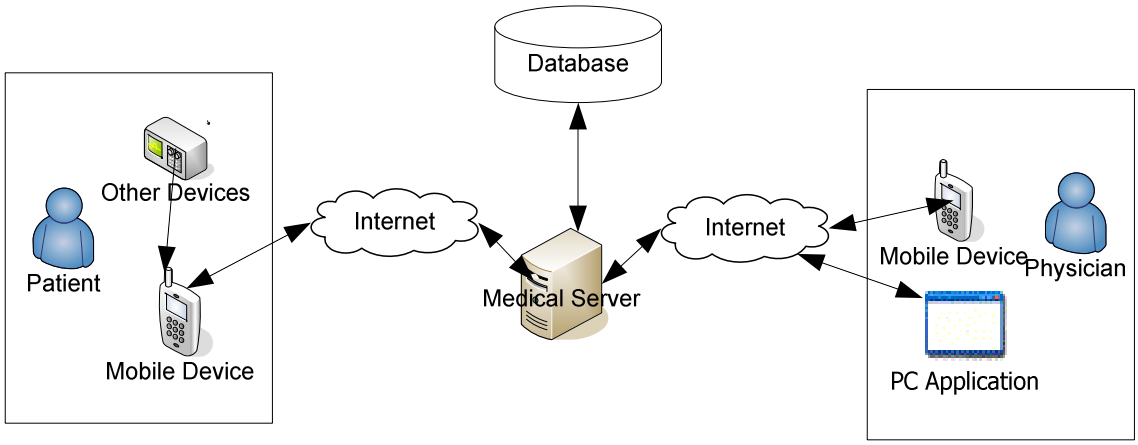


Fig. 13 Proposed service in the interview

Both of patients' and physicians' prototypes work as follows:

The mobile device reads the menu to patient/physician. The patient/physician selects the operation by pronouncing the operation name and saying "OK" keyword. The service listens to the voice of the patient/physician and syntheses it. After the service hears the "OK" keyword, it goes on to the next step based on the selected operation. So, there occurs a dialogue between patient/physician and the service. Table 7 shows the operations in the service.

Table 7 Menu Items of the Proposed Service in the Interview

Patients Menu	Physicians Menu
- Enter Meal	- Calorie Information
- Enter Information	- Blood Glucose Information
---- Enter movement or exercise	- Blood Pressure Information
---- Enter Trauma	- Exit
---- Enter pain	
---- Enter drug	
---- Return main menu	
- Meal Suggestion	
- Get Calorie Information	
- Exit.	

The proposed system also has reminder services for both patients and physicians. If the patient takes medicine at regular times, the service warns him/her when medicine time

comes. Also, if the patient does not enter any information at a specific time period, the service warns him/her to enter. Moreover, physicians can define reminders based on specific patient data. As an example, they can define so that the service can warn them when the patient's blood glucose level decreases to below "3 mmol/l". You can see the dialogue and sample warning texts in the Appendix B. Developed PC application prototype enables the physician to monitor all of the patient's data such as what patient eats, how much calorie he/she gets, which exercises he/she does.

Table 8 shows a sample dialogue between patient and service. Appendix A contains full paragraph of dialogues between patient-service and physician-service.

Table 8 Sample Dialogue between Patient and Service

Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.
Patient: Enter Meal (okay)
Service: What did you eat or drink?
Patient: I eat hamburger (okay)
Service: How much you eat or drink
Patient: One (okay)
Service: Do you eat or drink anything else?
Patient: Yes (okay)
Service: What did you eat or drink?
Patient: I drink coke (okay)
Service: How much you eat or drink?
Patient: I drink one bottle (okay)
Service: Do you eat or drink anything else?
Patient: No (okay)
Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.

Twenty-five participants from three target groups namely potential users, physicians, and nurses participated in the study. The age of the participants was in a range between 22 and 50. Fifteen were female and ten were male. Educational level of the sample consists of high school graduates, university graduates and graduate students.

Semi structured open-ended questions were asked to the potential users, physicians and nurses. In the beginning of the interview, participants were informed about the service with a presentation that takes approximately five minutes. After presentations, physicians used the prototype developed for physicians and potential users used the other one developed for them. Finally, the interview was conducted by asking 14 questions (See Appendix A for questions).

The results of the in-depth interview will be explained in Findings section.

AHP Study

Patients prefer using the service that meets their needs and requirements. So, to develop the best health service requires knowing patients' needs, requirements and preferences. The aim of the research is to explore the factors that affect users' preferences in the health service selection process. In this study, Analytic Hierarchy Process (AHP) is applied to evaluate users' preference about health service.

Analytic Hierarchy Process (AHP) (Saaty, 1977; Saaty, 1996) is an outstanding method that can be used in multifactor decision-making environments. It presents a structured approach to determine individual weights of multiple attributes of a product or service so that they can be compared in a simple way. Then, it simplifies decision-making in the selection process.

In the literature, many applications of AHP have been published in different fields including planning, resource allocations, and selecting a best alternative, etc. (Vaidya & Kumar, 2006). AHP method also widely used in vendor selection problems (Tam & Tummala, 2001).

Moreover, there are many applications of AHP in the medical field. In one of the researches, AHP is used to develop an human resource planning model for hospital laboratory personnel (Kwak et al., 1997). Turi (1988) applied AHP approach to select a magnetic resonance imaging vendor by using the criteria like price, service, and technology. Another application of AHP was designed by Kahen and Sayers (1997) for selection of medical expert systems.

Six male and eight female potential users from different age groups were selected to conduct the research. Age of the participants was in a range between 23 and 60. Average age of the male and female group was 37.

Based on the literature and interview results, 21 different health service selection criteria were selected for the research. A mini survey involving randomly selected 3 male and 3 female potential users was conducted to reduce the number of critical factors by assessing and identifying the critical ones. Finally, 16 attributes were selected and used in the AHP model. The attributes were grouped in a hierarchy. It can be visualized as a diagram shown in Fig. 14. The diagram contains an overall goal and criteria broken down into two levels of sub-criteria.

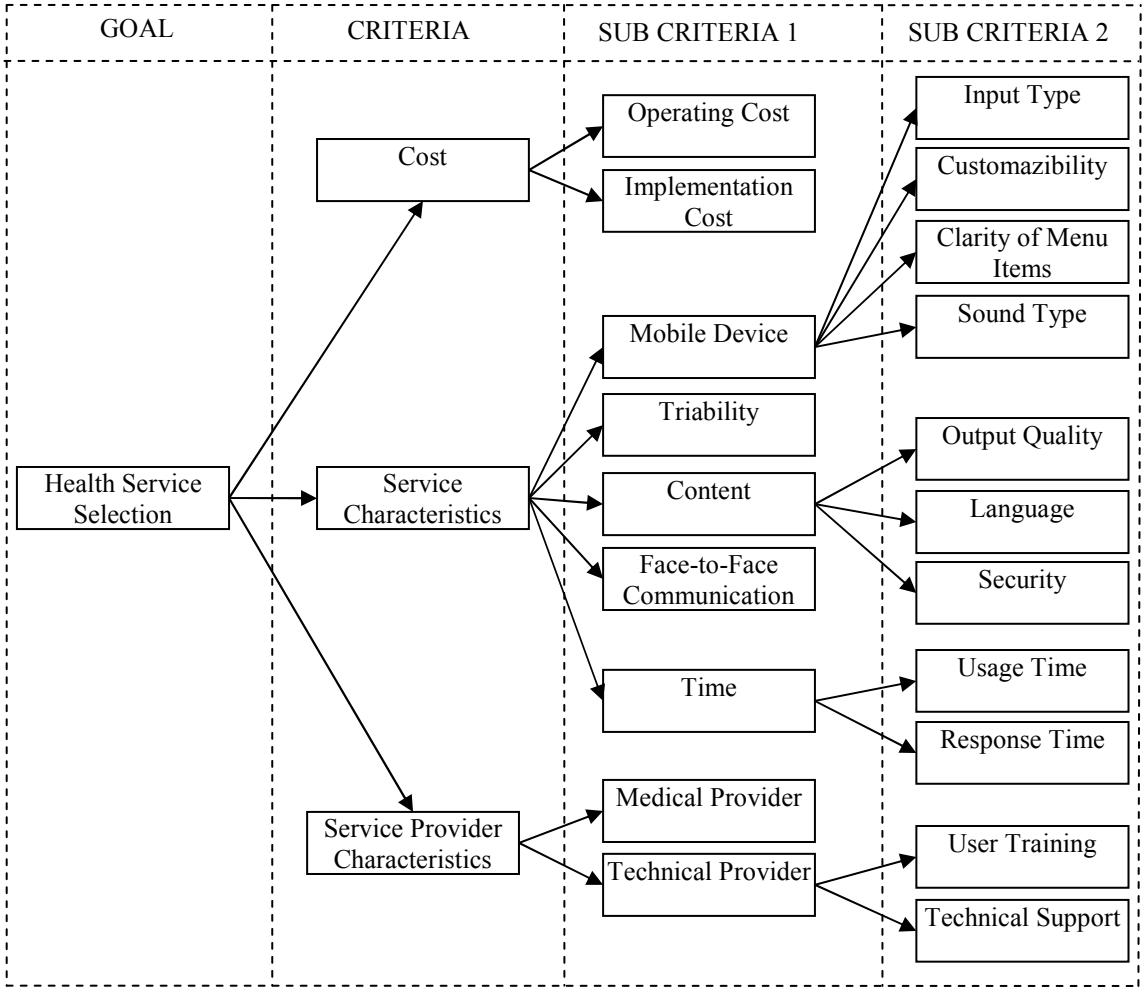


Fig. 14 AHP Model

Implementation Cost of the service is its purchase price. This price is paid only once while buying the service.

Operating Cost is the price that was paid by the user in every month to be able to use the service.

Usage Time is the amount of time required to use the service. 10 minutes usage time means that the user spends 10 minutes in a day entering meal information and other data.

Response Time is the doctor's response time to the patients' requests. As an example, in the alternative 1, the service provider guaranteed that the doctor could respond to the patients' questions in 45 minutes.

Language is the set of visual and auditory signs of communication.

Security means whether the service provides secure communication between patients and doctor, or not.

Triability is the degree to which a patient may be experimented with by the service on a limited time or functionality.

Sound Type is the voice style of the service. It can be one of computerized, male or female voices.

Input Type refers the data entry procedure of the patient.

Availability of Face-to-Face Communication means whether the service enable the patient to visit the doctor in the hospital or not.

Technical Support is how to assist the user in order to solve the specific problems with the service.

User Training means the demonstration of the features and functionality of the service to the potential users.

Medical Provider is the hospital that supports the medical related operations.

Customizability is the ability of the service to be changed by the user preferences.

Clarity of Menu Items is the degree to which the user may understand the function of the menu item.

Output Quality refers to how well the system performs the jobs.

The AHP model was applied on 4 different hypothetical home based tele-monitoring services. Each of the services had 16 different attributes. Levels of these attributes were proposed by the potential users in the mini research phase of the study (See Table 9 for levels). All of the alternatives and their levels are shown in Appendix B.

Table 9 AHP Attributes and Levels

Attribute	Levels
Implementation Cost	200 TL - 500 TL - 800 TL
Operating Cost	25 TL/month - 50 TL/month - 100 TL/month
Usage Time	10 min/day - 30 min/day - 50 min/day
Response Time	5 min – 15 min - 45 min
Language	Turkish – English - Turkish/English
Security	Available - Not Available
Triability	Not Available - 1 week limited functionality - 1 week unlimited functionality
Sound Type	Female - Computerized - Male
Input Type	Sound – Text - Selection among alternatives
Availability of Face-to-Face Comm.	Available - Not Available
Technical Support	Not Available - 7 days 24 hours – Between 09:00/17:00
User Training	Not Available - Operating manual is given to user - Online Education - Training is conducted by a professional
Medical Provider	Public Hospital - Private Hospital
Customizability	Users are selecting frequently used menu items manually - Frequently used menu items are automatically shown on top of the menu
Clarity of Menu Items	Service does not contain menu - Textual menu items - Graphical menu items - Both of the graphics and text are used in the menu items
Output Quality	Meal list is given as a output - User preference are taken into consideration in the meal list

Results showed that the medical provider, operating cost, and availability of face-to-face communication were three of the most important variables. The findings section contains detailed results of the AHP study.

Expert Focus Group

80 different variables were selected from the literature survey and the interview. Studying all of these variables in one research is a complex process. Also, it affects the validity and the reliability of the research. A face-to-face expert focus group study was conducted to reduce the number of constructs.

Following table (Table 10) lists all of the constructs studied in the expert focus group. In the study, the participants were assigned to select most important 25 constructs out of 80.

Table 10 Constructs Studied in Expert Focus Group

Accessibility	Job Experience
Accuracy	Job Relevance
Adequate Resources	Knowledge
Affect	Managerial Support
Age	Marital Status
Assistance	Market Variable
Behavioral Control	Meaning
Clinical Specialty	Observability
Clinical Variables	Occupation
Compatibility	Opinion of Professionals
Computer Experience	Output Quality
Computer Literacy	Patient Location during Treatment
Concern of Health	Peer Support
Currency	Place of Residence
Customization	Population Serviced
Detail	Presentation
Device Type	Professional Support
Documentation	Psychological Ownership
Ease of Use	Quality of Image
Educational Level	Quality of Support
Extrinsic Motivation	Quality of Verbal Communication
Facilitating Conditions	Relative Advantage
Fixed Cost	Satisfaction
Fun	Security
Functional Characteristics	Service Quality
Gender	Social Influence

Table 10 Continue

Geographic Area	Time
Government Policy	Time Investment
Habit	Time Spent On-Line
Hardware/Software	Tool Experience
Health Status	Triability
Hospital Size	Trust
Image	Type of Medical Service
Income	Understandability
Information Quality	Usefulness
Information-Seeking Preference	User Involvement
Internet Access at Home	Variable Cost
Internet Access at Worksite	Vendor Support
Internet Dependence	Visual Orientation
Intrinsic Motivation	Voluntariness

The study was carried out with 10 physicians working in public and private hospitals. The average age of the expert group was 36. Six of them were male and four of them were female. Descriptions of the constructs may be seen in the Appendix C.

Results of the expert focus group study will be explained in Findings section.

Experimental Study

The aim of the study is to explore the factors that affect users' adoption on e-health information services. A web-based data collection instrument containing three main parts namely animation, questionnaire for conjoint analysis, and questionnaire for regression analysis was developed to collect data from participants. Microsoft .NET, Microsoft Assess and Macromedia Flash were used to develop the instrument.

The first page of the instrument was a welcome page that informs the user about who the researchers are and what they study. After the user clicked the *Başla* button, an animation developed in Macromedia Flash was appeared on the screen. The aim of it was to provide an environment in which the participant could easily experience the

proposed e-health information service. In the animation, there were animated screens that explain the service to the user. When the user finished to read instructions on the page or watch an animation, he/she have to clicked a continue button to forward on the screens. Also, he/she can go backward by clicking back button. Animation screens were illustrated in Appendix D. After animation, the experiment continued with conjoint questionnaire form.

Conjoint analysis is a statistical method used to measure the preferences of customers about features of a product or service. Conjoint module of SPSS Statistics Software was chosen as a tool in order to analyze the results. SPSS Conjoint uses full-profile approach where participants order a set of product alternatives according to their specific attributes. Each of the alternatives describe a product or service that consists of different combinations of attribute levels. In the study, five attributes of a health information service namely input effort, availability of face-to-face communication, response time, cost, and technical support were examined. Each of these attributes also contains a set of levels. Table 11 shows attributes and levels studied in conjoint analysis.

Table 11 Conjoint Attributes and Levels

Attribute	Levels
Cost	Inexpensive (100 TL), Expensive (150 TL)
Face-to-Face Communication	Available, Not Available
Input Effort	Automatic, Manual
Response Time	Fast(4 hours), Slow (24 hours)
Technical Support	Available, Not Available

SPSS Conjoint produced eight different alternatives based on the attributes levels (Table 12).

Table 12 Conjoint Alternatives

Alternative	Input Effort	Face-to-Face Communication	Technical Support	Response Time	Cost
1	Automatic	Not Available	Not Available	Fast	Expensive
2	Automatic	Not Available	Available	Slow	Inexpensive
3	Automatic	Available	Available	Fast	Inexpensive
4	Automatic	Available	Not Available	Slow	Expensive
5	Manual	Not Available	Not Available	Fast	Inexpensive
6	Manual	Not Available	Available	Slow	Expensive
7	Manual	Available	Not Available	Slow	Inexpensive
8	Manual	Available	Available	Fast	Expensive

Participants were assigned to rank these eight alternatives by taking into consideration of their own usage preferences. Respondents ordered these alternatives from 1 to 8. “1” refers the most desirable alternative and “8” refers the least desirable one. The least the number, the most desirable is the alterative or vice versa.

Conjoint questionnaire form mainly consists of three parts. In the first part, the attributes of the service were explained to the participant so that clarifying what they mean. The second part of the page contains a list about terms of service usage. In the last part of the page, there is a table that contains all of the attributes and a combo box that enable the user to rank the alternatives (See Fig. 15). Moreover, the page includes a link that opens the animation in a new window. So, the user can watch the animation again.

Lütfen aşağıdaki 8 farklı alternatifi ilgili özellikleri göz önünde bulundurarak,
1 en çok kullanmayı tercih edeceğiniz, 8 en az kullanmayı tercih edeceğiniz şekilde sıralayınız.

Alternatif	Veri Giriş Yöntemi	Canlı Doktor Görüşmesi	Cepten Teknik Destek	Cevap Zamanı	Maliyet (Aylık)	Sıra
Alternatif 1	Elektronik	-	-	4 Saat	150 TL	--- Seçiniz ---
Alternatif 2	Elektronik	-	Var	24 Saat	100 TL	--- Seçiniz ---
Alternatif 3	Elektronik	Var	Var	4 Saat	100 TL	1 - En çok tercih ettiğim
Alternatif 4	Elektronik	Var	-	24 Saat	150 TL	--- Seçiniz ---
Alternatif 5	Manuel	-	-	4 Saat	100 TL	--- Seçiniz ---
Alternatif 6	Manuel	-	Var	24 Saat	150 TL	--- Seçiniz ---
Alternatif 7	Manuel	Var	-	24 Saat	100 TL	--- Seçiniz ---
Alternatif 8	Manuel	Var	Var	4 Saat	150 TL	2

Fig. 15 Conjoint question form

Regression questionnaire form of the study was designed to test hypotheses of e-health information service intention framework. It consists of 12 questions to collect demographic information of the participants, and 53 five point Likert-scale questions to assess attitude of participant toward e-health information service.

Participants answered the questions by considering attributes of alternative three presented in the conjoint part of the study. Table 13 lists the levels of the alternative three.

Table 13 E-Health Service Attributes for Regression Analysis

Alternative	Input Effort	Face-to-Face Communication	Technical Support	Response Time	Cost
3	Automatic	Available	Available	Fast	Inexpensive

The first part of the regression questionnaire form consists of questions to collect demographic information of the participant. Table 14 lists demographic constructs, question items, and options of the question.

Table 14 Demographic Questions

Construct	Question Item	Options
Gender	Select your gender	Male, Female
Educational Level	Select your educational level	Primary school degree, High school degree, Associate degree, Undergraduate degree, Graduate degree
Occupation	Select your occupation	13 different occupation types
Age	Select your age	Range from 1 to 100
Length	Select your length	Range from 100 to 220
Weight	Select your weight	Range from 30 to 150
Income	Select your income	0-500 TL, 501-1000 TL, 1001-1500 TL, 1501-2000 TL, 2001-2500 TL, 2501-3000 TL, 3001 or above TL
Income	How do you describe your income-expense relationship?	My income is less than my expenses, my income equals to my expenses, my income is more than my expenses
Time on Line	How much time do you spend on the web in one day?	None, 1 hour or less, 1-3 hours, 3-5 hours, 5-8 hours, 9 hours or above
Mobile Literacy	How do you describe your mobile phone usage?	I know all of the functionalities of my mobile phone and use all of them, I know all of the functionalities of my mobile phone. However, use some of them, I know and use only required functionalities of my mobile phone

Table 14 Continue

Construct	Question Item	Options
Information Seeking Preferences	Which one is your primary source when you encounter a health problem?	My friends, My family, The Internet, Physicians
Diabetics	Are you diabetic? If yes, what type?	No, Diabetes type 1, Diabetes type 2

Second part of the questionnaire includes items for regression analysis. Table 15 contains regression constructs and question items. All of the questions were five point Likert-scale questions. In the question form, 1 represents strongly disagree, 3 means neither agree nor disagree, and 5 equals strongly agree. Respondents specify their level of agreement to the question items by selection corresponding item level.

Table 15 Questionnaire Constructs and Items

Computer Literacy	I easily use computer in my daily work.
Net Health Search	I regularly visit health sites on the web.
Exercise	I regularly exercise.
Mobile Service	I use mobile services like weather forecast, pharmacy info in my mobile phone
Health Concern1	I am very preoccupied with my health
Health Concern2	I often feel powerless when faced with a health problem
Health Concern3	I find it difficult to obtain good health care when I need it
Health Concern4	I often feel guilty for not doing enough to improve my personal health
Weight Problem	I feel uncomfortable with my weight.
Accessibility	I can get data quickly and easily when I need it
Accuracy	It is important for me that the data presented in the service would be accurate.
Currency	It is important for me that the data presented in the service would be current.
Understandability	It is difficult for me to understand and interpret the data presented in the electronic health service.
Information Quality	The information available on the electronic health service is well structured
Location	My home is close to an medical institute.
Self Efficacy	I would have the ability to use the electronic health service.
Behavioral Control	Using the service would be entirely within my control.
Compatibility1	Using the health service is not suitable for my patient-physician interaction concept.
Compatibility2	Using the health service is suitable for my life style
Expectation	I will be very satisfied with the e-health service.
Time	I would be able to find the time I would need to use the service
Time Investment	The amount of time allocated by a doctor for service operations is important factor for me to use the service
Facilitating Conditions1	Live assistance feature of the e-health service adds value to it.
Facilitating Conditions2	User guidance of the e-health service makes usage easier.
Fixed Cost	Fixed cost of e-health service is expensive
Variable Cost	Monthly payments of e-health service is expensive
Quality Support1	Directions given by live assistance would be helpful.
Quality Support2	I can get rapid and easy support from live assistance.
Security	The degree of information and service security has an influence on my usage intention about service
Service Quality	The e-health service would be high quality.
Triability	I would be permitted to use the service on a trial basis long enough to use what it can do

Table 15 Continue

Trust1	I would believe that the e-health service provider would endeavor to provide high quality service.
Trust2	I would believe that the e-health service rapidly responds to my requests.
Input Effort	I would prefer to use automatic data sent instead of manual one.
Face2Face Communication	I would want to have live video communication with physician via mobile phone.
Response Time	It is important for me that getting rapid responses for my messages from e-health service.
Image	People who use the service would have more prestige than those who do not
Social Influence1	It is important for me that experts in the media would think I should use the service.
Social Influence2	It is important for me that my family, friends and peers would think I should use the service.
Social Influence3	It is important for me that medical providers around me would think I should use the service.
Ease of Use1	E-health service will be easy to use.
Ease of Use2	I will find it easy to get [e-health] to do what I want it to do.
Ease of Use3	It is difficult to use this service.
Usefulness1	The electronic health service is a useful tool.
Usefulness2	The electronic health service satisfies all of my health information needs.
Usefulness3	The electronic health service always has an answer to my question.
Usefulness4	The electronic health service would save time to me.
Usefulness5	The electronic health service would be beneficial to protect my health.
Attitude1	It is a good idea to use this service.
Attitude2	I want to use this service.
Intention1	I do not think about using this service.
Intention2	I am planning to use this service.
Intention3	I advise other people to use this service.

Analysis including ANOVA, conjoint, regression, and cluster were applied in the experimental study. Findings and results of these analysis will be explained in findings section.

CHAPTER 5

FINDINGS

Findings of Interview

Twenty-five individuals were participated in this study. Educational level, age group, gender, computer literacy, and mobile phone experience variables were taken into consideration in the selection process. Fifteen of them were female and ten of them were male. Table 16 contains details about the profile of interviewees.

Table 16 Participants Profile of Qualitative Research

	Number	Average Age (in years)	Computer Experience	Mobile Phone Experience
Doctor	6	40	18	10
Nurse	2	32	8	7
Potential User	17	27	10	9
Total	25	31	12	9

In the analysis phase of qualitative research the following steps have been carried out.

1. Interviews' audio-records were deciphered and written in a file sentence by sentence.
2. The sentences were examined so that we can extract casual relationships where an outcome is attributed to one or more factors (Silver, 2004) and consequently dependent and independent variables were set. Also the variables list grew out of this concept.
3. A second expert also repeated the same relationship coding In case of any discrepancy a discussion has been carried to resolve the conflict.

4. All produced casual relationships were weighted based on how critical they were perceived by the interviewees. The weight was accepted as 1 by default. If the participant mentioned about the same factor more than once or gave special emphasis, the relationship was assigned a score of 1.5.
5. After content analysis and coding, the relationship scores were summed up and divided by total weights, and depicted in the Table 47 for further analysis.

As a result of the data gathered through the interview, e-health information service adoption taxonomy was created (Fig. 16).

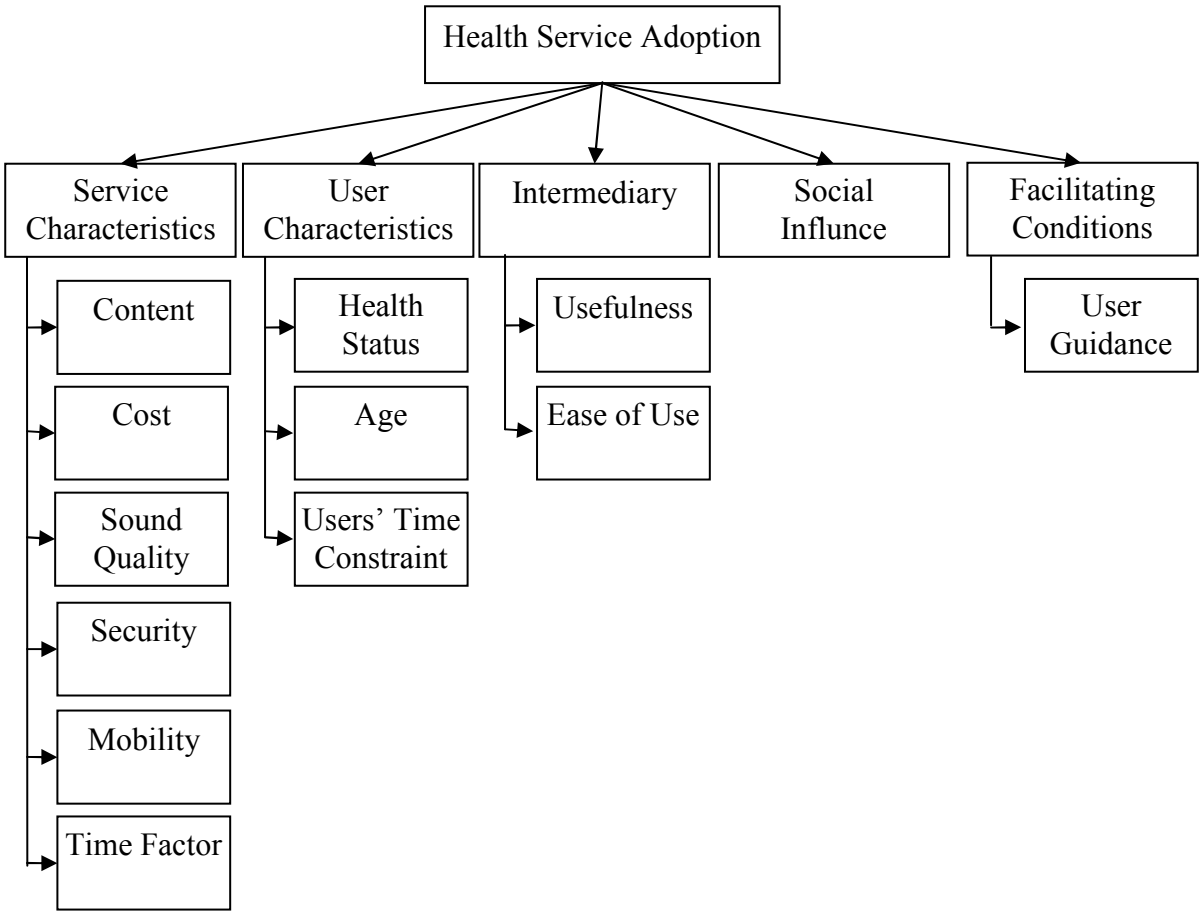


Fig. 16 Health Service Adoption Taxonomy

According to the taxonomy, health service adoption has five main aspects: service characteristics, user characteristics, intermediary variables, social factors and facilitating conditions. Weights of these aspects are shown in Table 17.

Table 17 Weights of Health Service Adoption Taxonomy Aspects

Class	Weight
Service Characteristics	55%
User Characteristics	26%
Intermediary	8%
Social Factors	6%
Facilitating Conditions	5%

In the service characteristics aspect, there are six sub-characteristics, namely content, cost, sound quality, security, mobility and time factor. Participants claimed that appropriate, comprehensive and quality content improve the usefulness of the service. Another major predictor of behavior intention toward technology adoption is the perceived cost (Mathieson et al., 2001). Based on the participants' comments, it can be said that the more costly the service, the less people prefer to use it. Moreover, participants are more comfortable with a non-mechanical female voice in the conversation with mobile device. Furthermore, security is the condition of protecting user specific data against others. Users want to store their data in a secure environment and do not prefer sharing them with unauthorized users. Besides, according to Kleinrock (1996), two of the well-known dimensions of mobility are time and place independence. What participants said about the mobility also support these findings. Time factor is a person's belief about the expense of time while interacting with the service and response time of the service about patient requests. Participants emphasized that time expense is a significant factor that affects adoption of users.

User characteristics aspect contains three sub-categories as follows health status, age and user's time constraint. Participants preferred to use the service if they suffer from an illness. In addition, age affects the behavior of the user toward technology adoption (Liu et al., 2000, Chau and Hu, 2002). In the study, it was found that age is a factor that effects users adoption of health information service. Compared to younger ones, aged people would face with difficulties in the adoption process. Moreover, participants think that people who do not have enough time to visit a doctor may prefer to use the service.

Usefulness and ease of use composed intermediary aspect of the framework. Davis (1989) found that usefulness is the strongest predictor of behavioral intention. Perceived ease of use (EoU) is one of the core constructs in TAM (Davis, 1989). Significant effects of usefulness and ease of use on the behavior intention was found by many researches (Davis, 1989; Venkatesh and Davis, 2000; Taylor and Todd, 1995). What is found in this study is in parallel with the previous research findings that both usefulness and ease of use have great effects on technology adoption.

Social influence is another aspect of the framework. People are influenced by others' opinions and behaviors. And, they intend to use a service if they believe that becoming one of the service users improves his/her social status.

Facilitating conditions aspect includes user guidance. Participants indicated that all of the users would need some help while using the service.

Finally a theoretical framework was developed (Fig. 17). This framework draws upon both prior research such as TAM and TRA and the findings of this study.

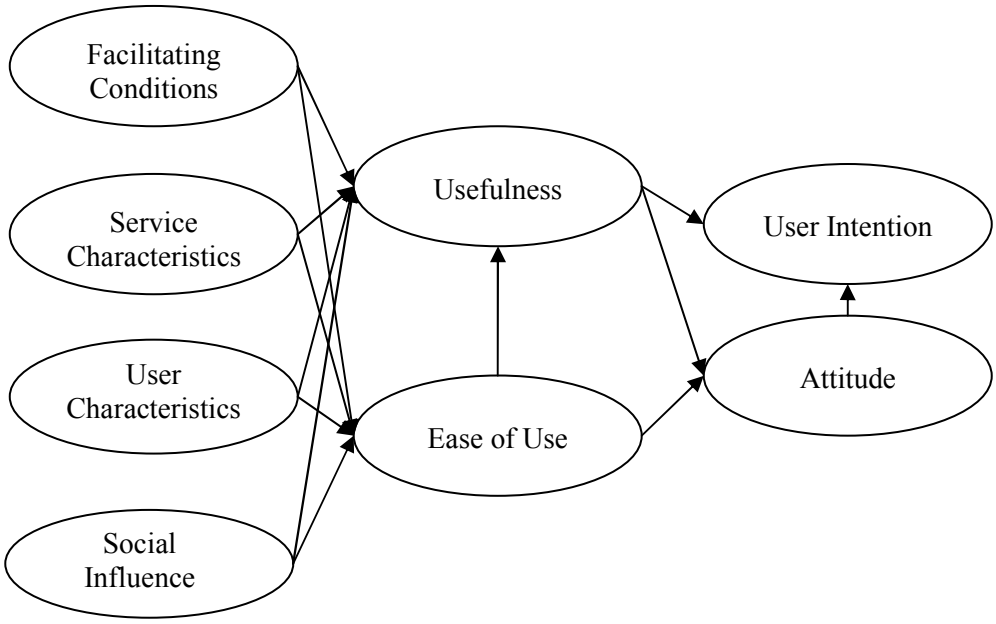


Fig. 17 Theoretical framework developed in qualitative study

Findings of AHP Study

Table 18 summarizes participant profile of the study.

Table 18 Participants Profile of AHP study

		Age Groups				
	Total	20-30	30-40	40-50	50+	Average
Male	6	2	2	1	1	36
Female	8	2	2	2	2	38
Total	14	4	4	3	3	37

After calculations were conducted, local weights of the attributes were calculated. The local weights represent the relative weight of the nodes within a group of siblings regarding their parent (Table 19). It can be seen from the table that local weights of each group add up to 1.

Table 19 shows that potential users pay more attention on the characteristics of the service like face-to-face communication, content, and time in the health service selection process. Moreover, operating cost of the service is more important than

purchasing cost. Also, content and availability of face-to-face communication are two of the significant service characteristics. Medical provider affects decision of the potential user more than technical provider. Clarity of menu items, security and response time are other important factors. And, as a characteristic of the technical provider, users attach slightly more importance to user training than technical support. Compared to usage time, short response time has more positive effects on patients' selection decision of HIS.

Table 19 Overall Local Weights of Attributes

Criteria	Local Weight	Sub Criteria 1	Local Weight	Sub Criteria 2	Local Weight
Service Chars	0.39	F-to F Comm.	0.27		
		Content	0.26	Security	0.48
				Output Quality	0.35
				Language	0.17
		Time	0.22	Usage Time	0.23
				Response Time	0.77
		Triability	0.15		
		Mobile Device	0.10	Cl. of Menu Item	0.40
				Customizability	0.28
				Input Type	0.25
				Sound Type	0.07
Ser. Prov. Chars	0.37	Med. Provider	0.78		
		Tech. Provider	0.22	Tech. Support	0.57
				User Training	0.43
Cost	0.24	Operating Cost	0.65		
		Impl. Cost	0.35		

Moreover, the global weights were calculated by multiplying the local weights of the siblings by their parents' local weights (Table 20). The global weights of all the 16 attributes add up 1.

Table 20 presents weight of the 16 attributes in the decreasing order. According to the table, medical provider is the most important factor for health service selection.

Secondly, people give importance on the operating cost of the medical service. Thirdly, they choose services that make available face-to-face communication with the physician. On the other hand, input type, customizability and sound type was found three of least important attributes according to overall values.

Table 20 Overall Global Weights of Attributes

Attribute	Weight
Medical Provider	0.289
Operating Cost	0.156
Face-to-Face Communication	0.105
Implementation Cost	0.084
Response Time	0.066
Trialability	0.058
Security	0.049
Technical Support	0.046
Output Quality	0.035
User Training	0.035
Usage Time	0.020
Language	0.017
Clarity of Menu Items	0.016
Customizability	0.011
Input Type	0.010
Sound Type	0.003
Sum	1.000

Table 21 shows the total decision weights of the alternatives. The total decision weight of a specific alternative was calculated by multiplying weight of the attribute with overall priority vector value of that attribute and summed up these multiplications for 16 attributes. According to the table, people have a tendency on selecting alternative 4 which is followed by alternative 1. Alternatives 2 and 3 are the least preferred services by the potential users.

Table 21 Overall Priority Vectors of Alternatives

Attribute	A1	A2	A3	A4
Implementation Cost	0.60	0.17	0.06	0.17
Operating Cost	0.05	0.17	0.17	0.61
Usage Time	0.62	0.06	0.16	0.16
Response Time	0.09	0.16	0.58	0.16
Language	0.31	0.10	0.30	0.30
Security	0.41	0.09	0.41	0.09
Triability	0.07	0.25	0.07	0.61
Sound Type	0.19	0.25	0.37	0.19
Input Type	0.29	0.12	0.47	0.12
Availability of Face-to-Face Comm	0.41	0.09	0.09	0.41
Technical Support	0.66	0.15	0.15	0.05
User Training	0.21	0.46	0.28	0.05
Hospital	0.36	0.14	0.14	0.36
Customizability	0.36	0.22	0.06	0.36
Clarity of Menu Items	0.23	0.16	0.23	0.38
Output Quality	0.12	0.38	0.12	0.38
Total Score	0.30	0.17	0.18	0.35

Alternative 4 has the finest attribute values for the most important three attributes listed in Table 21. Medical provider of the alternative is a private hospital. Although its implementation cost is higher than alternative 1 and equals to alternative 2, it has cheapest operating cost that has valuable impact on potential users' health service selection decisions. Moreover, it provides patients face-to-face communication with the physician.

The most important attributes, found in the research, enable the service designers and providers to know the characteristics of the most preferred e-health service. Furthermore, governments, especially in developing countries, face some difficulties while providing quality healthcare in underserved and rural areas. Even if they achieve serve, they suffer from high cost of the health service. With the rapid

development of information and communication technologies, they benefit from internet to serve the healthcare service. But, at this time user adoption problems becomes one of the obstacles in spreading of the electronic health services. The proposed AHP framework will help the authorities overcome adoption problems so as to reduce health care costs, to improve health care and access to health care, to improve patience obedience.

Findings of Expert Focus Group

Expert focus group study was conducted with 10 physicians, 6 of them were male, and 4 were female. Age of the participants ranges from 28 to 46 with a average 36.

Although participants were assigned to select the most important 25 constructs out of 80 (See Appendix C for detail list of constructs), only five selected exactly 25 constructs. Others picked 21, 24, 35, and 32 constructs respectively. Table 22 shows the selection frequencies of the constructs.

Table 22 Selection Frequencies of the Constructs

Ease of Use	10	Presentation	4	User Involvement	2
Accuracy	10	Service Quality	4	P. Loc. d Treatment	2
Understandability	10	Type of Med. Ser.	4	Internet Dependence	2
Security	8	Gender	3	Peer Support	1
Facilitating Conditions	8	Geographic Area	3	Voluntariness	1
Accessibility	8	Clinical Specialty	3	Device Type	1
Concern of Health	8	Managerial Support	3	Q. of Verbal Comm.	1
Age	7	Social Influence	3	Behavioral Control	1
Satisfaction	7	Meaning	3	Market Variable	1
Educational Level	6	Tool Experience	3	Extrinsic Motivation	1
Occupation	6	Image	3	Habit	1
Usefulness	6	Hardware/Software	3	Info-Seeking Pref	1

Table 22 Continue

Professional Support	6	Customization	3	Visual Orientation	1
Currency	6	Output Quality	3	Comp. Experience	1
Information Quality	6	Assistance	3	Time Spent On-Line	1
Support	6	Opinion of Profess.	3	Income	0
Quality of Support	5	Computer Literacy	3	Marital Status	0
Compatibility	5	Net Access at Home	3	Job Experience	0
Fixed Cost	5	Adequate Resources	2	Place of Residence	0
Job Relevance	5	Detail	2	Hospital Size	0
Usage Time	5	Quality of Image	2	Clinical Variables	0
Triability	5	Functional Character.	2	Relative Advantage	0
Time Investment	5	Knowledge	2	Affect	0
Population Serviced	4	Intrinsic Motivation	2	Documentation	0
Vendor Support	4	Government Policy	2	Fun	0
Variable Cost	4	Observability	2	Net Access at Work	0
Health Status	4	Psychological Owner	2		

According to Table 22, all of the participants agreed on the importance of ease of use, accuracy, and understandability. They thought that easy to use service should provide accurate and understandable data. Besides security, facilitating conditions, accessibility, and concern of own health are another significant constructs set that were selected 8 times.

Findings of Experimental Study

Profile of the Respondents

Age construct was regrouped into four categories like 24 or below, 25-29, 20-39, and 40 or above. In addition, height and weight constructs were used to calculate Body Mass Index (BMI), an index that shows the relationship between weight and height of each participant. BMI is defined as the weight (in kilograms) divided by the square of height (in meter) (WHO, 2009). Then, a new construct, called BMI Category, was created by regrouping BMI variable based on ranges defined by the World Health Organization (WHO, 2009). Table 23 shows the classifications by BMI range.

Table 23 The International Classification of adult weight according to BMI

Classification	Range
Underweight	< 18.50
Normal Range	18.50 – 24.99
Overweight	25.00-29.99
Obese	>30

The frequency analysis was conducted on the demographic variables and results were presented in Table 24.

Table 24 Profile of Respondents

Range	Frequency	Percent	Valid Percent	Cumulative Percent
Gender				
Male	78	48	51	51
Female	74	46	49	100
Age				
24 or below	77	48	51	51
25-29	35	22	23	74
30-39	26	16	17	91
40 or above	14	9	9	100
Educational Level				
Primary school	1	1	1	1
High school	8	5	5	6
University Student	48	30	32	38
Associate degree	2	1	1	39
Undergraduate degree	61	38	40	79
Graduate degree	32	20	21	100
BMI Category				
Underweight	9	6	6	6
Normal Range	94	58	62	68
Overweight	37	23	24	92
Obese	12	7	8	100
Diabetes				
None	149	93	98	98
Type 1	2	1	1	99
Type 2	1	1	1	100

Table 24 Continue

Range	Frequency	Percent	Valid Percent	Cumulative Percent
Income				
0-500 TL	40	25	26	26
501-1000 TL	24	15	16	42
1001-1500 TL	15	9	10	52
1501-2000 TL	21	13	14	66
2001-2500 TL	19	12	13	78
2501-3000 TL	13	8	9	87
3001 and above TL	20	12	13	100
Income				
Less than my expenses	20	12	13	13
Equals to my expenses	95	59	63	76
More than my expenses	37	23	24	100
Time on Line				
None	3	2	2	2
1 hour or less	16	10	11	13
1-3 hours	44	27	29	41
3-5 hours	48	30	32	73
5-8 hours	25	16	16	89
9 hours or above	16	10	11	100
Mobile Literacy				
Know and use all functions	34	21.1	22.4	22.4
Know all and use some functions	59	36.6	38.8	61.2
Know and use required functions	59	36.6	38.8	100
Information Seek Preferences				
My friends	10	6	7	7
My family	36	22	24	30
The Internet	31	19	20	51
Physicians	75	47	49	100
Total	152	94		
Missing System	9	6		
Grand Total	161	100		

As stated before, the study consists of two parts, namely conjoint and regression. Although 161 individuals participated in the study, 152 of them responded to all of the questions. 9 participants did not respond regression questions including demographics.

The results indicate that gender distribution of the sample was 51% male and %49 female which is approximately dispersed equal. The sample predominantly aged

twenty-four or lower. Most of the respondents held an undergraduate degree (38%). Other largest educational levels were university students (30%) and graduate degrees (20%). BMI category variable shows that 30% of the participants have a weight problem (23% overweight, 7% obese).

Descriptive Statistics

Number of respondents, mean, standard deviation, variance, minimum, and maximum values of the constructs were summarized in Table 25.

Table 25 Descriptive Statistics

	N	Mean	Std. Dev.	Var.	Min.	Max.
Computer Literacy	152	4.82	0.565	0.319	1.0	5.0
Response Time	152	4.78	0.566	0.320	1.0	5.0
Currency	152	4.76	0.584	0.341	1.0	5.0
Self Efficacy	152	4.74	0.695	0.483	1.0	5.0
Accuracy	152	4.69	0.693	0.480	1.0	5.0
Time Investment	152	4.67	0.617	0.381	2.0	5.0
Security	152	4.63	0.889	0.791	1.0	5.0
Input Effort	152	4.51	0.970	0.940	1.0	5.0
Facilitating Conditions	152	4.44	0.822	0.675	1.0	5.0
Behavioral Control	152	4.39	0.950	0.903	1.0	5.0
Face-to-Face Comm	152	4.38	1.022	1.044	1.0	5.0
Triability	152	4.38	0.955	0.911	1.0	5.0
Accessibility	152	4.31	0.951	0.904	1.0	5.0
Ease of Use	152	4.28	0.793	0.628	1.0	5.0
Attitude	152	4.23	0.811	0.658	1.0	5.0
Quality Support	152	4.14	0.781	0.611	1.0	5.0
Expectation	152	4.13	0.937	0.878	1.0	5.0
Location	152	4.12	1.196	1.430	1.0	5.0
Usage Time	152	4.10	0.961	0.924	1.0	5.0
Usefulness	152	3.95	0.730	0.533	1.4	5.0
Intention	152	3.91	0.899	0.809	1.0	5.0
Compatibility	152	3.82	1.030	1.061	1.0	5.0

Table 25 Continue

	N	Mean	Std. Dev.	Var.	Min.	Max.
Service Quality	152	3.81	0.947	0.897	1.0	5.0
Trust	152	3.78	0.885	0.784	1.5	5.0
Understandability	152	3.62	1.212	1.469	1.0	5.0
Net Health Search	152	3.56	1.473	2.169	1.0	5.0
Information Quality	152	3.55	1.091	1.190	1.0	5.0
Concern of own Health	152	3.52	0.918	0.842	1.5	5.0
Variable Cost	152	3.49	1.312	1.722	1.0	5.0
Social Influence	152	3.40	1.133	1.283	1.0	5.0
Fixed Cost	152	3.39	1.343	1.803	1.0	5.0
Exercise	152	2.95	1.450	2.103	1.0	5.0
Weight Problem	152	2.78	1.519	2.307	1.0	5.0
Image	152	2.72	1.488	2.215	1.0	5.0
Mobile Service Experience	152	1.74	1.226	1.503	1.0	5.0

Reliability Analysis

Reliability analysis is used to test the reliability of the measurement instrument. Intention, attitude, usefulness, ease of use, cost, concern of own health, compatibility, facilitating conditions, quality support, trust, and social influence constructs contain more than one question items. The internal consistency of these constructs is tested with Cronbach's Alpha coefficient. Threshold value of the reliability statistics was selected as 0.6. Reliability analysis is summarized in Table 26 and all of the alpha values are above the threshold value.

Table 26 Reliability Analysis

Construct	Number of Question Items	Cronbach's Alpha
Attitude	2	0.861
Usefulness	5	0.821
Trust	2	0.766
Ease of use	3	0.759
Social influence	3	0.735
Intention	3	0.701
Quality support	2	0.700
Compatibility	2	0.694
Facilitating Conditions	2	0.693
Cost	2	0.649
Concern of own health	4	0.609

Results of ANOVA Analysis

Participants were grouped into four categories, namely 24 or below, 25-29, 30-39, and 40 or above, according to age. Table 27 shows the results of ANOVA for age construct. The results shows that compared to aged users, young one benefits from computer capabilities in a easy way. People in 40 or above group pay more attention on their health status.

Table 27 ANOVA Results for Age

Construct	F	Sig.	24 or below	25-29	30 - 39	40 or above
Usefulness Q2	2.779	0.043	3.65	3.31	3.85	*3.07*
Usefulness Q3	4.437	0.005	3.77	3.54	3.69	*2.79*
Computer Literacy	7.094	0.000	4.92	4.91	*4.38*	4.86
Concern Health Q2	4.623	0.004	3.61	3.63	*2.92*	4.50
Concern Health Q3	3.053	0.030	3.65	3.37	*2.92*	4.21
Concern Health Q4	2.789	0.043	3.64	3.11	*2.85*	2.93
Information Quality	3.479	0.018	3.61	3.77	3.50	*2.71*
Quality Support Q1	2.708	0.047	4.27	*4.06*	4.69	4.29
Variable Cost	3.610	0.015	3.35	3.91	3.73	*2.71*
Weight Problem	2.782	0.043	*2.47*	2.89	3.38	3.07

ANOVA results of BMI group (Table 28) shows that people in the overweight group found the e-health service more useful. Moreover, information security influences their intentions towards the service usage. They can get rapid and easy support from live assistance functionality of the service.

Table 28 ANOVA Results for BMI Group

Construct	F	Sig.	Under Weight	Normal Range	Over Weight	Obese
Usefulness Q4	4.27	0.006	4.44	4.23	4.46	*3.33*
Quality of Support Q2	2.94	0.035	4.22	3.86	4.32	*3.75*
Security	3.53	0.016	4.67	4.60	4.92	*4.00*
Weight Problem	15.42	0.000	*1.78*	2.36	3.49	4.58

Table 29 contains ANOVA results for information seeking preference of the users. Users, who select physicians as a primary information source when they encounter a health problem, prefer face-to-face communication with medical providers. Besides, compared to others they have greatest intention toward using the service.

Table 29 ANOVA Results for Information Seeking Preferences

	F	Sig.	Friends	Family	The Internet	Physicians
Intention Q3	2.84	0.040	*3.60*	3.61	4.06	4.13
Face-to-Face Comm	5.09	0.002	*3.30*	4.25	4.42	4.56
Net Health Search	8.70	0.000	3.40	*2.69*	4.39	3.65

Results of Conjoint Analysis

Conjoint framework hypothesis were tested with conjoint module of SPSS Statistics 17 software. The aim of the analysis is to study questions like which alternatives are the most or the least preferred, which attributes of the service are important or unimportant to the participants, which attribute levels are the most or the least desirable by the respondents, and what is the market share of the alternatives.

Table 30 provides a measure of the relative importance of each attributes, known as averaged important score. The values represent percentages and they sum to 100. Attributes with greater score play a more significant role than those with a smaller score. The results show that input type has the most influence on overall preference. This means that there is a large difference in preference between alternatives containing the most desired input type and those containing the least desired input type. Also, cost plays least important role in overall preferences. In addition, face-to-face communication is another important attribute, but not as significant as input type.

Table 30 Averaged Important Score of Attributes

Attribute	Averaged Important Score
Input Type	27.380
Face to Face Communication	24.684
Technical Support	15.237
Response Time	18.349
Cost	14.350
Total	100.000

Table 31 summarizes the utility scores and standard errors for each attribute levels. Higher utility score means greater preference, and vice versa. According to the table, automatic data sending method for input type, available for face-to-face communication, available for technical support, rapid response for response time, and low payments for cost attributes are desirable levels. Besides, there is a negative relationship between cost and utility, and response time and utility. In other words, higher prices and longer response times lead to lower utility.

Table 31 Utility Scores

Attribute	Level	Utility Estimate	Std. Error
Input Type	Automatic	.828	.068
	Manual	-.828	.068
Face to Face Communication	Available	.748	.068
	Not Available	-.748	.068
Technical Support	Available	.449	.068
	Not Available	-.449	.068
Response Time	Fast	.433	.068
	Slow	-.433	.068
Cost	Inexpensive	.379	.068
	Expensive	-.379	.068
(Constant)		4.500	.068

Utility scores can be added together to calculate total utility score of an alternative. As an example, total utility of alternative 3 can be calculated as follow;

Total Utility Score = $\text{Utility}_{\text{Input Type}}$(Automatic) + $\text{Utility}_{\text{FacetoFaceComm.}}$(Available) + $\text{Utility}_{\text{Technical Support}}$(Available) + $\text{Utility}_{\text{Response Time}}$ (Fast) + $\text{Utility}_{\text{Cost}}$(Inexpensive)

Table 32 shows the total utility scores all of the alternatives. Results show that alternative 1 has the highest utility score and alternative 6 has lowest one.

Table 32Total Utility Scores of the Alternatives

Alter.	Input Type	Response Time	Face to Face Communication	Technical Support	Cost	Total Utility
3	Automatic	Fast	Available	Available	Inexpensive	7.337
2	Automatic	Slow	Not Available	Available	Inexpensive	4.974
8	Manual	Fast	Available	Available	Expensive	4.924
4	Automatic	Slow	Available	Not Available	Expensive	4.815
1	Automatic	Fast	Not Available	Not Available	Expensive	4.185
7	Manual	Slow	Available	Not Available	Inexpensive	3.918
5	Manual	Fast	Not Available	Not Available	Inexpensive	3.287
6	Manual	Slow	Not Available	Available	Expensive	2.561

Table 33 displays two statistics, Pearson's R and Kendall's tau, which provide measures of the correlation between the observed and estimated preferences.

Table 33 Correlation Coefficients

	Value	Sig.
Pearson's R	.997	.000
Kendall's tau	.929	.001

Market shares of the alternatives are calculated based on their utility scores (Table 34).

Table 34 Market Shares of the Alternatives

Alternative	Market Share
Alternative 3	20%
Alternative 2	14%
Alternative 8	14%
Alternative 4	13%
Alternative 1	12%
Alternative 7	11%
Alternative 5	9%
Alternative 6	7%

Fig. 18 Market share chart of the alternatives.

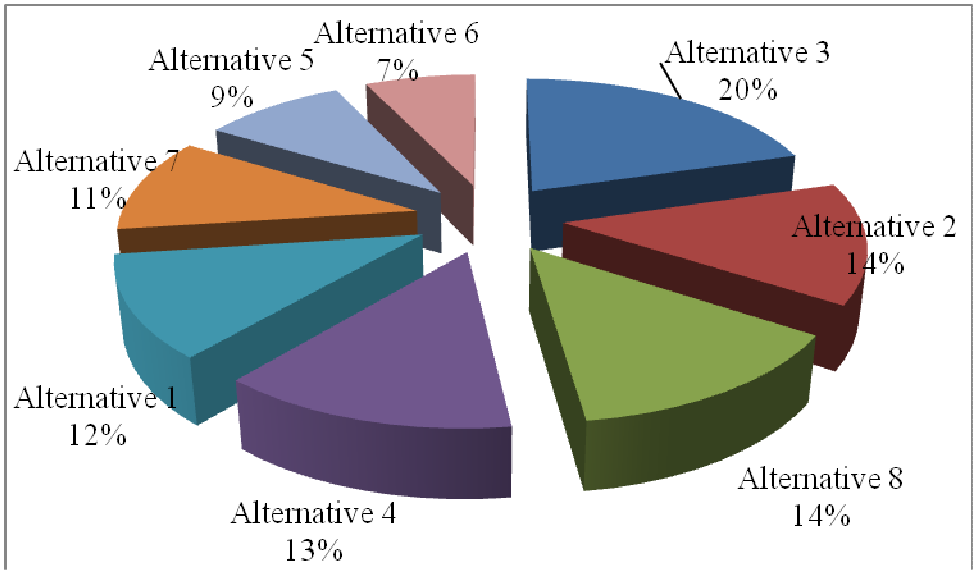


Fig. 18 Market share chart of the alternatives

Table 35 summarizes selection frequencies of the alternatives. For example, 125 participants selected alternative 3 as their first preferences and alternative 6 was not ranked in the first place by any of the respondents.

Table 35 Alternative Frequencies

	1	2	3	4	5	6	7	8
Alternative 3	125	10	10	2	4	6	4	0
Alternative 2	9	23	43	23	28	18	11	6
Alternative 4	6	36	26	34	21	19	11	8
Alternative 8	10	42	21	14	36	13	14	11
Alternative 1	5	24	13	37	15	18	18	31
Alternative 7	2	15	18	25	16	36	34	15
Alternative 5	4	7	19	19	25	22	30	35
Alternative 6	0	4	11	7	16	29	39	55

Correlation Analysis

Correlation analysis was conducted to show the relationship between constructs. Table 36 summarizes the correlation results of intermediary variables. Full list of the analysis was attached in Appendix F.

Table 36 Correlation Results

	Ease of Use	Usefulness	Attitude	Intention
Ease of Use	1	.488**	.475**	.363**
Usefulness	.488**	1	.623**	.469**
Attitude	.475**	.623**	1	.664**
Intention	.363**	.469**	.664**	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Results of Regression Analysis

Linear regression analysis was used to examine relationships among constructs in the e-health information service intention taxonomy. Regression model were executed in SPSS Statistics 17 software. Table 37 summarizes the results of regression analysis.

Table 37 Results of Regression Analysis

R^2	Dependent	Independent	Beta	Std. Error	Sig
0.467	Intention	(Constant)	0.806	0.291	0.01
		Attitude	0.735	0.068	0.00
0.427	Attitude	(Constant)	0.993	0.319	0.00
		Usefulness	0.570	0.079	0.00
		Ease of Use	0.230	0.073	0.00
0.626	Usefulness	(Constant)	0.179	0.275	0.52
		Service Quality	0.132	0.049	0.01
		Compatibility	0.138	0.046	0.00
		Quality Support	0.146	0.055	0.01
		Information Quality	0.137	0.038	0.00
		Usage Time	0.130	0.049	0.01
		Image	0.071	0.027	0.01
		Accessibility	0.100	0.046	0.03
		Ease of Use	0.114	0.056	0.04
0.481	Ease of Use	(Constant)	-0.356	0.451	0.43
		Response Time	0.378	0.100	0.00
		Compatibility	0.195	0.049	0.00
		Social Influence	0.186	0.044	0.00
		Understandability	0.142	0.041	0.00
		Self-efficacy	0.198	0.080	0.01

Based on the regression results, Fig. 19 illustrates the e-health information service intention framework.

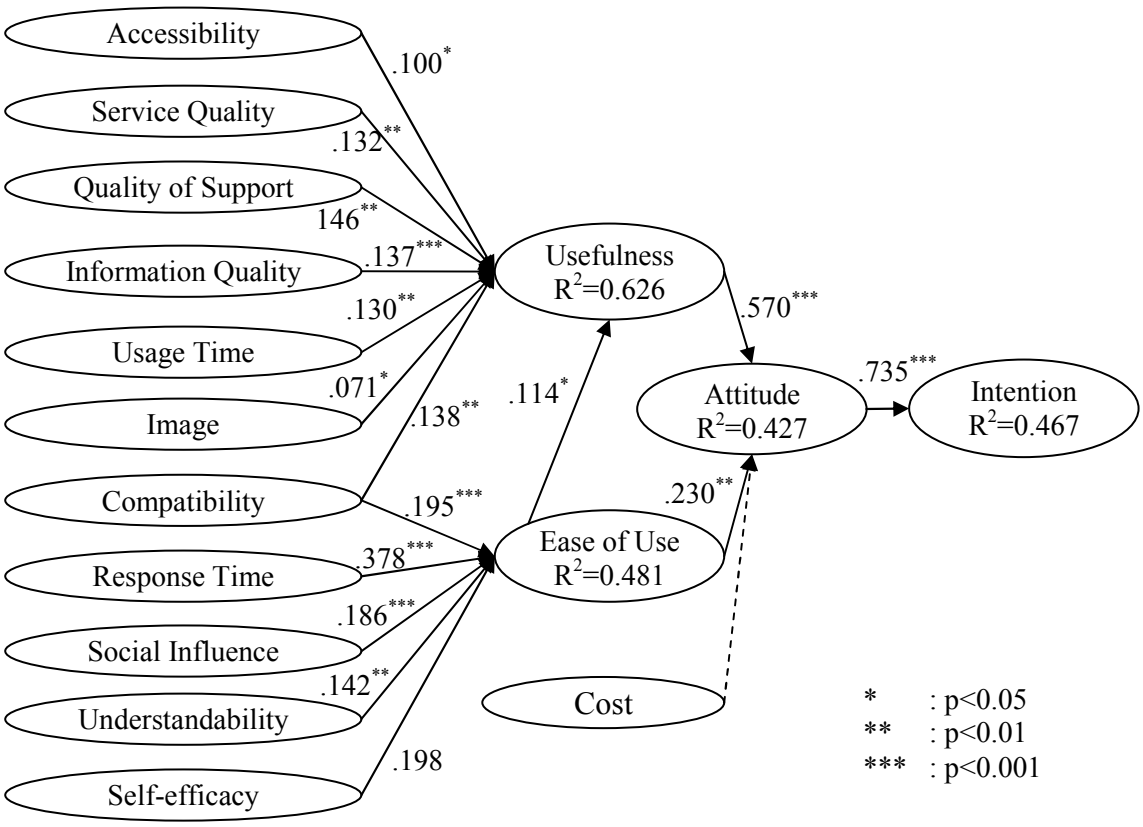


Fig. 19 Results of e-health information service intention framework

The results show that attitude is a direct determinant of users' intention toward the e-health service with a coefficient of .735 (p<.001). This relationship was also found significant in the previous studies (Fishbein & Ajzen, 1975; Chau & Hu, 2002).

Attitude is directly affected by usefulness and ease of use with the coefficients .570 (p<.001) and .270 (p<.01), respectively. These variables explain .427 of the attitude. Moreover, ease of use is significantly correlated with usefulness (b=.114, p<.05). These findings are parallel with what Davis found in TAM model (Davis, 1989).

The model revels that accessibility (b=.100, p<.05), service quality (b=.132, p<.01), quality of support (b=.146, p<.01), information quality (b=.137, p<.001), usage

time (b=.130, p<.01), image (b=.071, p<.05), and compatibility (b=.138, p<.01) are direct determinants of usefulness.

Besides, the effect of response time, compatibility, social influence, understandability, and behavioral control on ease of use are sustained with .378, .195, .186, .142, and .198 beta coefficients and <.001, <.001, <.001, <.01, and <.05 significant values, respectively.

According to regression analysis findings, sixteen hypotheses are accepted. Table 38 summarizes proposed hypotheses and results with significant values.

Table 38 Results of Hypothesis

Hypothesis	Dependent Variable	Independent Variable	Result	Sig.
H_1	Intention	Attitude	Supported	.000
H_2	Attitude	Usefulness	Supported	.000
H_3	Attitude	Ease of Use	Supported	.002
H_4	Usefulness	Ease of Use	Supported	.044
H_5	Usefulness	Accessibility	Supported	.030
H_6	Usefulness	Service Quality	Supported	.008
H_7	Usefulness	Quality Support	Supported	.008
H_8	Usefulness	Information Quality	Supported	.000
H_9	Usefulness	Usage Time	Supported	.008
H_{10}	Usefulness	Image	Supported	.011
H_{11}	Usefulness	Compatibility	Supported	.003
H_{12}	Ease of Use	Compatibility	Supported	.000
H_{13}	Ease of Use	Response Time	Supported	.000
H_{14}	Ease of Use	Social Influence	Supported	.000
H_{15}	Ease of Use	Understandability	Supported	.001
H_{16}	Ease of Use	Self-Efficacy	Supported	.014
H_{17}	Attitude	Cost	Not Supported	-

Cluster Analysis

Cluster analysis was conducted in order to indentify market segments of the e-health information service. SPSS Statistics software, version 17, is used to group the participants in different segments whose members show similar behavioral in some

sense. More than one cluster analysis containing two, three, and four clusters was applied based on the participants' preferences, and constructs studied in the regression. After constructing cluster segments, ANOVA analysis was also conducted to study characteristics within and between groups.

First cluster analysis, called cluster typology I, was performed with utility scores of each participant in the conjoint model. Respondents were grouped according to their preferences about service characteristics including input type, availability of face-to-face communication, availability of technical support, response time, and cost. Based on these variables, users were segmented into two, three, and four clusters. Only, segmentation that includes four clusters will be explained below. Others are presented in the Appendix G.

Table 39 shows the number of cases in each cluster. According to the table, clusters contain twenty-eight, fifty-one, twenty-seven, and fifty-five participants, respectively. Moreover, a name was given to each of the clusters according to predominant behavior of the users in the group. Name of the clusters are price-sensitive, in-touch, speedy, and automatic, respectively.

Table 39 Cluster Typology I - Number of Cases for Four Clusters

Clusters No	Clusters	Number of Cases
1	Price-Sensitive	28
2	In-touch	51
3	Speedy	27
4	Automatic	55

Results of cluster analysis were illustrated in Fig. 20 and summarized in Table 40.

The first cluster was named as *price-sensitive* on the grounds that users in this cluster choose inexpensive services. Their preferences are significantly affected by money they will pay to use the service. Users in this group pay little attention on the response time. They accept slow responses from the service.

The second cluster was named as *in-touch* because people in this cluster want to face-to-face communication with physician through mobile phone and technical support when they encounter a problem. Compared to other clusters, they mostly desire manual input instead of automatic.

The name of the third cluster was given as *speedy*. Common characteristics of the users in the third cluster are that they require rapid responses for their requests from the service. Face-to-face communication may not be available in the service.

Users in the fourth cluster were named as *automatic*. Compared to others, they strongly prefer automatic inputs. They are willing to pay more money for the services sending user information automatically. Also, they do not think about whether the service provides technical support or not..

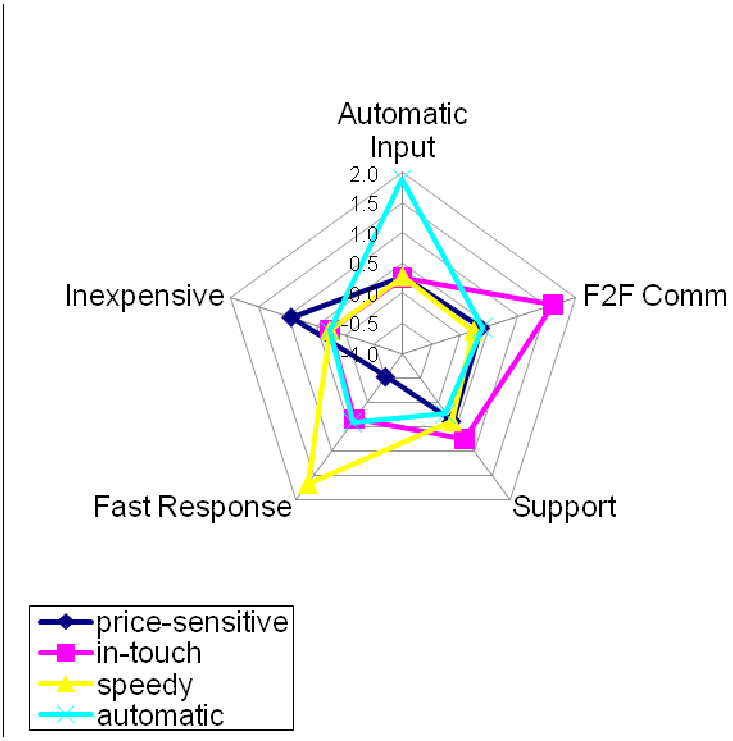


Fig. 20 Cluster typology I - analysis results for four clusters

Table 40 Cluster Typology I - Analysis Results for Four Clusters

Attribute	Level	F	Sig.	price-sensitive	in-touch	speedy	auto matic
Input Type	Automatic	111.55	0.000	0.28	*0.26*	0.29	1.90
Face2Face Comm.	Available	54.47	0.000	0.36	1.61	*0.24*	0.40
Technical Support	Available	8.04	0.000	0.39	0.75	0.39	*0.22*
Response Time	Fast	81.37	0.000	*-0.52*	0.34	1.67	0.40
Cost	Inexpensive	9.96	0.000	0.94	0.26	0.27	*0.26*

Besides, ANOVA analysis was done for the cluster by using regression variables. Threshold value of the analysis was 0.05 and the variables with a significant level less than the threshold value was listed in Table 41 in order to show the differences between clusters.

Table 41 Cluster Typology I - Results of ANOVA for Four Clusters

Attribute	F	Sig.	price-sensitive	in-touch	speedy	automatic
Cost	2.91	0.036	3.93	3.36	3.58	*3.17*
Currency	3.41	0.019	4.82	4.88	4.88	*4.55*
Input Effort	3.55	0.016	*4.00*	4.57	4.54	4.71
Location	3.33	0.021	*3.64*	4.43	4.35	3.96
Variable Cost	2.86	0.039	3.96	3.33	3.81	*3.20*
Weight Problem	2.77	0.044	*2.32*	2.78	3.46	2.67

According to Table 41, *price-sensitive* users pay more attention on the cost of the service. They prefer to send their information manually instead of buying an expensive service. Currency of the data is one of the important factors for the *speedy* users. They prefer to access up-to-date information. Being uncomfortable with their weights is another characteristic of these users. ANOVA analysis also support that users classified in the *automatic* group do not want to enter their data manually.

The second cluster analysis, cluster typology II, was conducted with six user characteristics including health concern, mobile service experience, usage time, compatibility, weight problem, and exercise. Users were grouped into two, three, and four clusters. Results of four cluster was explained below, others were summarized in Appendix G.

Number of cases in each cluster is shown in Table 42. According to the table, clusters consist of twenty-two, twenty-six, fifty-four, and forty-five users, respectively. Moreover, names of the clusters are *healthy*, *mobile-experienced*, *conservative*, and *overweight*.

Table 42 Cluster Typology II - Number of Cases for Four Clusters

Clusters No	Clusters	Number of Cases
1	Healthy	27
2	Mobile-experienced	26
3	Conservative	54
4	Overweight	45

Table 43 summarizes the results of cluster analyze and Fig. 21 represents the clusters.

The first cluster was called as *healthy* on the grounds that people in this cluster concern their health status and regularly exercise. So, they do not complain about weight problems. Moreover, they pay little attention on if the service is compatible with their life styles, and usage time.

Participants in the second cluster, named as *mobile-experienced*, use mobile services like weather forecast, pharmacy info in mobile phone. These users lean toward using the e-health service in their mobile phones because of previous similar experiences.

Users in the third cluster attach importance to compatibility of the service with their way of life, so this group was named as *conservative*. Besides, they are ready to find the time needed to use the service.

The forth cluster was named as *overweight* because users in this group generally have weight problems. They do not pay attention their health status and do not exercise regularly.

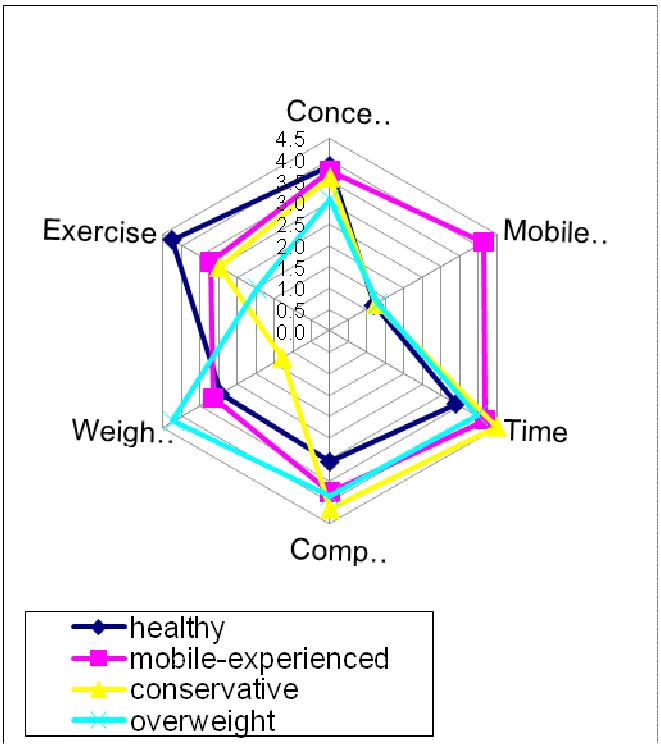


Fig. 21 Cluster typology II - analysis results for four clusters

Table 43 Cluster Typology II - Analysis Results for Four Clusters

Attribute	F	Sig.	healthy	mobile exp	conser vative	over weight
Concern Health	5.74	0.001	3.86	3.75	3.60	*3.09*
Mobile Service Exp.	201.90	0.000	*1.19*	4.15	1.24	1.29
Usage Time	9.48	0.000	*3.41*	4.19	4.50	3.98
Compatibility	8.18	0.000	*3.06*	3.79	4.18	3.88
Weight Problem	87.63	0.000	2.96	3.15	*1.28*	4.24
Exercise	20.39	0.000	4.26	3.23	2.98	*1.96*

In addition, ANOVA analysis was conducted for the clusters in order to explore differences between groups. Table 44 summarizes ANAOVA results with a significant level less than 0.05.

Table 44 Cluster Typology II - Results of ANOVA for Four Clusters

Attribute	F	Sig.	healthy	mobile exp	conser vative	over weight
Intention	3.60	0.015	*3.46*	3.82	4.10	4.01
Intention Q2	2.71	0.047	*3.30*	3.69	4.00	3.96
Attitude	3.86	0.011	*3.87*	4.06	4.46	4.26
Attitude Q1	4.00	0.009	*3.93*	4.15	4.54	4.40
Attitude Q2	2.99	0.033	*3.81*	3.96	4.39	4.11
Usefulness Q1	2.97	0.034	*3.85*	3.88	4.26	4.36
Usefulness Q5	2.67	0.050	*3.81*	4.04	4.37	4.27
Compatibility	8.18	0.000	*3.06*	3.79	4.18	3.88
Compatibility Q1	4.45	0.005	*3.19*	3.73	4.17	3.87
Compatibility Q2	8.14	0.000	*2.93*	3.85	4.19	3.89
Concern Health	5.74	0.001	3.86	3.75	3.60	*3.09*
Concern Health Q2	3.03	0.031	4.11	3.81	3.52	*3.20*
Concern Health Q4	7.32	0.000	3.74	3.38	3.72	*2.53*
Exercise	20.39	0.000	4.26	3.23	2.98	*1.96*
Expectation	4.40	0.005	*3.70*	4.00	4.44	4.07
Input Effort	2.86	0.039	*4.30*	4.58	4.31	4.82
Mobile Service Experience	201.90	0.000	*1.19*	4.15	1.24	1.29
Quality of Support Q1	2.95	0.035	*4.00*	4.04	4.39	4.51
Usage Time	9.48	0.000	*3.41*	4.19	4.50	3.98
Weight Problem	87.63	0.000	2.96	3.15	*1.28*	4.24

According to ANOVA results, cluster three has greatest attitude toward using e-health service. Users in this cluster think that the e-service is suitable for their life styles and patient-physician interactions. Moreover, they will be satisfied with the service.

CHAPTER 6

CONCLUSION

With the help of recent technological improvements, different type of telemedicine services have applied in the health care sector to improve quality of care, reduce cost, and access patients in the underserved areas. However, users of these services face difficulties in the adoption process. Therefore, the aim of this research is to examine factors that affect users' adoption on health information services. During the study, both qualitative and qualitative studies have been applied in order to construct health information service adoption taxonomy.

Implications

This research may provide valuable information not only for e-health service designers and marketing experts but also e-health adoption literature.

Table 45 shows the characteristics and market share of most desirable two alternatives. According to the table, these alternatives share some common properties like sending users' data automatically, availability of technical support, and inexpensive price. So, e-health service providers and designers should focus on the services that enable users to send measurement results automatically instead of manually. Automatic data send can be achieved by wireless technologies like Bluetooth, or infra-red. Devices used in the measurement process can be communicated with mobile phone that will be used to send the collected data over the internet to the medical servers by the help of wireless technologies. Besides, users feel in comfortable when they find someone's help in the case of meeting difficulties or failures while using the service. Live assistance

feature, and text or voice chat with operators add great value to a service. Designers can provide quick response and ease of access capabilities to the live assistance feature in order to improve effect of it on the users' choices. Another important issue is that service providers should be sensitive about the price while adding these value-added service functionalities.

Table 45 The Most Preferred Two Alternatives

Alter.	Input Type	Response Time	Face to Face Communication	Technical Support	Cost	Market Share
3	Automatic	Fast	Available	Available	Inexpensive	20%
2	Automatic	Slow	Not Available	Available	Inexpensive	14%

Features of the least desirable two alternatives are listed in Table 46. According to the table, on the contrary of most preferred ones, least desirable alternatives have manual input type functionality. In addition, they do not provide face-to-face communication between patients and physicians. Service providers should avoid of these characteristics while developing e-health services.

Table 46 The Least Preferred Two Alternatives

Alter.	Input Type	Response Time	Face to Face Communication	Technical Support	Cost	Market Share
5	Manual	Fast	Not Available	Not Available	Inexpensive	9%
6	Manual	Slow	Not Available	Available	Expensive	7%

According to averaged importance scores of the e-health service attributes in the conjoint analysis (Table 30), input type was found as the most important attribute that effects users' preferences, followed by availability of face-to-face communication, availability of live technical support, response time, and cost, respectively. Service providers should pay great attention on the automatic data send functionality to improve

the market share of the e-health service. They should provide an environment in which different type of devices can communicate each other by sending and receiving patients' data. By this way, the role of the patients can be decreased in the data collection process and more accurate data can be collected without user involvement. Availability of face-to-face communication is another important attribute of the e-health service. Patients prefer face-to-face interaction with a physician via mobile phone. Service providers can improve the interaction quality by proving video conversation in a large mobile phone screen and more understandable voice. Moreover, they can enable sending a image during conversation.

Regression analysis showed that usefulness of an e-health service was affected by quality of the service, compatibility with users' life style, quality of support, quality of information presented in the service, usage time, image, accessibility, and easy-to-use properties of the service. Designers should develop services that do not require much usage time. Users do not prefer to spend much time while using the service. This can be achieved by automatic data sending mechanisms. In addition, users should access data presented in the service quickly and easily when they need it. Customizable menu items and short cut keys can be used to make data access quick and easy. Moreover, colorful graphics and charts can help the designers to provide well-structured data outputs that improve quality of information.

Parallel to previous research findings (Davis, 1989; Yu et al., 2009; Venkatesh et al., 2003), usefulness and ease of use were found significant determinants of attitude toward e-health service usage. Moreover, like Davis's findings (Davis, 1989), the results showed that compared to ease of use, usefulness had a significantly greater

correlation with attitude. In addition, it was found in this research and previous studies (Davis, 1989; Dishaw et al., 1999; Mathieson et al., 2001) that ease of use significantly influences the usefulness.

Like previous studies (Schaper & Pervan, 2007; Tung et al., 2008), compatibility was found one of the significant determinants of usefulness. Although, Schaper and Pervan (2007) did not find the effect of compatibility on ease of use significant, this research did. As Venkatesh and Davis (2000) findings, it was found that image significantly influence usefulness. Yusof et al. (2007) showed that service and information quality improve user satisfaction. However, Lemire et al. (2008) did not find relationship between information quality and system usage. This research showed that service and information quality significantly affects usefulness. Although Yu et al. (2009) find that subjective norms affects both of usefulness and ease of use, this research found significant only relationship between social influence and ease of use. In addition, parallel with the previous researches conducted in the internet usage (Seyal & Pijpers, 2004) and smart phone usage (Chen et al., 2004) contexts, it was found that self-efficacy has a positive effect on ease of use in the adoption process of e-health services. Unlike previous research findings (Tung at al., 2008; Luarn & Lin, 2005), the significant relation between cost and behavioral intention did not found in this study.

In addition, this research concluded that service quality, compatibility, quality of support, information quality, usage time, image, accessibility, and ease of use are significant determinants of usefulness and response time, compatibility, social influence, understandability, and self efficacy are significant antecedents of ease of use in the e-health information service adoption context.

Limitations of the Study

One limitation of this study is about sample size, which is 152. Although the number of participants is enough to conduct analysis in this study, it would be beneficial to improve the respondent size in order to generalize findings.

Convenience of the sample is another limitation of the study. The e-health service was designed for users suffering from obesity or diabetes. However, according to WHO body mass index classification (WHO, 2009), 32% of the respondents were categorized as overweight and obese. Also, only three of the participants were diabetic.

Moreover, the experiment was conducted in Turkey, so it is difficult to generalize the findings for people live in other countries. Cultural differences should be taken into consideration while examining the study results.

Further Works

Although eighty constructs were derived from the literature survey, qualitative and quantitative studies, only some of them were used in the electronic health information service adoption framework. So, extracted constructs or new constructs from the literature can be added to the proposed taxonomy and validity test can be carried out.

Moreover, the study can be conducted in different cultures in order to reduce the effects of cultural differences. By this way, results of the study can be generalized in a larger population.

APPENDICES

A. Interview Study

Interview Questions (English)

1. Have you ever used a mobile service?
    a. If you have used, which mobile service(s) did you use?
    b. Are you interested in new technologies?

2. Would you want to use the proposed service?
    a. According to you, which functionality/properties of the service are beneficial?
    b. In your opinion, which functionality/properties of the service are inadequate?

3. Do you advise the service to your colleagues and friends?
    a. According to you, which functionality/properties of the service do you advice?
    b. According to you, which functionality/properties of the service do not you advice?

4. If you encounter someone who uses the service, do you attempt to use it?

5. What do you think about the one that uses the service?

6. Did you need help while using the service?
    a. If you need, in which part of the service do you need help?

7. Do you think the service is ease of use? What type of difficulties did you encounter while you were using the service?

8. Is the information given by the service useful? Which information is the most useful for you?

9. Do you suggest any extra information for the service?

10. How much money would you want pay for using the service?

11. Do you mind privacy and security of your data stored in the service?

12. Do you think that people intend to use this service? In your opinion, who are the people that need this service at most?

13. What do you think about the interface's sound used in the service?

14. Do you have any additional comment for the proposed service?

Interview Questions (Turkish)

1. Daha önce mobil hizmet kullandın mı?
    a. Hangilerini kullandın?
    b. Teknolojiyi takip eder misin?

2. Böyle bir servisi kullanmak ister misin?
    a. Evet- Sence bu servisin en faydalı özellikleri nelerdir?
    b. Hayır – Sence bu servisin hangi özellikleri yetersiz?

3. Meslektaslarına veya arkadaşlarına bu sistemi kullanmalarını tavsiye eder misin?
    a. Tavsiye edersen hangi ozelliklerini tavsiye edersin?
    b. Hangi özelliklerini tavsiye etmezsin?

4. Başkaları bu servisi kullanıyorsa sende kullanmayı dener misin?

5. Bu servisi kullanan bir arkadaşını gördüğününde onun hakkında ne düşünürsün?

6. Sistemi kullanırken birinin yardımına ihtiyaç duydun mu?
    a. Hangi kısımlarda yardıma daha çok ihtiyaç duydun?

7. Sence kullanımı kolay mıdır? Sistemi kullanırken karşılaştığın zorluklar nelerdir?

8. Sistemin size verdiği bilgiler yararlı mı? Sence en çok hangi bilgi işine yarar?

9. Sistemde (hasta ile ilgili) olmasını istediğiniz başka bir bilgi varmı?

10. Bununla ilgili ne kadar maliyete katlanabilirsiz?

11. Bilgilerin sağlam bir şekilde bozulmadan saklanması ve kişisel bilgilerin gizliliği konusunda kaygınız var mı?

12. Sizce bu sistemi insanlar kullanır mı? Bu sisteme en fazla ihtiyaç duyacak kişiler kimlerdir? Meslek ve insan özellikleri (çok konuşan….) nelerdir?

13. Arayüzlerde “ses” kullanılması hakkında ne düşünüyorsunuz?

14. Sistemde olmasını istediğiniz başka özellikler var mı?

Dialogue between patient/physician and the service

Patient Dialogue
Service: Hello. What is your username?
Patient: Tiger (okay)
Service: Enter your password.
Patient: Enter 1224 (okay)
Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.
Patient: Enter Meal (okay)
Service: What did you eat or drink?
Patient: I eat hamburger (okay)
Service: How much you eat or drink
Patient: One (okay)
Service: Do you eat or drink anything else?
Patient: Yes (okay)
Service: What did you eat or drink?
Patient: I drink coke (okay)
Service: How much you eat or drink?
Patient: I drink one bottle (okay)
Service: Do you eat or drink anything else?
Patient: No (okay)
Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.
Patient: Meal Suggestion (okay)
Service: You can eat 1 Cups of Spaghetti, 3/4 Cup Tossed Salad, 1 Cup Apple Juice. Do I repeat or return main menu.
Patient: Repeat (okay)
Service: You can eat 1 Cups of Spaghetti, 3/4 Cup Tossed Salad, 1 Cup Apple Juice. Do I repeat or return main menu.
Patient: Return main menu (okay)
Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.
Patient: Enter Information (okay)
Service: Select your operation. Enter movement or exercise, Enter Trauma, Enter pain, Enter drug, Return main menu
Patient: Enter Pain (okay)
Service: What is your pain?
Patient: I have headache and chest pain (okay)
Service: Select your operation. Enter movement or exercise, Enter Trauma, Enter pain, Enter drug, Return main menu
Patient: Enter movement or exercise (okay)
Service: What type of movement or exercise you did?
Patient: Today, I run 3000 meters and ride a bicycle 6000 meters.
Service: Select your operation. Enter movement or exercise, Enter Trauma, Enter pain, Enter drug, Return main menu
Patient: Enter drug (okay)

Service: Enter drug information.
Patient: I get one sulfonylurea.(okay)
Service: Select your operation. Enter movement or exercise, Enter Trauma, Enter pain, Enter drug, Return main menu
Patient: Return Main Menu (okay)
Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.
Patient: Get Calorie Information (okay)
Service: Today you got 4200 cal and you can got 1000 more in today. Do I repeat or return main menu.
Patient: Return main menu (okay)
Service: Select your operation. Enter Meal, Enter Information, Meal Suggestion, Get Calorie Information, Exit.
Patient: Exit
Service: Bye bye

Warning to take medicine
Service: Hello Mrs. James. This is a reminder service of the Medical Record Server. It is time to take sulfonylurea. Bye Bye.
Warning to enter information
Service: Hello Mrs. James. This is a reminder service of the Medical Record Server. You do not enter any information to the system last 8 hours. Thank you. Bye Bye.

Physician Dialogue
Service: Hello. What is your username?
Physician: Tiger (okay)
Service: Enter your password.
Physician: Enter 1224 (okay)
Service: Select your operation. Calorie Information, Blood Glucose Information, Blood Pressure Information, Exit
Physician: Calorie Information (okay)
Service: What is your patient name?
Physician: Peter Brown (okay)
Service: Peter Brown got 3000 calories in today. He can take 1230 more calories. Do I repeat or return main menu.
Physician: Return main menu (okay)
Service: Select your operation. Calorie Information, Blood Glucose Information, Blood Pressure Information, Exit
Physician: Blood Glucose Information (okay)
Service: What is your patient name?
Physician: Mary Brown (okay)
Service: There are two Mary Brown. What is the birth date of Mary Brown?
Physician: 4th of April (okay)
Service: Blood glucose of Mary Brown is 6 mmol/l and recorded at 10:00 am in today. Do I repeat or return main menu.
Physician: Repeat

Service: Blood glucose of Mary Brown is 6 mmol/l and recorded at 10:00 am in today. Do I repeat or return main menu.
Physician: Return main menu (okay)
Service: Select your operation. Calorie Information, Blood Glucose Information, Blood Pressure Information, Exit
Physician: Exit
Service: Bye Bye

Warning
Service: Hello Mr. James. This is an alert service of the Medical Record Server. Blood Glucose level of patient Mary Brown decreases under 3 mmol/l. Bye Bye.

Interview Analysis Results

Table 47 Data Extracted from the Interviews

Class	Variable	Content Quality		Service Quality		EoU		Usefulness		Attitude		total	
		N	%	N	%	N	%	N	%	N	%	N	%
Service	Comm. standards	2	0.71	2	0.71							4	1.42
Service	Sound quality			5	1.77	8	2.84					13	4.61
Service	Language			2	0.71	5	1.77					7	2.48
Service	Accurate input			1	0.35			2	0.71	3	1.06	6	2.13
Service	Output quality			1	0.35			2	0.71	2	0.71	5	1.77
User	User involvement			1	0.35			2	0.71	2	0.71	5	1.77
Service	Customizable			1	0.35			1	0.35			2	0.71
Facilitate	User guidance					10	3.55					10	3.55
User	Age					7	2.48			8	2.84	15	5.32
Service	Input type					4	1.42			3	1.06	7	2.48
User	Experience					4	1.42			3	1.06	7	2.48
Service	Input quantity					3	1.06			1	0.35	4	1.42
Service	Sound					3	1.06			1	0.35	4	1.42
Service	Menu items					3	1.06				0.35	3	1.06
User	Tech-savvy					2	0.71			5	1.77	7	2.48
Facilitate	Help button					2	0.71		.	2	0.71	4	1.42
Service	Device type					2	0.71					2	0.71
Service	Serv. Complexity					1	0.35			1	0.35	2	0.71
Service	Input Quality					1	0.35					1	0.35
Service	Content							16	5.67	12	4.26	28	9.93
Service	Serv. Capabilities							5	1.77	2	0.71	7	2.48
Service	Mobility							3	1.06	6	2.13	9	3.19
Service	Job Fit							3	1.06	4	1.42	7	2.48
Service	Rapid Response							1	0.35	1	0.35	2	0.71
Service	Service Accuracy							1	0.35	1	0.35	2	0.71
Service	Cost									16	5.67	16	5.67
User	Health Status									16	5.67	16	5.67
Social	Social Influence									15	5.32	15	5.32
Inter.	Usefulness									14	4.96	14	4.96
User	Users Time Const									9	3.19	9	3.19
Service	Security			1	0.35					9	3.19	10	3.55
Service	Time Factor									8	2.84	8	2.84
Service	Face2face Comm									6	2.13	6	2.13
Inter.	Ease of Use			1	0.35			1	0.35	6	2.13	8	2.84
User	Income									4	1.42	4	1.42
User	Education Level									3	1.06	3	1.06
User	Gender									3	1.06	3	1.06
User	Requirement									3	1.06	3	1.06
Facilitate	Image									2	0.71	2	0.71
Service	Service Quality									1	0.35	1	0.35
User	Trust									1	0.35	1	0.35
Total		2	0.71	15	5.32	55	19.50	37	13.12	173	61.35	282	100

B. AHP Study

AHP Alternatives

Table 48 AHP Alternatives

Attribute	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Implementation Cost	200 TL	500 TL	800 TL	500 TL
Operating Cost	100 TL/month	50 TL/month	50 TL/month	25 TL/month
Usage Time	10 min / day	50 min / day	30 min / day	30 min / day
Response Time	45 min	15 min	5 min	15 min
Language	Turkish	English	Turkish/English	Turkish/English
Security	Available	Not Available	Available	Not Available
Triability	Not Available	1 week limited functionality	Not Available	1 week unlimited functionality
Sound Type	Computerized	Male	Female	Computerized
Input Type	Sound	Text	Selection among alternatives	Text
Availability of Face-to-Face Communication	Available	Not Available	Not Available	Available
Technical Support	7 / 24	09:00 – 17:00	09:00 – 17:00	Not Available
User Training	Operating manual is given to user	Training is conducted by a professional	Online Education	Not Available
Medical Provider	Private Hospital	Public Hospital	Public Hospital	Private Hospital
Customizability	Frequently used menu items are automatically shown on top of the menu	Users are selecting frequently used menu items manually	Menu items are shown in the same order	Frequently used menu items are automatically shown on top of the menu
Clarity of Menu Items	Service does not contain menu	Textual menu items	Graphical menu items	Both of the graphics and text are used in the menu items
Output Quality	Meal list is given as a output	User preference are taken into consideration in the meal list	Meal list is given as a output	User preference are taken into consideration in the meal list

AHP Study Results

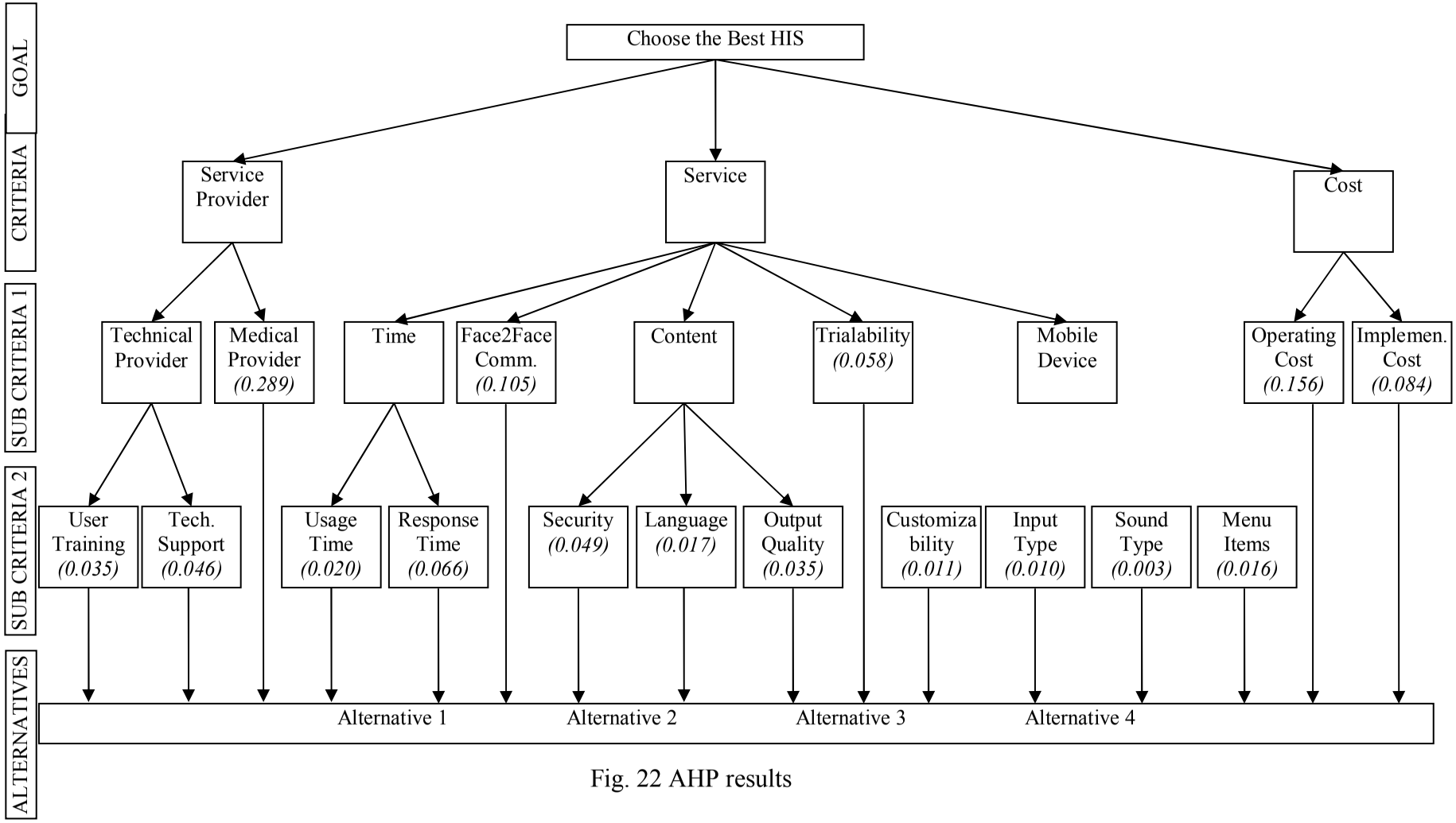


Fig. 22 AHP results

C. Expert Focus Group Study

Expert Focus Group Constructs and Definitions

Table 49 Expert Focus Group Constructs and Definitions

Construct (English)	Construct (Turkish)	Description
Age	Yaş	Kullanıcının yaşı.
Educational Level	Eğitim Düzeyi	Kullanıcının eğitim düzeyi.
Gender	Cinsiyet	Kullanıcının cinsiyeti.
Income	Gelir	Kullanıcının aylık geliri.
Marital Status	Evlilik Durumu	Kullanıcının evlilik durumu.
Job Experience	İş Deneyimi	Kullanıcının iş deneyimi.
Place of Residence	İkamet Yeri	Kullanıcının ikamet yerinin özelliliği (köy, ilçe, şehir merkezi).
Occupation	Meslek	Kullanıcının mesleği.
Ease of Use	Kolay Kullanım	Servisin kolay kullanımı.
Usefulness	Fayda	Servisi kullanımdan doğan fayda.
Geographic Area	Coğrafi Konum	Hastahanenin coğrafi konumu (şehir merkezi, ilçe, köy gibi).
Population Serviced	Hizmet Ettiği Nüfus	Hastahanenin hizmet verdiği kişi sayısı.
Hospital Size	Hastahane Büyüklüğü	Hastahanenin fiziksel büyüklüğü.
Clinical Variables	Diğer Değişkenler	Hastahane ile ilgili değişkenler.
Adequate Resources	Kaynaklar	Hastanenin servis icin ayirabilecegi kaynaklar.
Clinical Specialty	Uzmanlık Alanı	Hasthanenin genel uzmanlık alanı.
Managerial Support	Yönetim Desteği	Yöneticilerin servisin kullanılması için verdiği destek.
Peer Support	Arkadaş Desteği	Servis kullanımı sırasında yaşıtlarınından veya arkadaşlarından aldığı destek.
Professional Support	Profesyonel Destek	Servis kullanımı sırasında profesyonellerden alınan destek.
Vendor Support	Satıcı Desteği	Satıcı firmanın sağladığı yardım ve destek.
Quality of Support	Desteğin Kalitesi	Verilen yardım ve desteğin kalitesi.
Social Influence	Sosyal Etkenler	Servisi kullanan kişinin çevresindekilerden aldığı etki.
Compatibility	Uyumluluk	Servisin hastanın yaşam tarzına uygunluğu.
Accuracy	Doğruluk	Sunulan bilginin doğruluğu.
Understandability	Anlaşılabilirlik	Sunulan bilginin kolay bir şekilde anlaşılması.
Currency	Güncellik	Sunulan bilginin güncelliği.
Detail	Detay	Sunulan bilginin detayı.

Table 49 Continue

Construct (English)	Construct (Turkish)	Description
Meaning	İçerik Bilgisi	Sunulan bilginin anlamı.
Information Quality	Bilgi Kalitesi	Sunulan içeriğin kalitesi.
Security	Bilginin Güvenliği	İçeriğin başkalarının erişemeyeceği bir ortamda saklanması.
Tool Experience	Deneyim	Kullanıcının benzer servis ya ürün ile ilgili geçmiş deneyimleri.
Image	İmaj	Kullanıcıların etraflarındaki insanlara kendilerini farklı, ayrıcalıklı ve öncü gösterme isteği.
Satisfaction	Memnuniyet	Kullanıcının servisten memnun kalması.
Voluntariness	Gönüllülük	Kullanıcının yükümlülüğü olmadan isteyerek servisi kullanması.
Fixed Cost	Sabit Ücret	Kullanıcının servisi alırken ödediği tek seferlik ücret.
Variable Cost	Değişken Ücret	Kullanıcın ödediği aylık ücret.
Device Type	Cihaz Tipi	Kullanılan cihazınların tipleri.
Hardware/Software	Yazılım/Donanim	Kullanılan cihazın yazılımsal ve donanomsal özellikleri.
Quality of Image	Resim Kalitesi	Kullanılan cihazdaki resimlerin kalitesi.
Quality of Verbal Communication	Ses Kalitesi	Sesli iletişimdeki sesin kalitesi.
Facilitating Conditions	Kolaylaştırıcı Koşullar	Servisin kullanımını kolaylaştıracak koşullar.
Functional Characteristics	Fonksiyonel Özellikler	Servisin fonksiyonel özellikleri.
Customization	Kişiselleştirilebilirlik	Servis fonksiyonlarını isteğe göre değiştirebilmek.
Relative Advantage	Göreceli Avantaj	Servisin alternatiflere göre avantajları.
Accessibility	Ulaşabilirlik	Kullanıcının sunulan bilgiye kolay ulaşabilimesi.
Affect	Duygulanım	Kullanıcının servisi kullanması ile ilgili duyguları.
Behavioral Control	Davranış Kontrolü	Hastanın servisi kullanmak için yeterli yeteneklerinin, kaynağının ve fırsatının olup olmadığı algısı.
Concern of Health	Sağlık Durumu Kaygısı	Kullanıcının sağlığına verdiği önem.
Health Status	Sağlık Durumu	Kullanıcının sağlık durumu.
Job Relevance	Işe Uygunluk	Servisin doktorun işine uygunluğu.

Table 49 Continue

Construct (English)	Construct (Turkish)	Description
Knowledge	Bilgi Düzeyi	Kullanıcının sağlık ve e-sağlık hakkında bilgi düzeyi.
Market Variable	Market Özellikleri	Sağlık sektörünün içinde bulunduğu marketin özellikleri.
Intrinsic Motivation	İçsel Motivasyon	Kullanıcının içinden gelen dışsal kaynaklara dayanmayan motivasyon.
Extrinsic Motivation	Dışsal Motivasyon	Kaydağı dışaradan gelen motivasyon.
Output Quality	Çıktı Kalitesi	Servis çıktısının kalitesi.
Presentation	Çıktının Sunumu	Servisin sunduğu bilgilerin gösterim özelliği (text, grafik, ses).
Service Quality	Servis Kalitesi	Servisin genel anlamda kalitesi.
Usage Time	Zaman	Kullanıcının servisi kullanmak için harcadığı zaman.
Triability	Denenebilirlik	Servisin satın alınmadan önce kullanıcı tarafından demo olarak denenebilmesi.
Type of Medical Service	Medikal Servisin Tipi	Sunulan medikal servisin tipi.
Assistance	Yardım	Servisi kullanırken kullanıcıya sunulan yardım.
Documentation	Dökümantasyon	Servisin dökümantasyonu.
Fun	Eğlence	Servisin kullanıcı tarafından sıkılmadan eğlenilerek kullanılması.
Government Policy	Devlet Politikası	Devletin elektronik sağlık servisleri ile ilgili politikası.
Habit	Alışkanlık	Kullanıcının mevcut alışkanları.
Information-Seeking Preference	Bilgi Arama Önceliği	Kullanıcının bir konuyu araştırma sırasında danışacağı veya bakacağı yerlerin sıralaması.
Observability	Görünürlük	Servis sonuçlarının başkaları tarafından görünebilmesi.
Opinion of Professionals	Profesyonel Görüşler	Sağlık sektöründe çalışanların servis hakkındaki görüşleri.
Psychological Ownership	Sahiplenme	Kullanıcının servisi sahiplenmesi.
Trust	Güvenilirlik	Hastanın servise ve servis sağlayıcıya güveni.
Time Investment	Zaman Ayırma	Doktorun servise ayıracağı zaman.
User Involvement	Katılım	Kullanıcının servisi kullanırken kendini sistemin bir parçası olarak hissetmesi.
Visual Orientation	Görsel Yönelim	Kullanıcının görsel yönelimi (Text, Grafik, Ses).

Table 49 Continue

Construct (English)	Construct (Turkish)	Description
Patient Location during Treatment	Tedavi Yeri	Tedavi sırasında hastanın bulunduğu yer (ev veya hastahane).
Computer Experience	Bilgisayar Deneyimi	Kullanıcının bilgisayar kullanımı deneyimi.
Computer Literacy	Bilgisayar Okuryazarlığı	Kullanıcının bilgisayar kullanım seviyesi.
Internet Dependence	Internet Bağımlılığı	Kullanıcı internete hangi oranda bağımlı yaşadığı.
Internet Access at Worksite	İşyerinde İnternete Erişim	Kullanıcının işyerinden internete erişebilmesi
Internet Access at Home	Evde İnternete Erişim	Kullanıcının evden internete erişebilmesi.
Time Spent On-Line	Çevirimiçi Zamanı	Kullanıcının internet ortamında harcadığı zaman.

Expert Focus Results

Table 50 Expert Focus Group Results

Variable	Expert										Total
	1	2	3	4	5	6	7	8	9	10	
Ease of Use	x	x	x	x	x	x	x	x	x	x	10
Accuracy	x	x	x	x	x	x	x	x	x	x	10
Understandability	x	x	x	x	x	x	x	x	x	x	10
Security	x	x	x	x	x	x	x	x			8
Facilitating Conditions		x	x	x	x	x	x	x		x	8
Accessibility	x	x	x	x	x		x	x	x		8
Concern of Health		x	x	x	x	x	x	x		x	8
Age		x	x	x		x		x	x	x	7
Satisfaction	x		x	x	x	x			x	x	7
Educational Level		x	x		x		x	x		x	6
Occupation	x		x	x		x		x		x	6
Usefulness	x	x				x	x		x	x	6
Professional Support		x			x	x	x		x	x	6
Currency	x	x			x		x	x	x		6
Information Quality	x	x		x	x			x	x		6
Trust	x	x		x	x			x		x	6
Quality of Support	x	x			x			x	x		5
Compatibility			x		x			x	x	x	5
Fixed Cost			x	x	x			x		x	5
Job Relevance			x	x			x		x	x	5
Usage Time	x		x					x	x	x	5
Triability		x	x			x		x		x	5
Time Investment				x		x	x	x		x	5
Population Serviced		x	x				x	x			4
Vendor Support			x			x	x			x	4
Variable Cost		x	x					x		x	4
Health Status	x					x		x		x	4
Presentation					x	x		x		x	4
Service Quality					x		x	x	x		4
Type of Medical Service					x	x			x	x	4
Gender				x					x	x	3
Geographic Area			x			x		x			3
Clinical Specialty	x			x	x						3
Managerial Support				x		x	x				3
Social Influence		x	x					x			3
Meaning					x		x		x		3
Tool Experience		x	x							x	3
Image					x	x		x			3
Hardware/Software					x		x		x		3

Table 50 Continue

Variable	Expert										Total
	1	2	3	4	5	6	7	8	9	10	
Customization	x	x					x				3
Output Quality			x		x				x		3
Assistance		x		x				x			3
Opinion of Professionals	x					x	x				3
Computer Literacy		x		x						x	3
Internet Access at Home		x				x	x				3
Adequate Resources							x		x		2
Detail								x	x		2
Quality of Image		x				x					2
Functional Characteristics							x		x		2
Knowledge				x	x						2
Intrinsic Motivation								x		x	2
Government Policy								x		x	2
Observability	x							x			2
Psychological Ownership				x				x			2
User Involvement				x					x		2
Patient Location during Treatment								x		x	2
Internet Dependence			x							x	2
Peer Support						x					1
Voluntariness	x										1
Device Type										x	1
Quality of Verbal Communication						x					1
Behavioral Control								x			1
Market Variable							x				1
Extrinsic Motivation										x	1
Habit			x								1
Information-Seeking Preference				x							1
Visual Orientation				x							1
Computer Experience	x										1
Time Spent On-Line	x										1
Income											0
Marital Status											0
Job Experience											0
Place of Residence											0
Hospital Size											0
Clinical Variables											0
Relative Advantage											0
Affect											0
Documentation											0
Fun											0
Internet Access at Worksite											0

D. Experimental Study

Experiment Welcome Screen

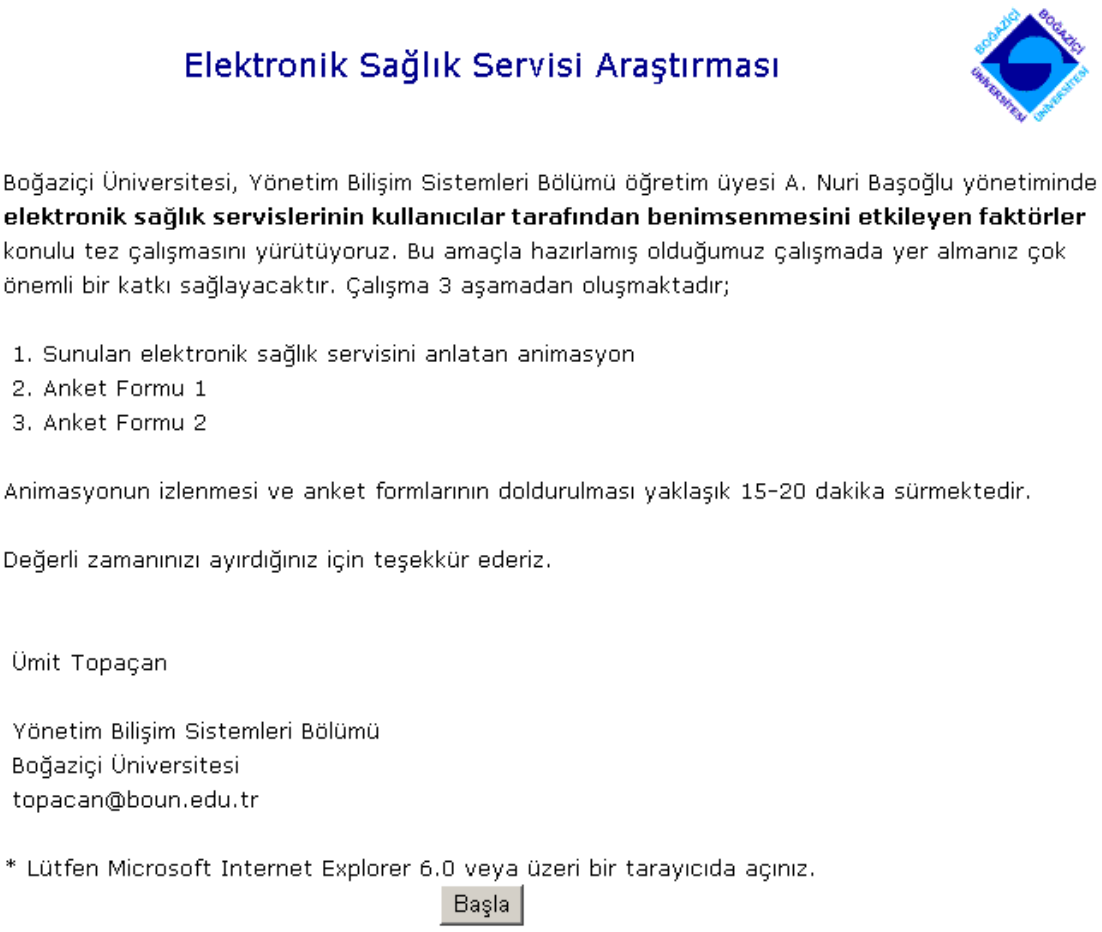


Fig. 23 Experimental study - welcome screen

Experiment Animation Screens

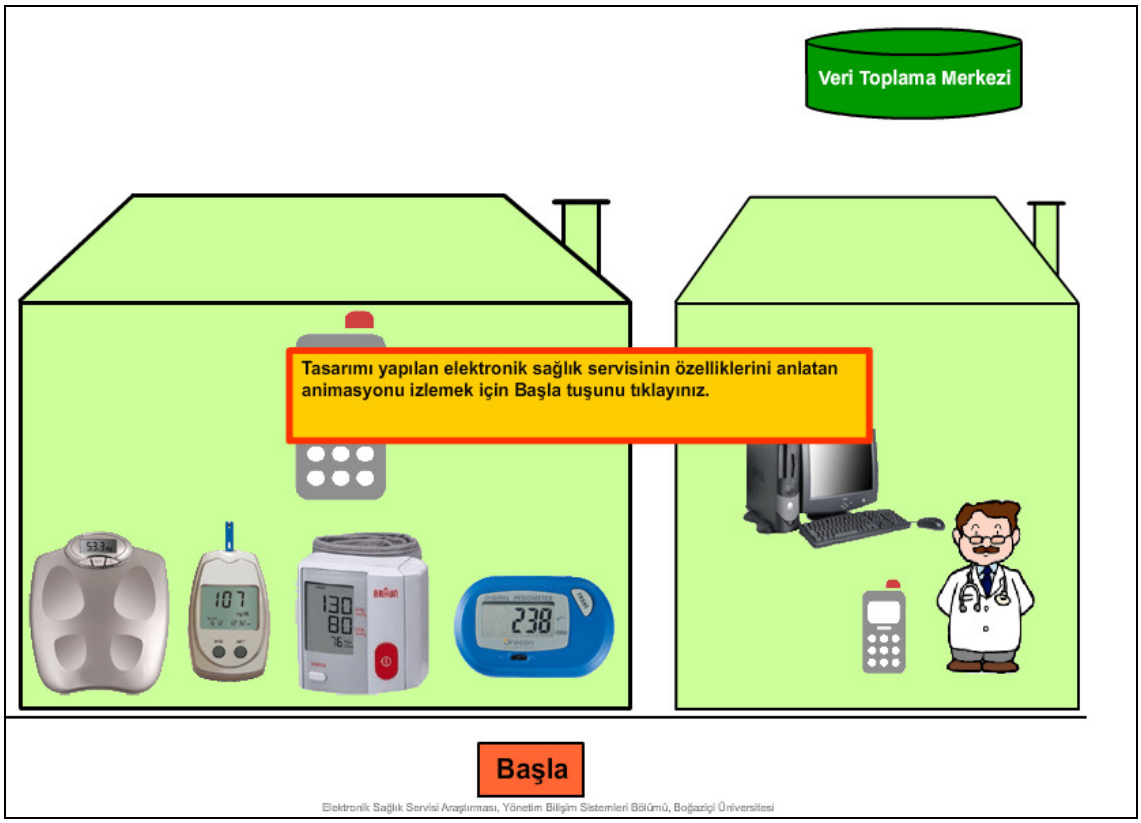


Fig. 24 Experimental study - animation - entrance screen

Fig. 24 shows the first page of the animation. It requires from the user to click “Başla” button in order to continue in the next page.

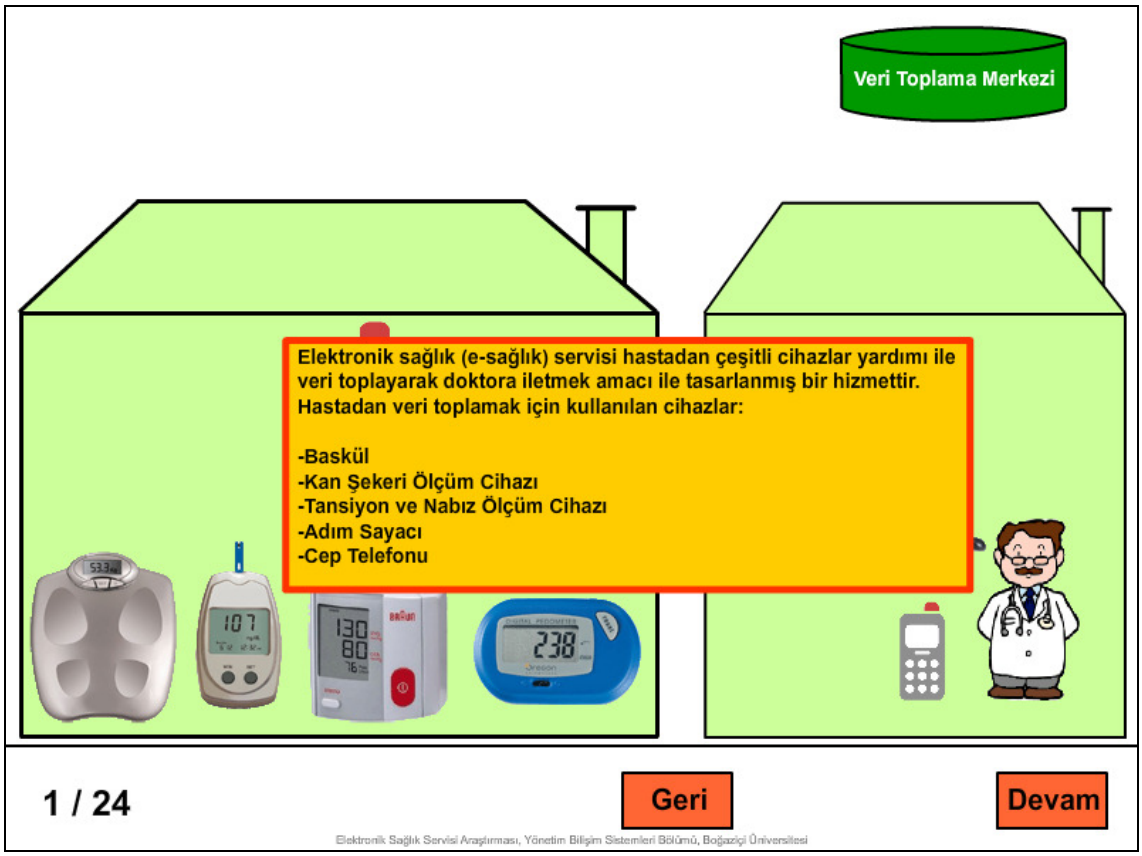


Fig. 25 Experimental study - animation - screen 1

Aim of the service is to collect data from the user via various devices like bascule, pedometer to share them with a physician. Tools in the service are;

Bascule
Glucose meter
Pulse meter
Pedometer
Mobile phone

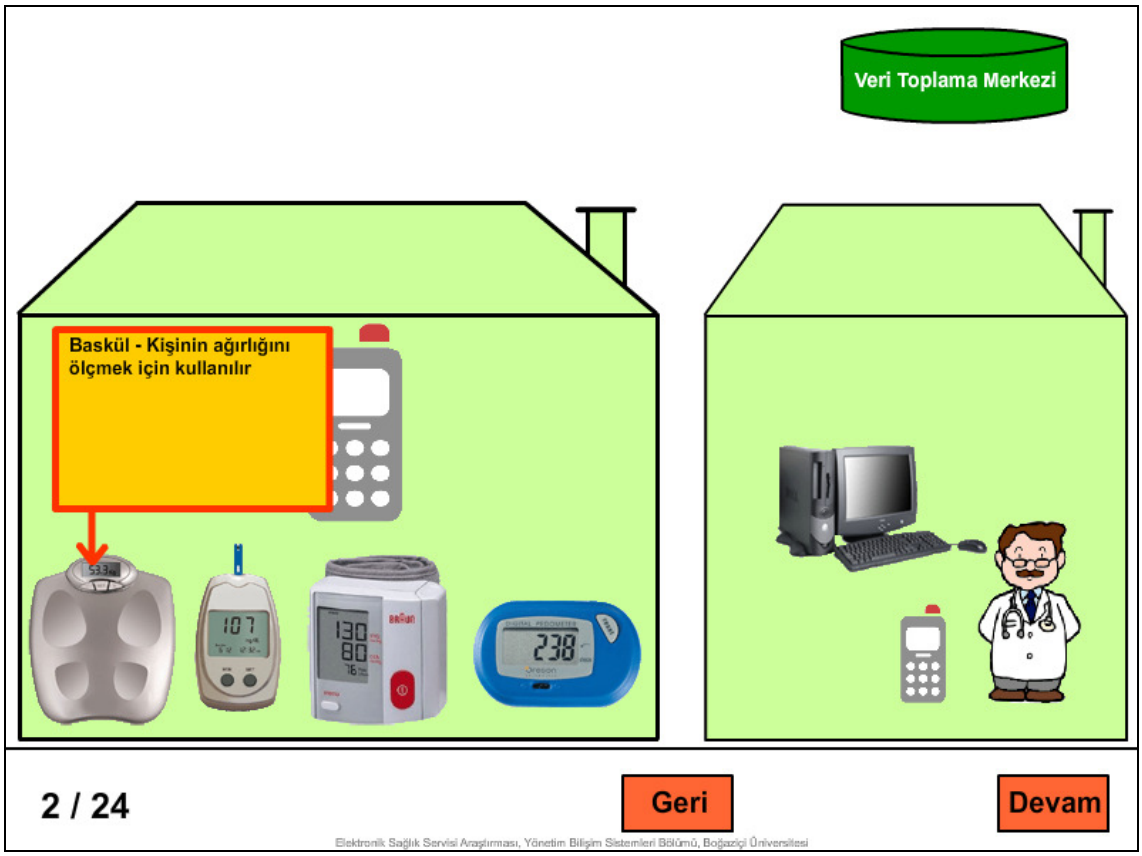


Fig. 26 Experimental study - animation - screen 2

Bascule is used to weight user.

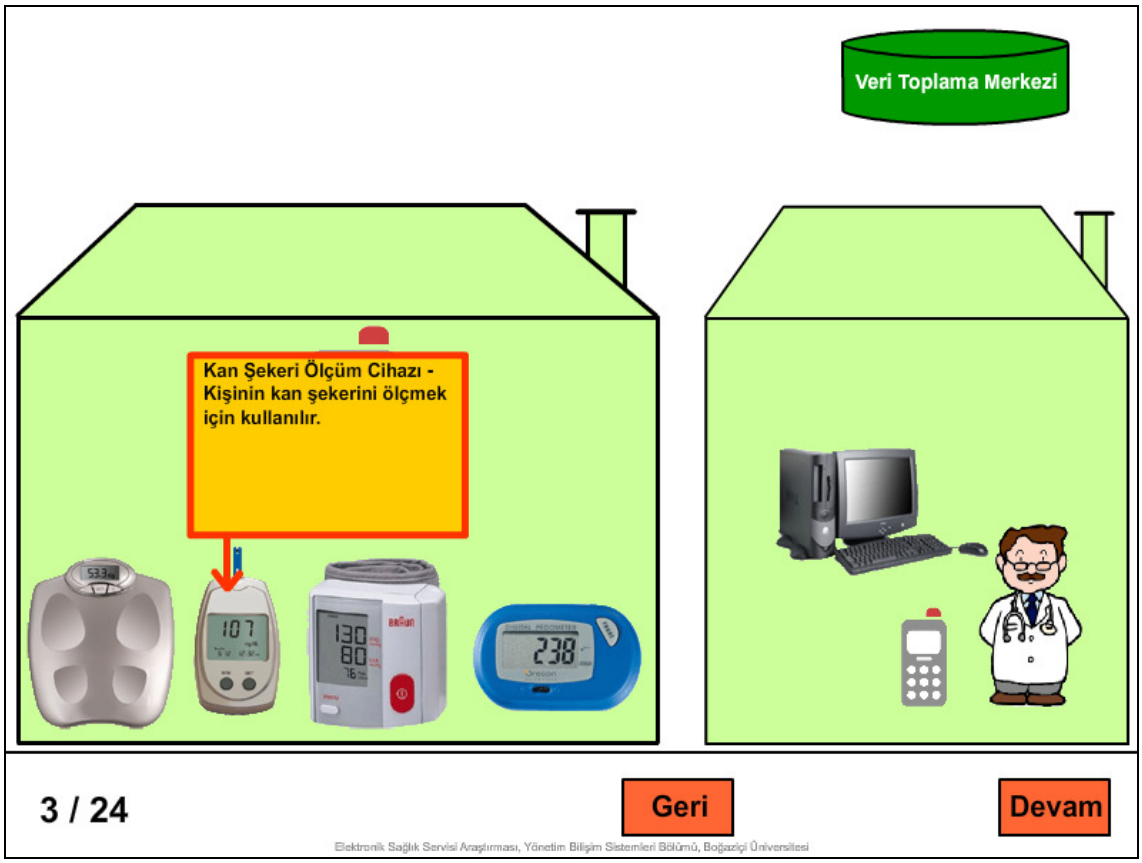


Fig. 27 Experimental study - animation - screen 3

Glucose meter is used to measure blood glucose of user.

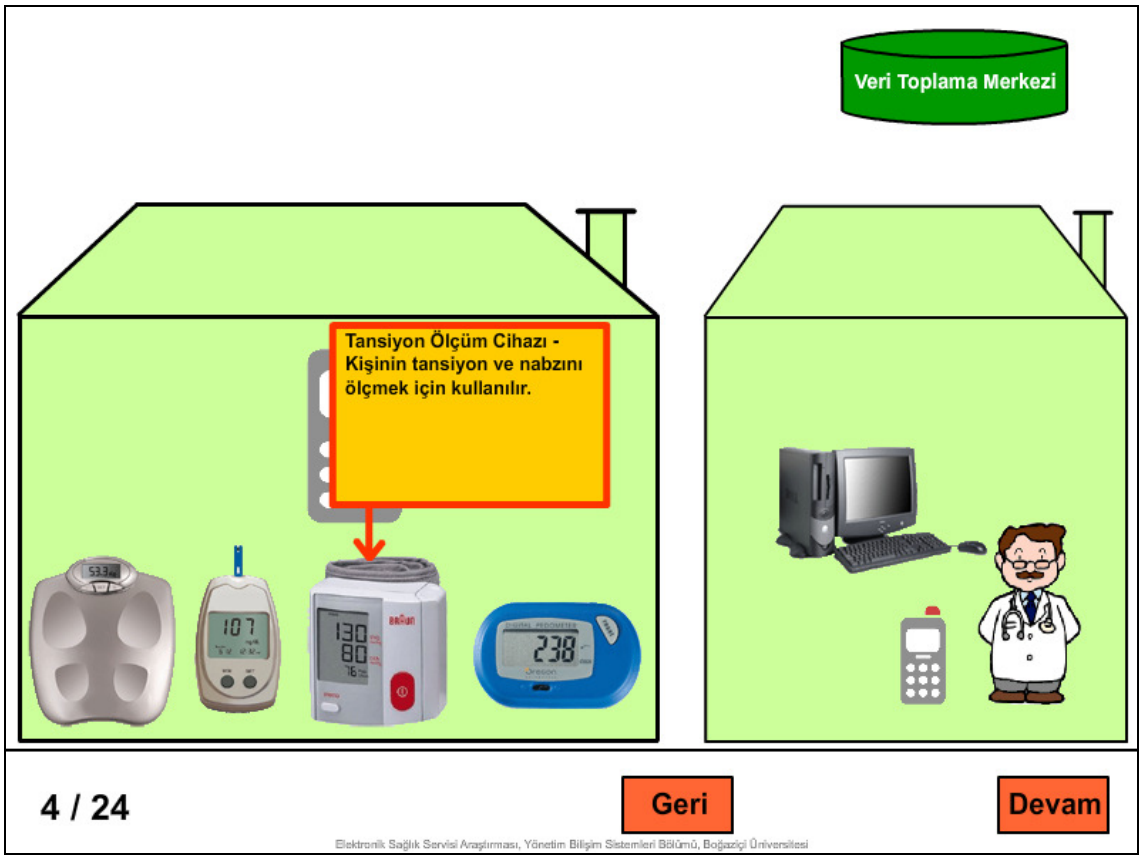


Fig. 28 Experimental study - animation - screen 4

Pulse meter is used to measure blood pressure of user.

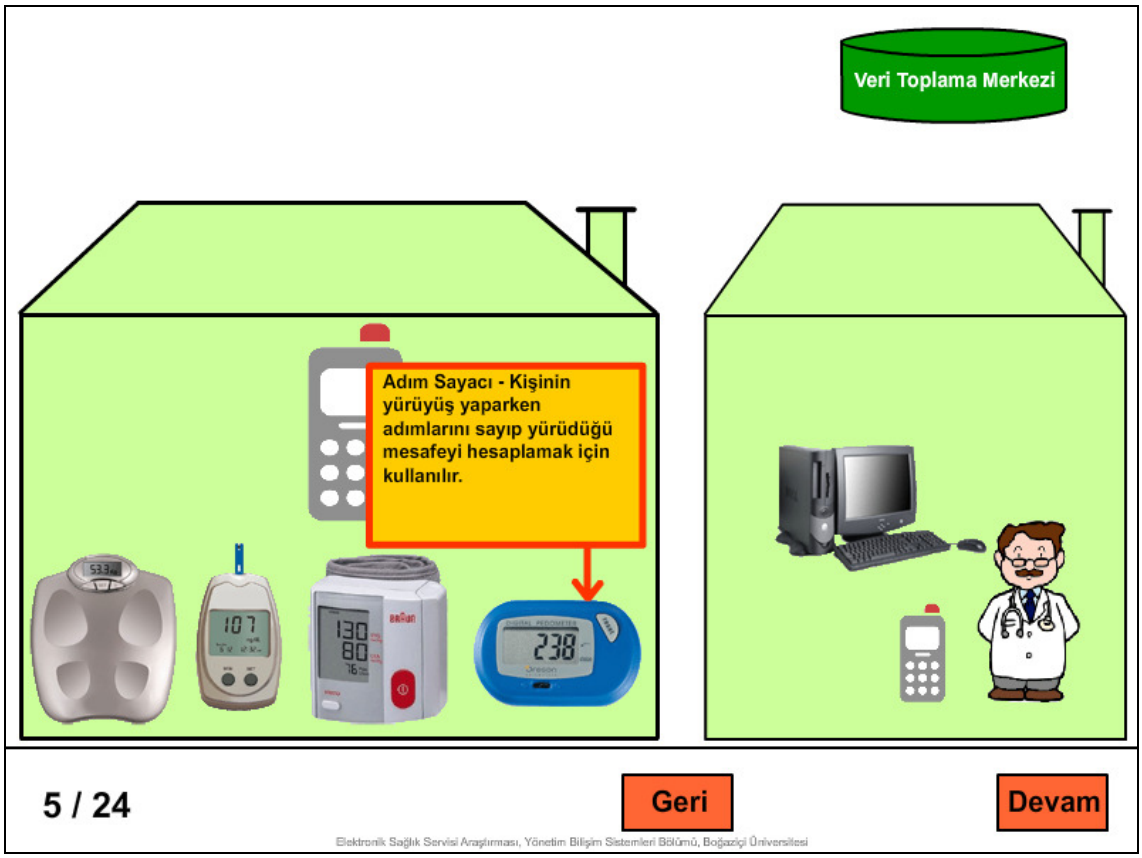


Fig. 29 Experimental study - animation - screen 5

Pedometer is used to measure walk distance of user during exercise.

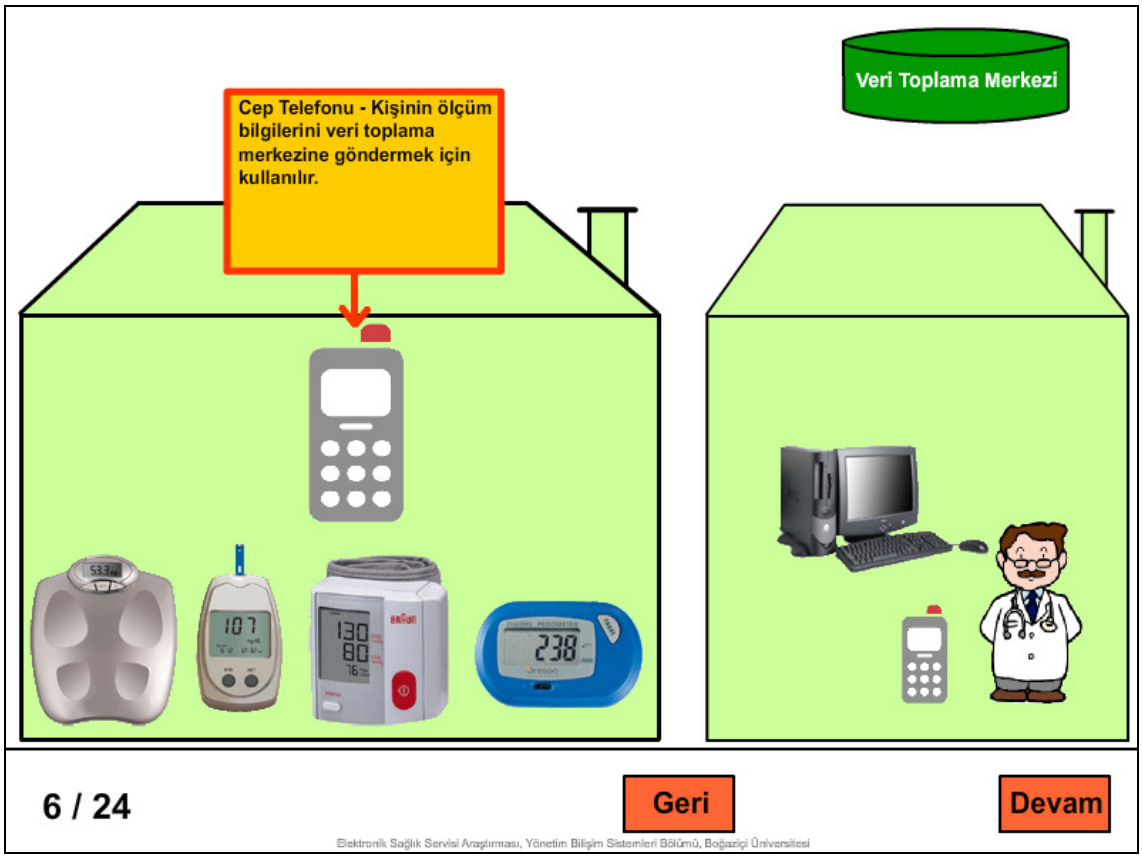


Fig. 30 Experimental study - animation - screen 6

Mobile phone is used to send patient data collected from various devices to the medical server.

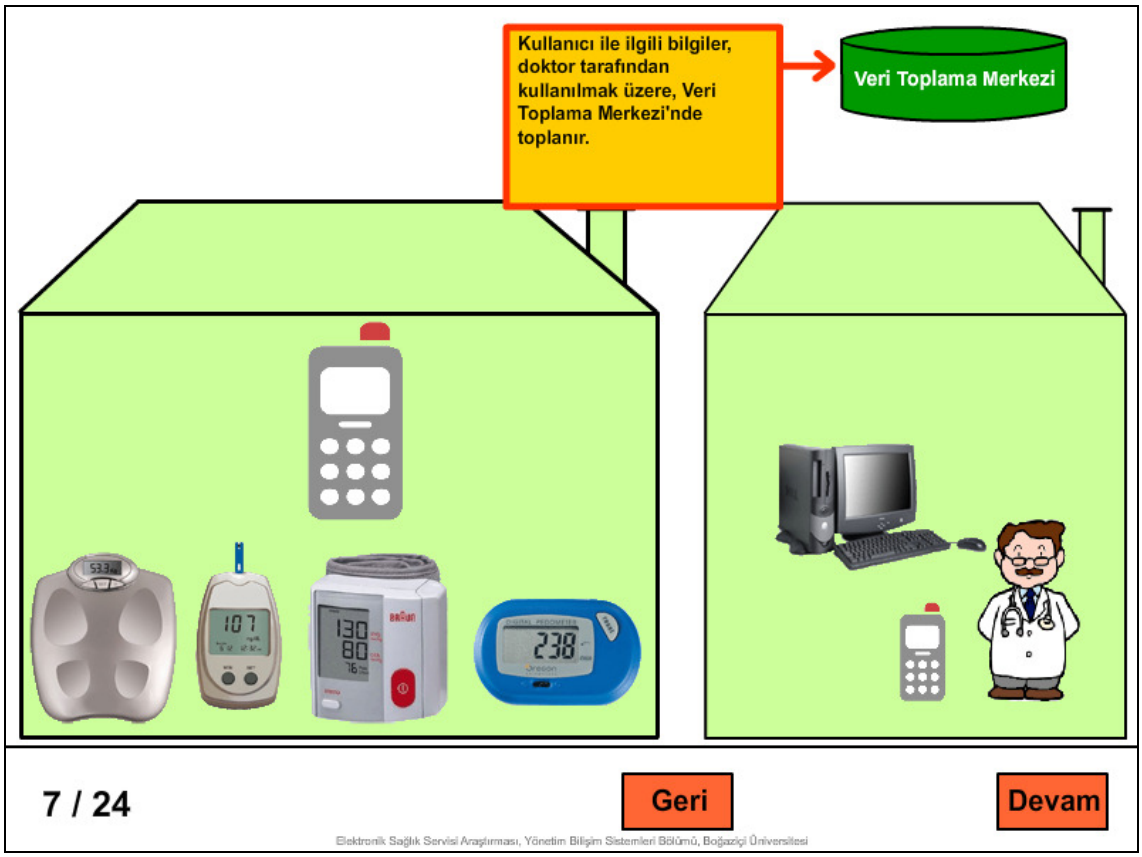


Fig. 31 Experimental study - animation - screen 7

Data collected from user are stored in a medical server. The physician can access these data whenever needed.

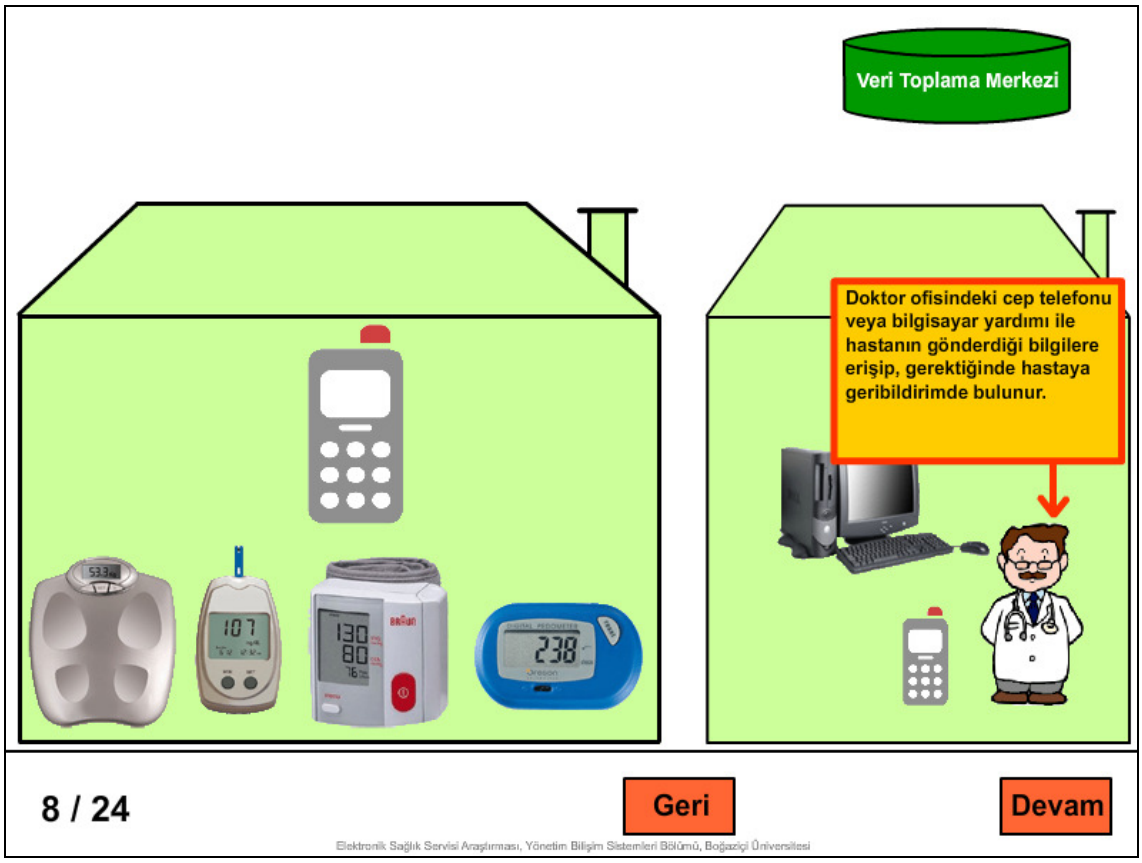


Fig. 32 Experimental study - animation - screen 8

The physician can access user data via mobile phone or computer; and give feedback to the user according to the collected data.

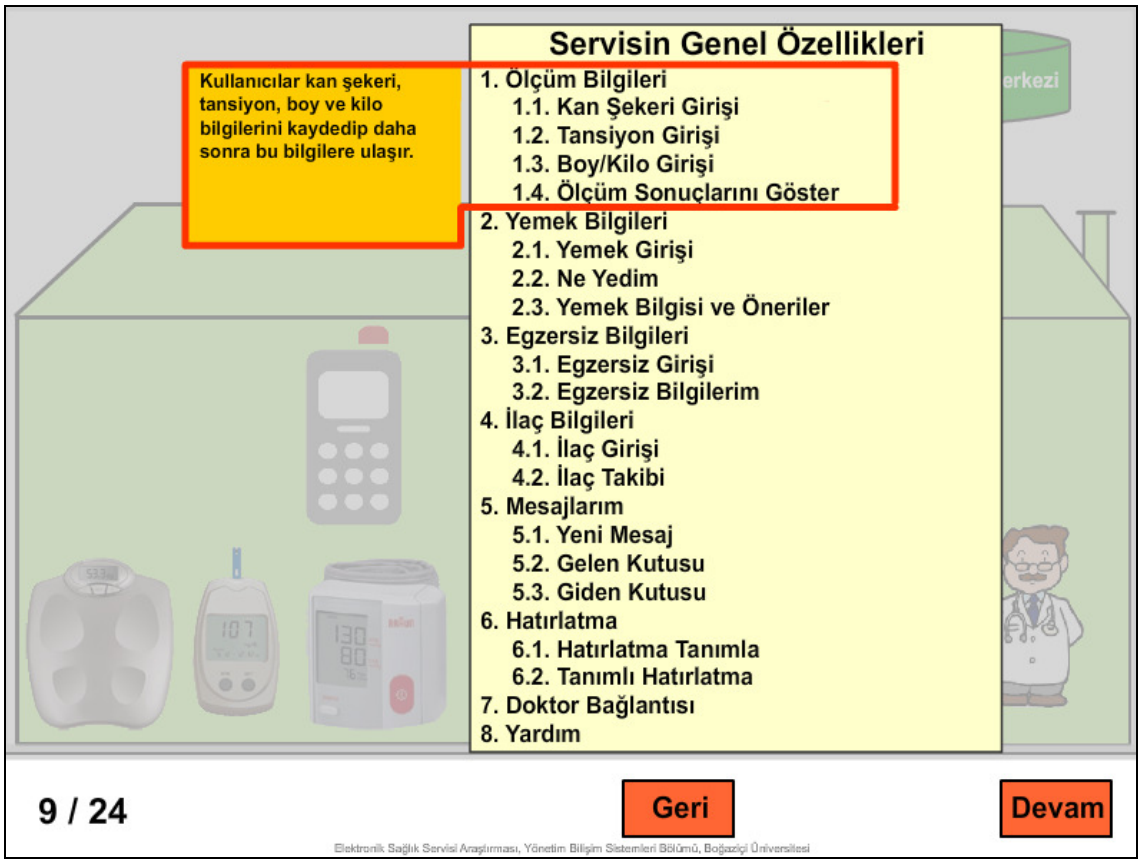


Fig. 33 Experimental study - animation - screen 9

After this screen, the animation continues with service functionalities.

The user can store the following data to the server and retrieve them whenever needed;

Blood glucose
Blood pressure
Weight
Length

Fig. 34 Experimental study - animation - screen 10

User sends data what he/she eats or drinks immediately after eating or drinking. The service calculates daily calorie taken by the user and gives meal suggestions based on the stored data. Also, user can learn calorie, protein, fat information of a meal by entering its name and weight on the service.

Fig. 35 Experimental study - animation - screen 11

User enters type and duration of exercises that he/she done and follows daily exercise data.

Fig. 36 Experimental study - animation - screen 12

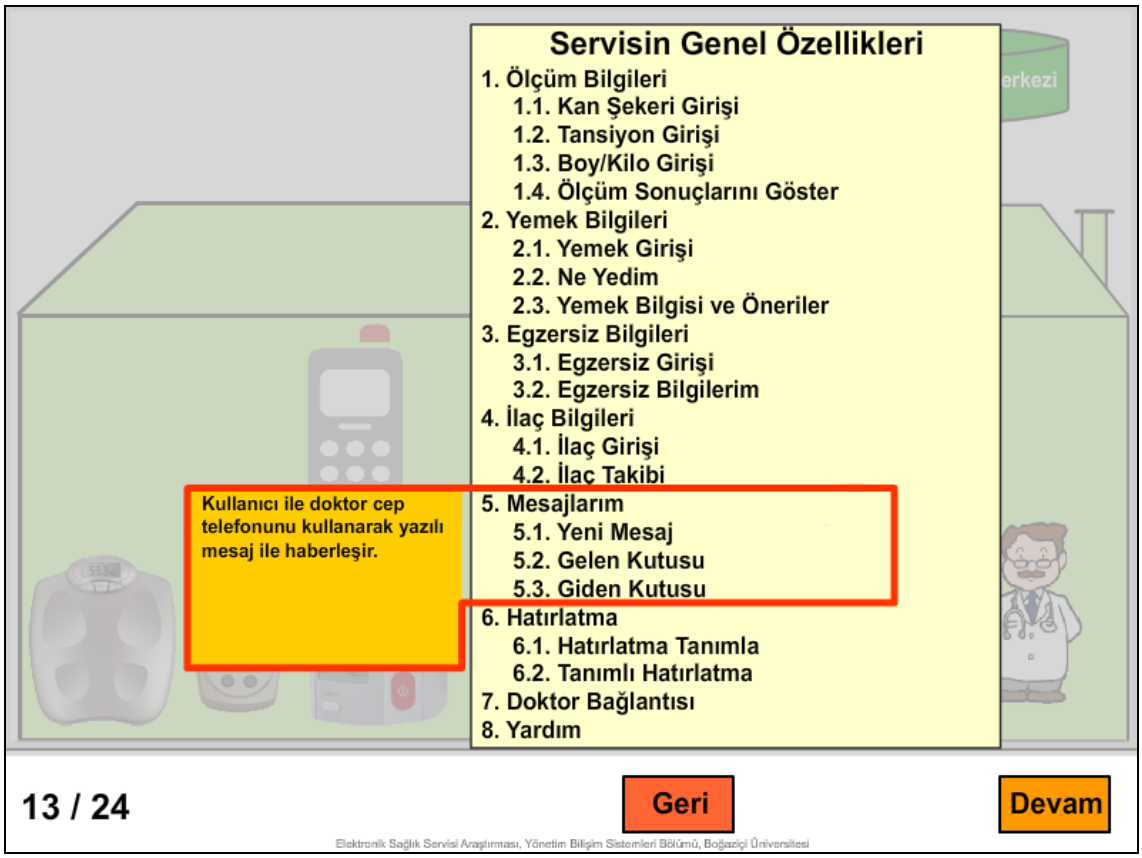


Fig. 37 Experimental study - animation - screen 13

User can communicate with doctor by means of text messages via mobile phone.

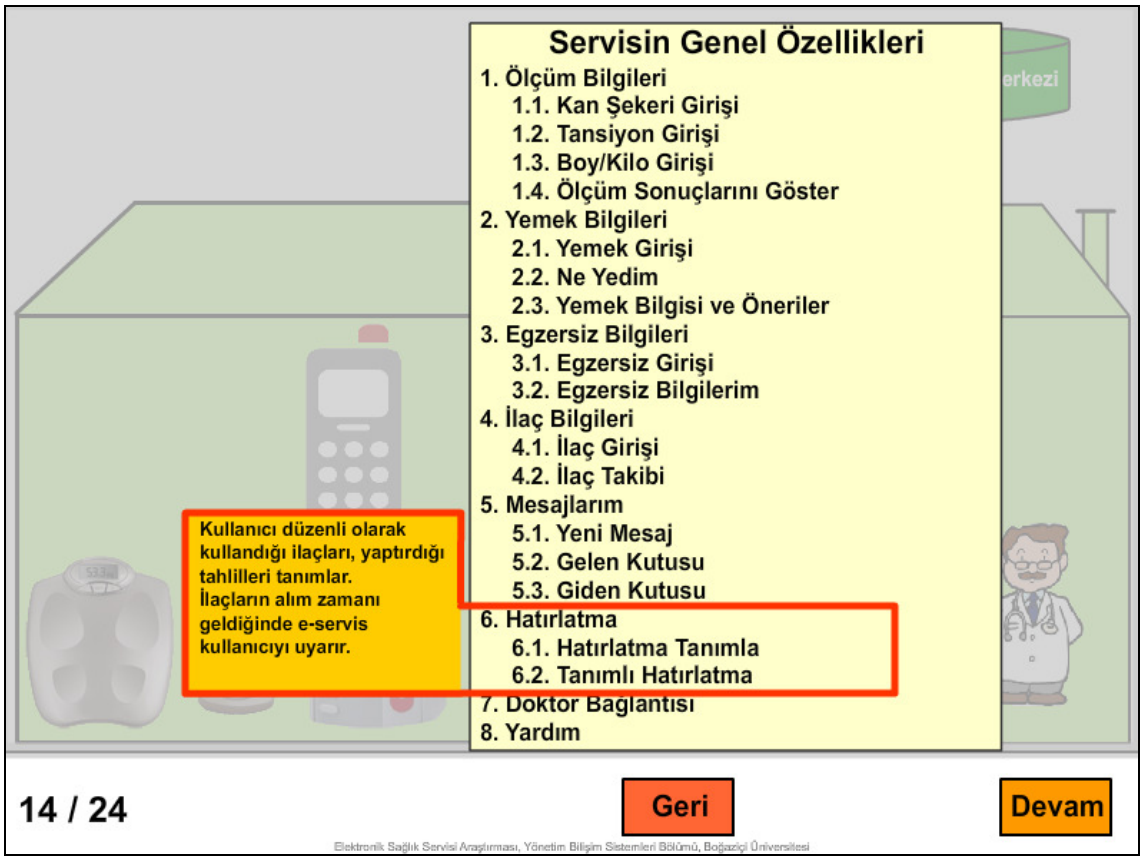


Fig. 38 Experimental study - animation - screen 14

User can set reminders for medicines and drugs times. The service warns the user when the getting drug time comes.

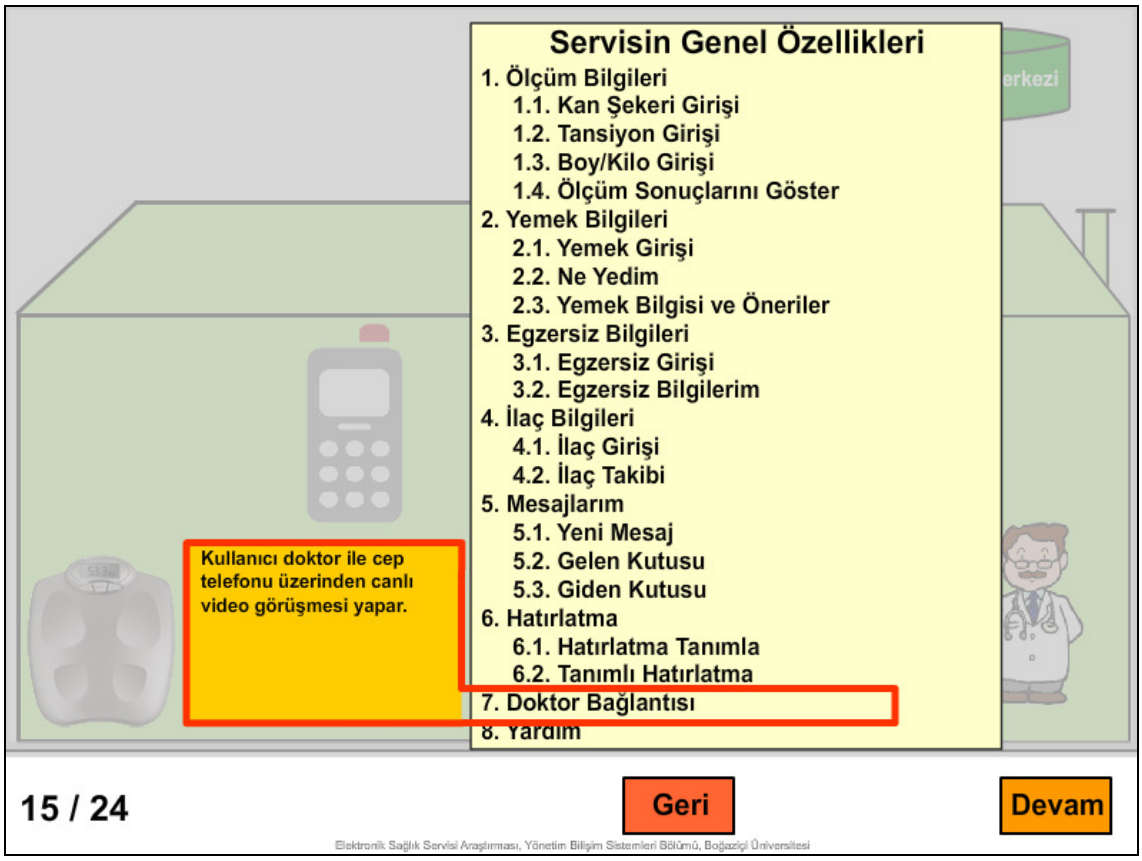


Fig. 39 Experimental study - animation - screen 15

The service provides live video conversation between user and physician via mobile phone.

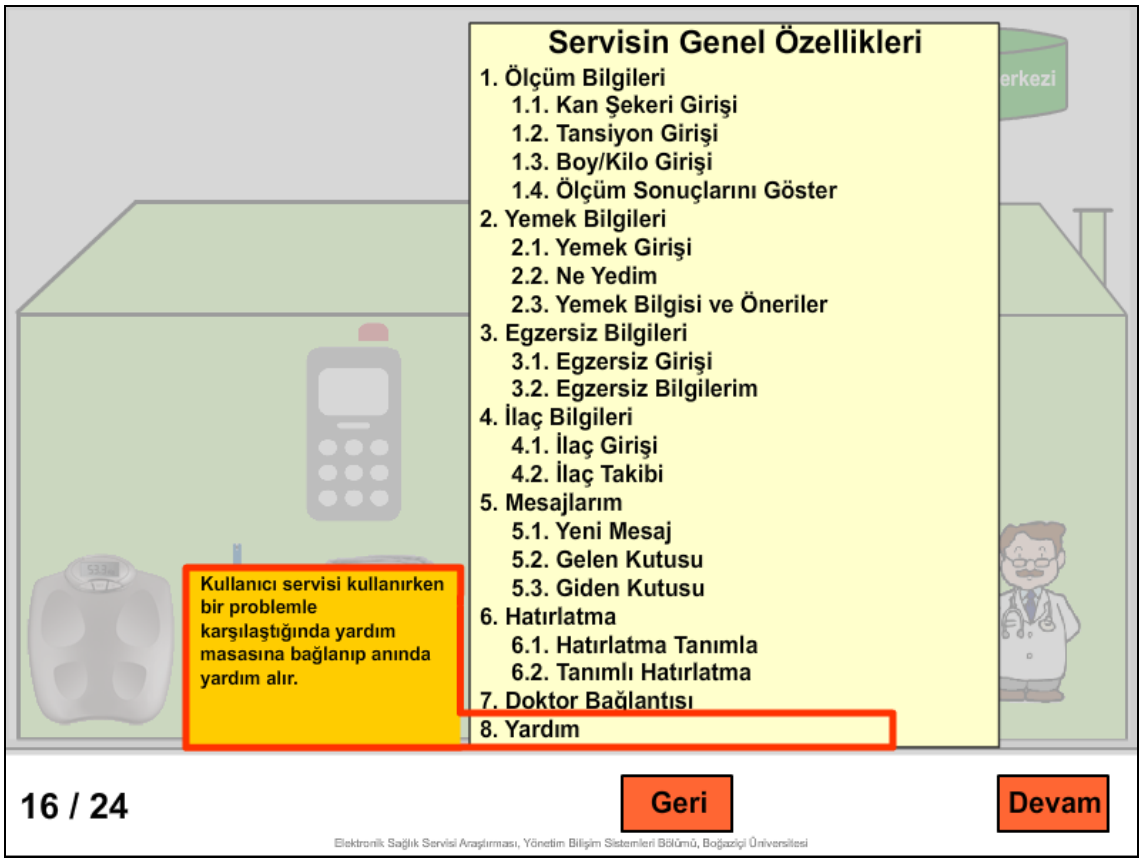


Fig. 40 Experimental study - animation - screen 16

User can get live technical support when encounter a problem.

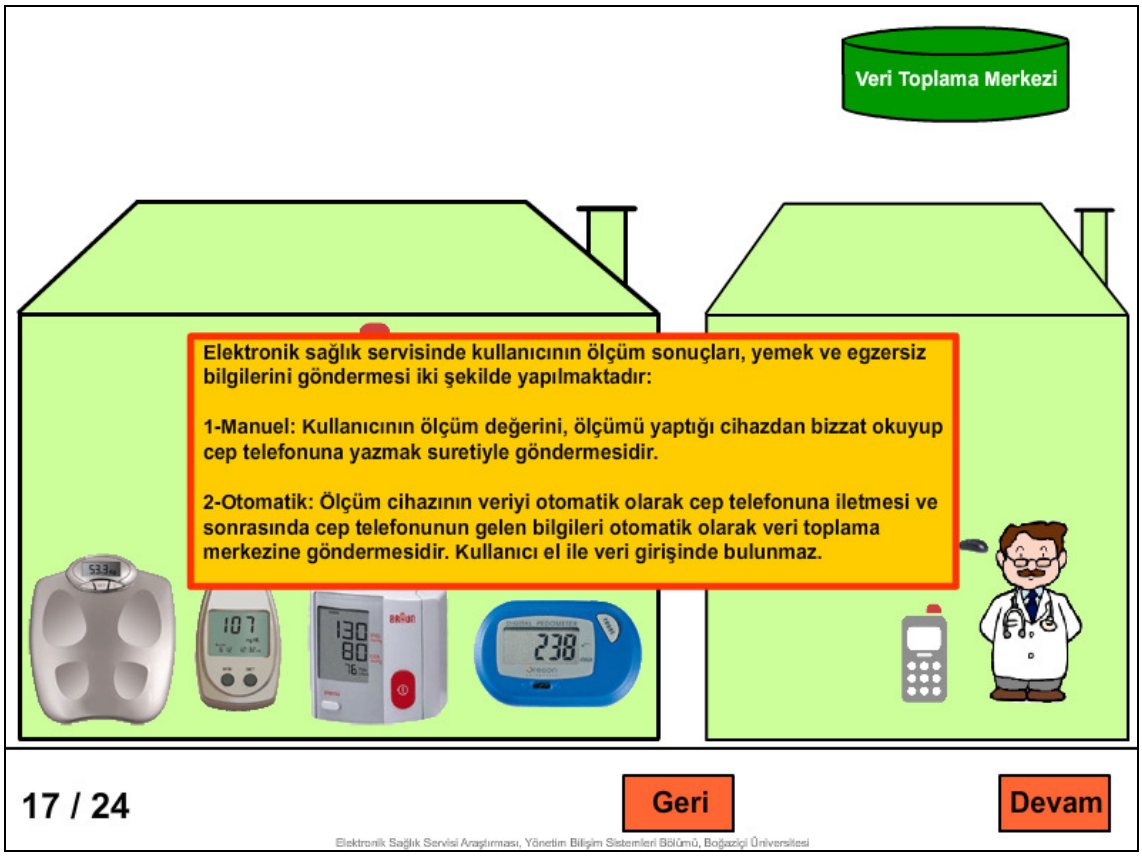


Fig. 41 Experimental study - animation - screen 17

The e-health service offers two different data sending methods. Alternatives in the conjoint part of the study contain only one of these methods.

1- Manual data send method: user reads the measurement result from the appropriate device and send the data by manually entering it on mobile phone.
2- Automatic data send method: measurement device automatically send the result to mobile phone and mobile phone automatically send it to the medical server. User does not enter any manual data to the mobile phone.

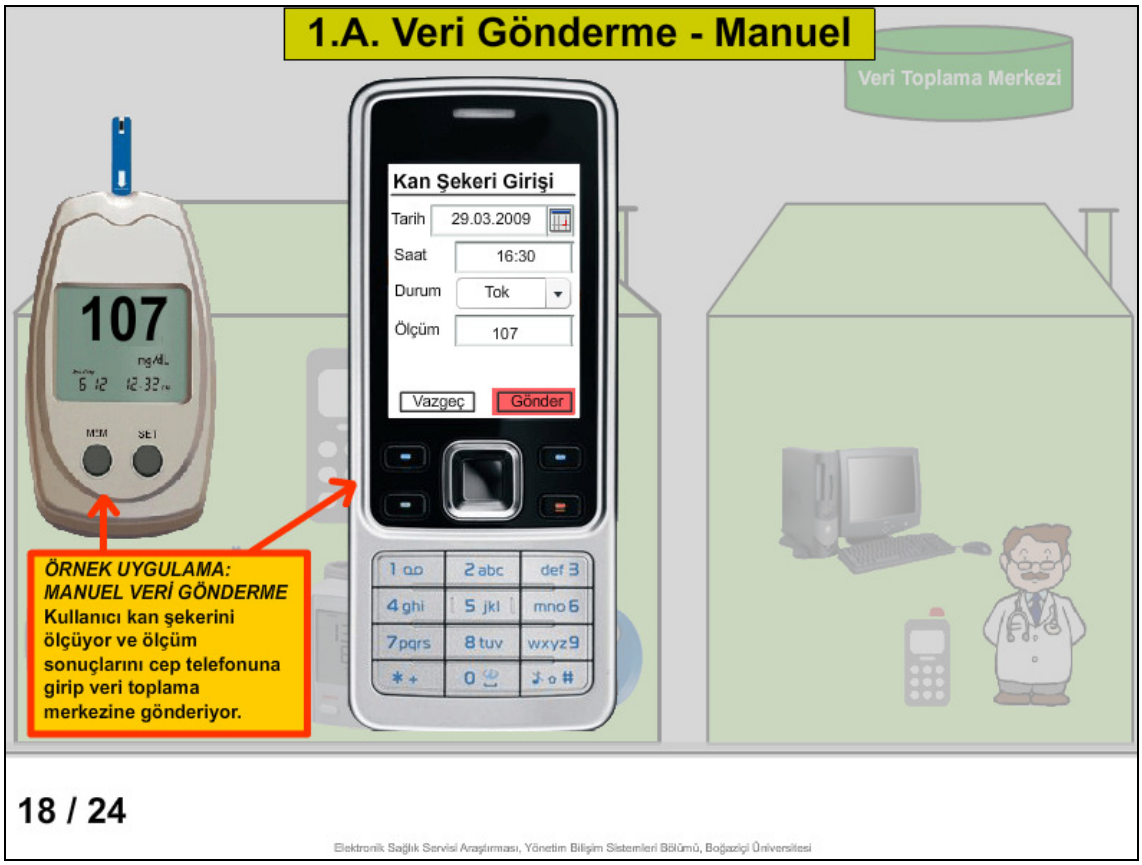


Fig. 42 Experimental study - animation - screen 18

This and following screens contain tasks and animations related to given tasks.

Fig. 42 includes a glucose meter and mobile phone. Number shown in the glucose meter changes and a few seconds later a final number is fixed on the monitor. After, user opens “glucose data send screen” by selecting appropriate menu item from the mobile phone menu list. Then, user enters date, time, situation and measurement result to the boxes on the screen and clicks “Gönder” button so as to send the data. A small blue ball that represents the data moves from mobile phone to medical server. Finally, mobile phone warns the user with a prompt like “you have successfully submitted your data to the medical server.”

Table 51 Experimental Study - Steps in Animation Screen 18

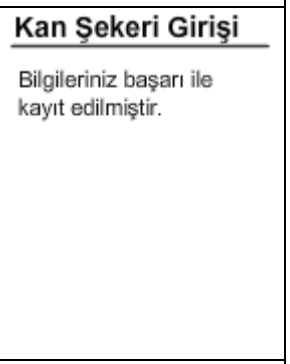
Screen Objects	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Glucose meter	Number changes and finally 107 is fixed					
Mobile Phone Screen						
Blue Ball					Blue balls moves from mobile phone to medical server	

Fig. 43 Experimental study - animation - screen 19

Table 52 Experimental Study - Steps in Animation Screen 19

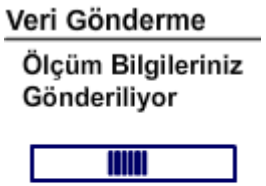
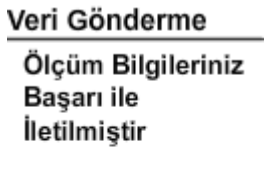
Screen Objects	Step 1	Step 2	Step 3	Step 4
Glucose meter	Number changes and finally 107 is fixed			
Mobile Phone Screen				
Blue Ball		Blue balls moves from glucose meter to mobile phone	Blue balls moves from mobile phone to medical server	

Fig. 44 Experimental study - animation - screen 20

Table 53 Experimental Study - Steps in Animation Screen 20

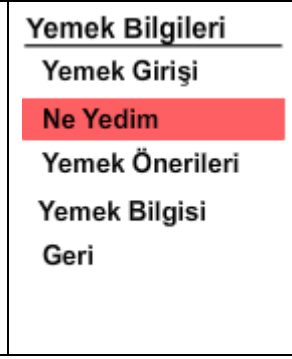
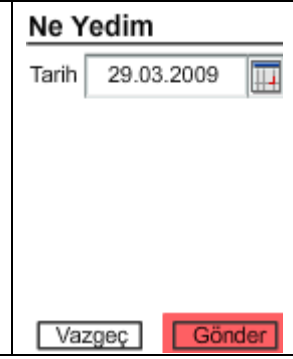
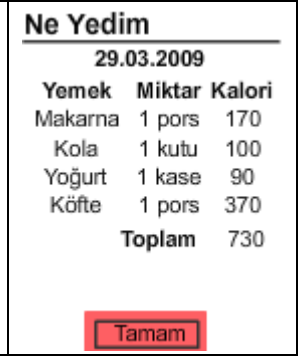
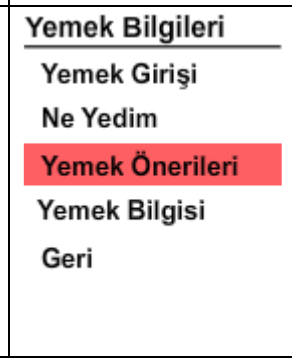
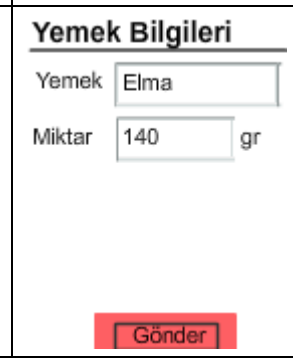
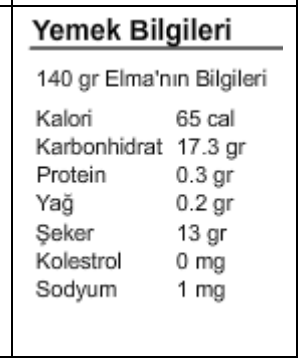
Screen Objects	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Mobile Phone Screen						

Table 53 Continue

Screen Objects	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
Mobile Phone Screen						

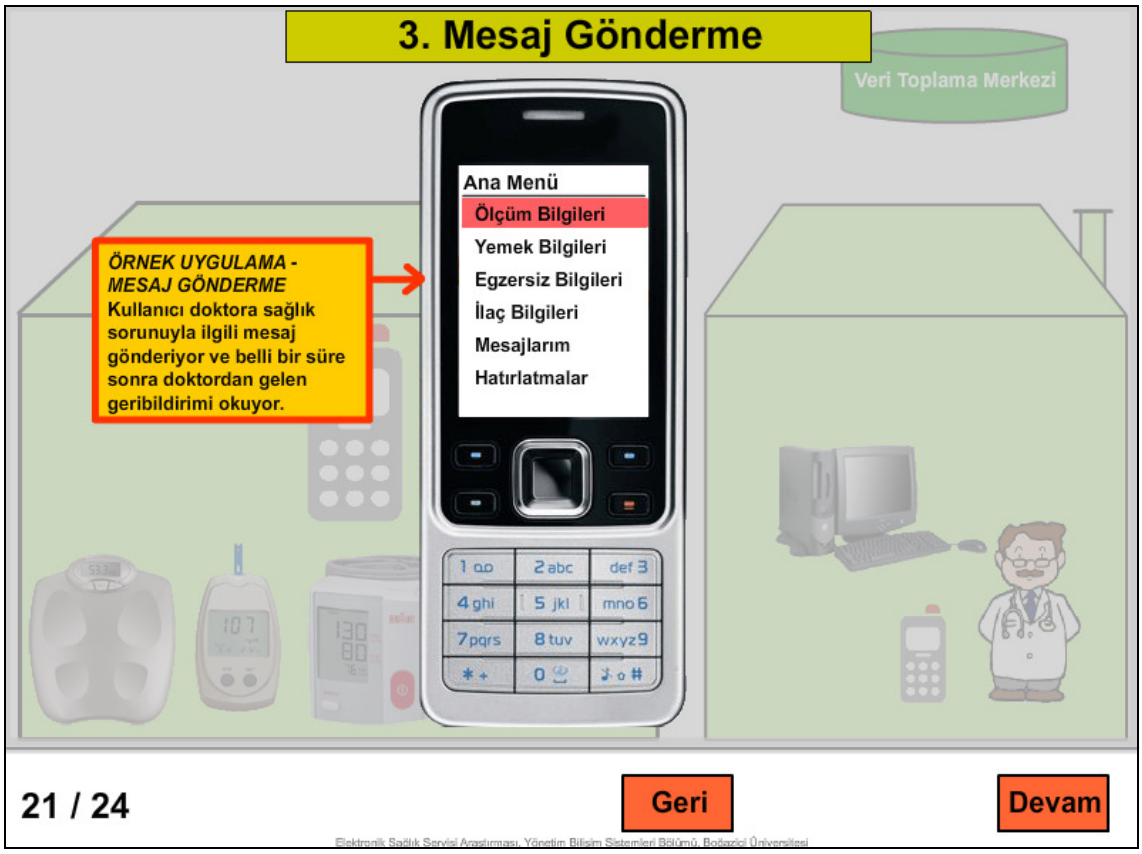


Fig. 45 Experimental study - animation - screen 21

Table 54 Experimental Study - Steps in Animation Screen 21

Screen Objects	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Mobile Phone Screen	**Ana Menü** Ölçüm Bilgileri Yemek Bilgileri Egzersiz Bilgileri İlaç Bilgileri Mesajlarım Hatırlatmalar	**Mesajlarım** Mesaj Yaz Gelen Kutusu Giden Kutusu Geri	**Mesaj Yaz** Mesaj Merhaba Mehmet Bey, Son günlerde başım çok dönüyor. Vazgeç Gönder	**Mesaj Yaz** Mesajınız Gönderiliyor	**Mesaj Yaz** Mesajınız İletildi.	
						6 seconds later

Table 54 Continue

Screen Objects	Step 7	Step 8
Mobile Phone Screen	**Ana Menü** Ölçüm Bilgileri **Mesajınız Var** Oku Hatırlatmalar	**Gelen Mesaj** Merhaba, Size en son verdiğim ilaçların yan etkileri arasında baş dönmesi de var. 1-2 gün içinde geçmezse benden randevu alınız.

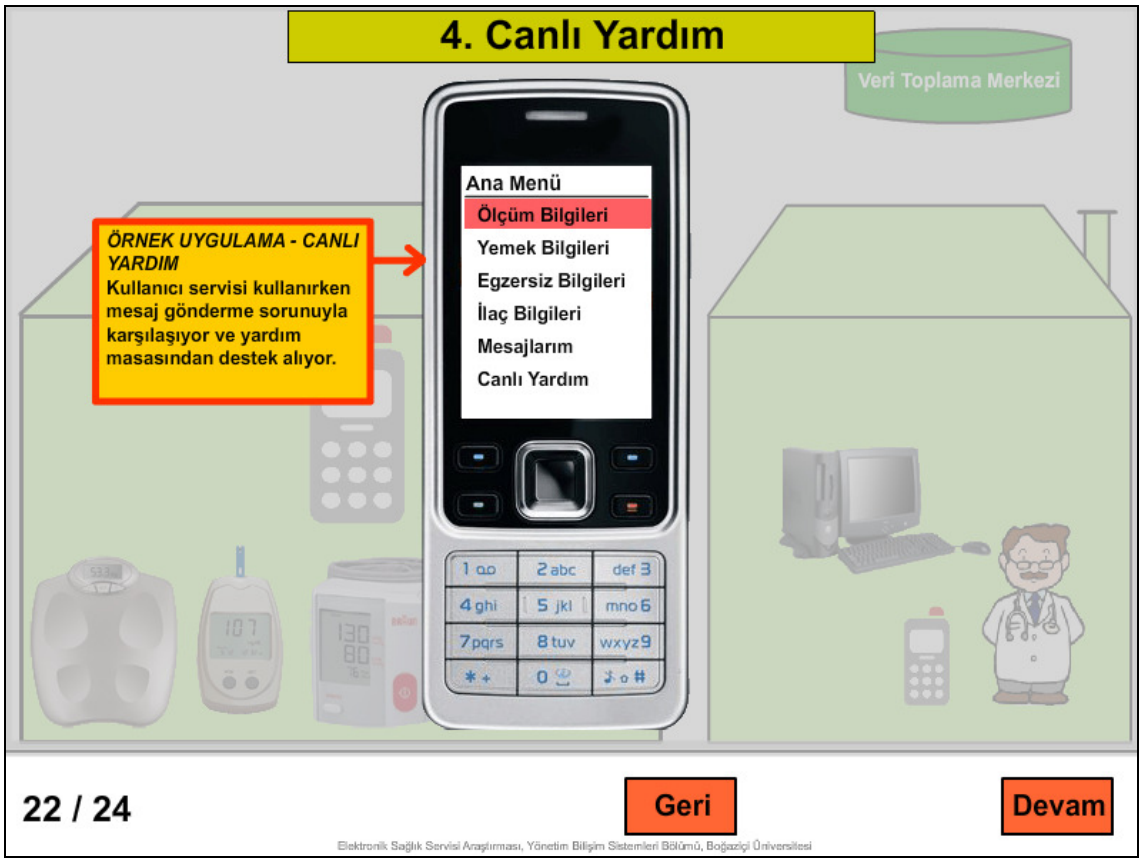


Fig. 46 Experimental study - animation - screen 22

Table 55 Experimental Study - Steps in Animation Screen 22

Screen Objects	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Mobile Phone Screen	**Ana Menü** **Ölçüm Bilgileri** **Yemek Bilgileri** **Egzersiz Bilgileri** **İlaç Bilgileri** **Mesajlarım** **Canlı Yardım**	**Canlı Yardım** Yardım Bağlantısı Kuruluyor	**Canlı Yardım** **Yardım >** Merhaba Ben Ali, nasıl yardımcı olabilirim?	**Canlı Yardım** **Yardım >** Merhaba Ben Ali, nasıl yardımcı olabilirim? Mesaj göndermede problem yaşıyorum	**Canlı Yardım** **Yardım >** Merhaba Ben Ali, nasıl yardımcı olabilirim? **Ben >** Mesaj göndermede problem yaşıyorum	**Canlı Yardım** Ali, nasıl yardımcı olabilirim? **Ben >** Mesaj göndermede problem yaşıyorum **Yardım >** Bu problem ne kadar zamandır devam ediyor?

Table 55 Continue

Screen Objects	Step 7	Step 8	Step 9
Mobile Phone Screen	**Canlı Yardım** Ali, nasıl yardımcı olabilirim? **Ben >** Mesaj göndermede problem yaşıyorum **Yardım >** Bu problem ne kadar zamandır devam ediyor? Yaklaşık olarak 2 saattir.	**Canlı Yardım** **Ben >** Mesaj göndermede problem yaşıyorum **Yardım >** Bu problem ne kadar zamandır devam ediyor? **Ben >**Yaklaşık olarak 2 saattir.	**Canlı Yardım** ediyor? **Ben >**Yaklaşık olarak 2 saattir. **Yardım >** Sorunu arkadaşlarıma bildirdim. 10 dakika içinde sorununuz çözülecektir.

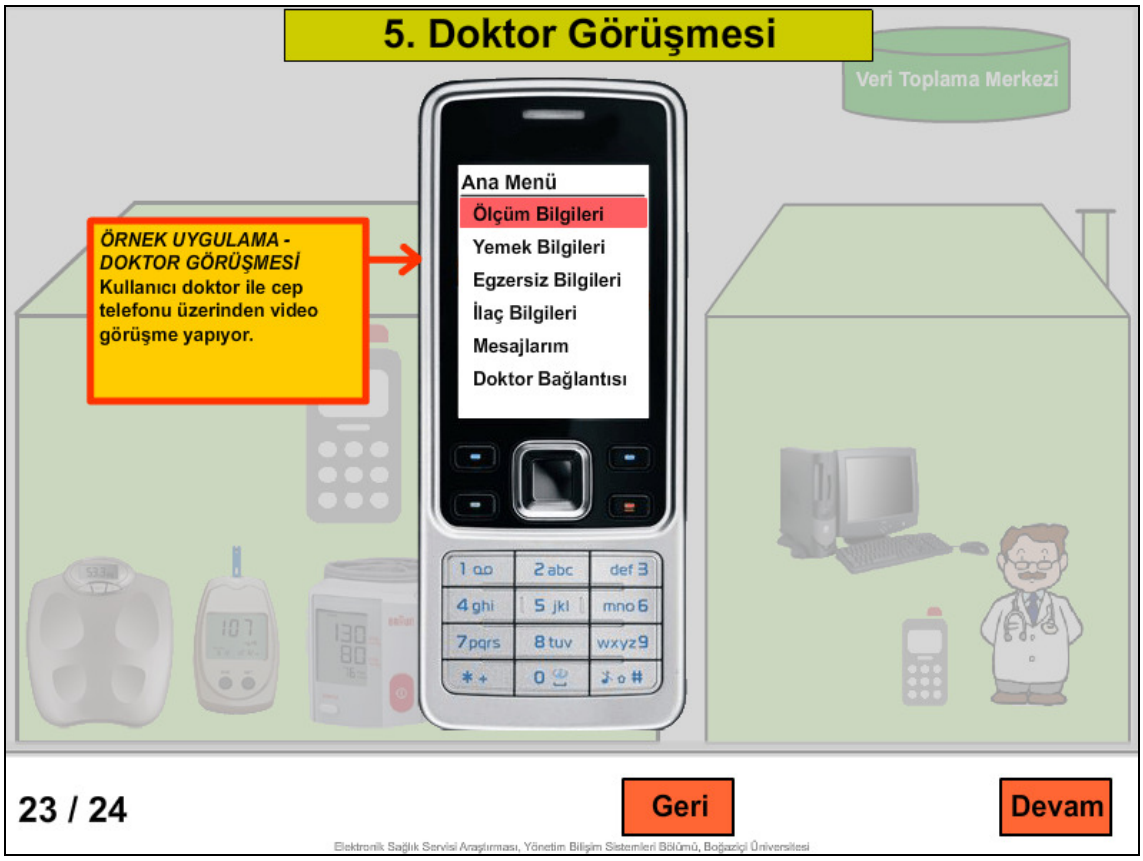


Fig. 47 Experimental study - animation - screen 23

Table 56 Experimental Study - Steps in Animation Screen 23

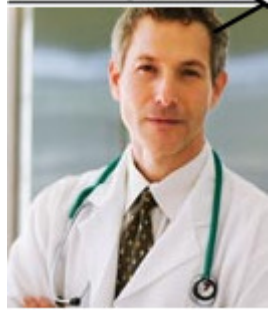
Screen Objects	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Mobile Phone Screen	**Ana Menü** **Ölçüm Bilgileri** **Yemek Bilgileri** **Egzersiz Bilgileri** **İlaç Bilgileri** **Mesajlarım** **Doktor Bağlantısı**	**Doktor Bağlantısı** Doktorunuza telefon üzerinden video görüşmesi talebiniz iletiliyor.	**Doktor Bağlantısı** Doktorunuza telefon üzerinden video görüşmesi talebiniz iletilmiştir. 15-20 dakika içinde canlı bağlantı kurulacaktır.		**Ana Menü** **Ölçüm Bilgileri** **Canlı Doktor Görüşmesi Talebiniz Var** Bağlan	**Canlı Bağlantı** 
				5 seconds later		

Fig. 48 Experimental study - animation - screen 24

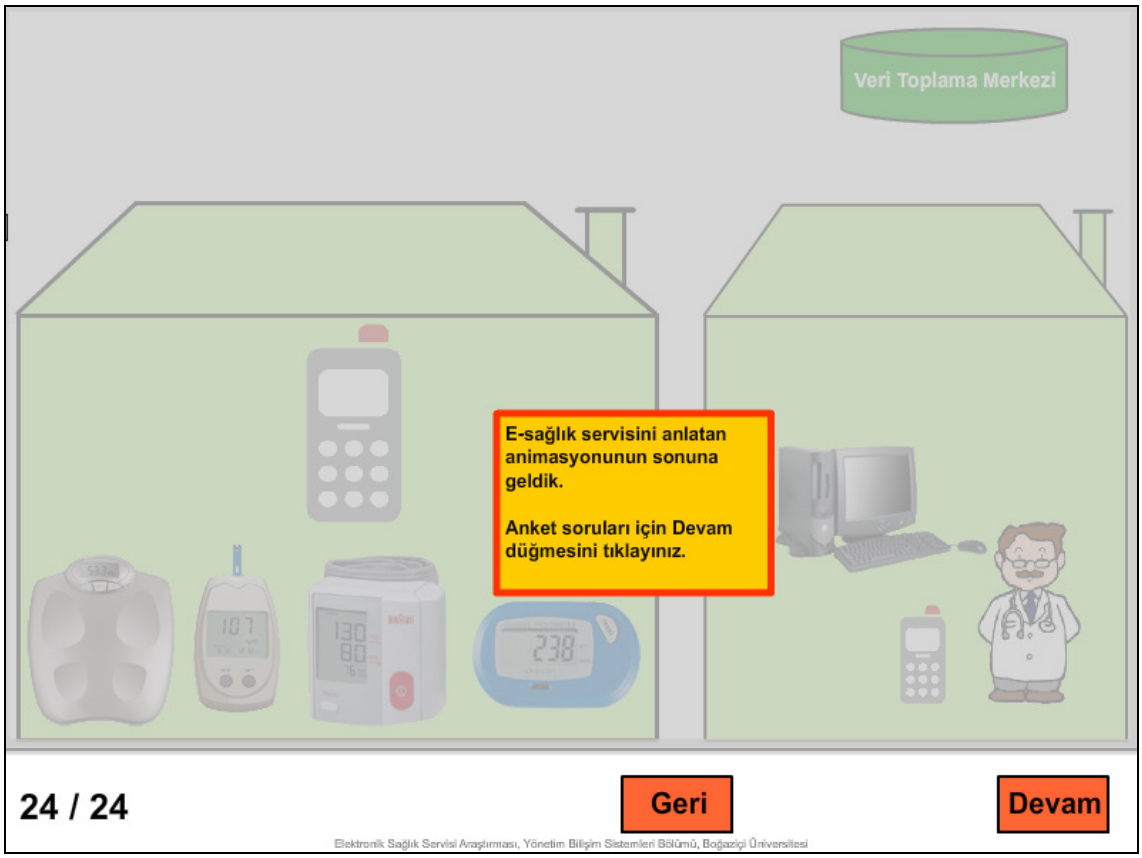


Fig. 49 Experimental study - animation - final screen

Conjoint Questionnaire Form

Elektronik Sağlık Servisi Araştırması

Özellik	Açıklama
Veri Giriş Yöntemi	Kullanıcı bilgilerinin *veri toplama merkezine* gönderilme yöntemi. *Manuel*: Kullanıcı ölçümü yaptıktan sonra değeri cep telefonuna kendisi yazıp gönderir. *Otomatik*: Ölçüm cihazı otomatik olarak cep telefonu üzerinden bilgileri veritoplama merkezine iletir. Kullanıcı veri girişinde bulunmaz.
Canlı Doktor Görüşmesi	Kullanıcı cep telefonu vasıtasıyla doktor ile video görüşmesi yapar.
Cevap Zamanı	Kullanıcının isteklerine servisin cevap verme süresidir. Örneğin, 4 saatin anlamı kullanıcı doktora mesaj gönderdiğinde servis 4 saat içinde kullanıcıya cevap verecektir. Bu süre maksimum 4 saattir. Yoğunluk durumuna göre daha az da olabiliir.
Teknik Destek	Kullanıcı teknik bir sorunla karşılaştığında cep telefonu üzerinden canlı destek alır.
Maliyet	E-sağlık servisini kullanmak için ödenecek aylık ücret.

Hizmetin Genel Şartları

- Ölçüm cihazlarının (tansiyon aleti, baskül, kan şekeri ölçüm cihazı, adım sayacı) toplam maliyeti 400 TL'dir.
- e-serviste sunulan hizmetler;
  - Doktorun uygun gördüğü şekilde yılda 2-3 defa yüzyüze görüşme yapılacaktır.
  - Kullanıcı gerektiğinde her ay cep telefonu üzerinden doktor ile yaklaşık 5-10 dk canlı video görüşmesi gerçekleştirebilir.
  - Kullanıcı gerektiğinde ayda 2-3 mesaj gönderebiliyor olacaktır.
- Kullanıcının canlı teknik destek taleplerine en geç 20 dakika içinde cevap verilecektir.

Animasyonu tekrar görmek isterseniz burayı Tıklayınız

Lütfen aşağıdaki 8 farklı alternatifi ilgili özellikleri göz önünde bulundurarak,
1 en çok kullanmayı tercih edeceğiniz, 8 en az kullanmayı tercih edeceğiniz şekilde sıralayınız.

Alternatif	Veri Giriş Yöntemi	Canlı Doktor Görüşmesi	Cepten Teknik Destek	Cevap Zamanı	Maliyet (Aylık)	Sıra
Alternatif 1	Elektronik	-	-	4 Saat	150 TL	--- Seçiniz ---
Alternatif 2	Elektronik	-	Var	24 Saat	100 TL	--- Seçiniz ---
Alternatif 3	Elektronik	Var	Var	4 Saat	100 TL	--- Seçiniz ---
Alternatif 4	Elektronik	Var	-	24 Saat	150 TL	--- Seçiniz ---
Alternatif 5	Manuel	-	-	4 Saat	100 TL	--- Seçiniz ---
Alternatif 6	Manuel	-	Var	24 Saat	150 TL	--- Seçiniz ---
Alternatif 7	Manuel	Var	-	24 Saat	100 TL	--- Seçiniz ---
Alternatif 8	Manuel	Var	Var	4 Saat	150 TL	--- Seçiniz ---

Kaydet

Fig. 50 Experimental study - conjoint questionnaire form

E. ANOVA Results

Table 57 ANOVA Results for Age

Construct	F	Sig.	24 or below	25-29	30 - 39	40 or above
Usefulness Q2	2.779	0.043	3.65	3.31	3.85	3.07
Usefulness Q3	4.437	0.005	3.77	3.54	3.69	2.79
Computer Literacy	7.094	0.000	4.92	4.91	4.38	4.86
Concern Health Q2	4.623	0.004	3.61	3.63	2.92	4.50
Concern Health Q3	3.053	0.030	3.65	3.37	2.92	4.21
Concern Health Q4	2.789	0.043	3.64	3.11	2.85	2.93
Information Quality	3.479	0.018	3.61	3.77	3.50	2.71
Quality Support Q1	2.708	0.047	4.27	4.06	4.69	4.29
Variable Cost	3.610	0.015	3.35	3.91	3.73	2.71
Weight Problem	2.782	0.043	2.47	2.89	3.38	3.07

Table 58 ANOVA Results for Educational Levels

	F	Sig.	1	2	3	4	5	6
Computer Literacy	22.29	0.000	1.00	4.00	4.92	5.00	4.87	4.91
Concern Health	3.93	0.002	3.50	2.56	3.47	3.88	3.43	3.98
Concern Health Q2	4.24	0.001	3.00	2.00	3.54	5.00	3.49	4.13
Concern Health Q3	4.50	0.001	1.00	1.75	3.42	4.50	3.57	4.00
Image	3.55	0.005	3.00	4.63	2.65	1.50	2.75	2.38
Information Quality	2.54	0.031	1.00	4.00	3.77	4.00	3.31	3.59
Location	2.55	0.031	1.00	3.75	3.88	4.50	4.26	4.38
Self Efficacy	2.31	0.047	3.00	4.50	4.65	5.00	4.77	4.94
Weight Problem	2.85	0.017	1.00	2.50	2.21	2.50	3.18	3.00

1 - Primary
2 - High school
3 - Student
4 - Associate
5 - Undergraduate
6 - Graduate

Table 59 ANOVA Results for Weight Groups

	F	Sig.	58 kg or lower	59-66 kg	67-78 kg	79 kg or above
Service Quality	2.69	0.048	3.94	3.41	3.89	3.95
Weight Problem	4.38	0.006	2.26	2.82	2.58	3.45

Table 60 ANOVA Results for BMI Group

Construct	F	Sig.	Under Weight	Normal Range	Over Weight	Obese
Usefulness Q4	4.27	0.006	4.44	4.23	4.46	3.33
Quality of Support Q2	2.94	0.035	4.22	3.86	4.32	3.75
Security	3.53	0.016	4.67	4.60	4.92	4.00
Weight Problem	15.42	0.000	1.78	2.36	3.49	4.58

Table 61 ANOVA Results for Income1

	F	Sig.	1	2	3	4	5	6	7
Accuracy	2.43	0.029	4.75	4.25	4.87	4.76	4.68	5.00	4.70
Attitude	2.31	0.037	4.49	3.81	4.47	4.29	4.21	4.15	4.03
Attitude Q2	2.31	0.037	4.43	3.71	4.47	4.10	4.16	4.00	3.90
Ease of Use	2.44	0.028	4.31	3.82	4.58	4.56	4.26	4.44	4.15
Ease of Use Q1	2.39	0.031	4.30	3.67	4.33	4.43	4.58	4.15	4.10
Ease of Use Q3	2.61	0.020	4.18	3.88	4.73	4.67	3.89	4.69	4.20
Expectation	3.34	0.004	4.48	3.67	4.53	4.05	4.00	4.31	3.75
Facilitating Cond.	2.34	0.034	4.50	4.00	4.53	4.79	4.50	4.65	4.23
Facilitating Cond. Q2	4.30	0.001	4.48	3.79	4.47	4.90	4.63	4.85	3.95
Input Effort	2.19	0.047	4.55	3.88	4.60	4.67	4.68	4.62	4.70
Security	3.03	0.008	4.75	4.04	4.87	4.43	4.84	5.00	4.70
Social Influence	2.56	0.022	3.73	2.99	3.62	3.44	3.74	3.18	2.83
Social Influence Q3	2.18	0.048	4.15	3.42	4.53	4.10	4.26	4.23	3.60
Usefulness Q4	2.18	0.048	4.55	3.92	4.53	3.86	4.21	4.46	4.00
Weight Problem	3.09	0.007	2.35	2.17	2.40	3.33	3.37	2.92	3.40

1 - 0-500 TL
2 - 501-1000 TL
3 - 1001-1500 TL
4 - 1501-2000 TL
5 - 2001-2500 TL
6 - 2501-3000 TL
7 - 3001 and above TL

Table 62 ANOVA Results for Income2

	F	Sig.	1	2	3
Service Quality	3.59	0.030	4.05	3.65	4.08
Trust Q2	4.20	0.017	4.00	3.54	4.00
Weight Problem	3.51	0.033	2.40	2.64	3.32

1 - My income is less than my expenses
2 - My income equals to my expenses
3 - My income is more than my expenses

Table 63 ANOVA Results for Time-on-Line

	F	Sig.	None	1h or less	1-3 hours	3-5 hours	5-8 hours	9h or above
Computer Literacy	7.85	0.000	3.33	4.44	4.86	4.87	4.96	5.00
Concern Health Q2	2.34	0.045	2.67	3.19	3.80	3.46	3.28	4.38
Location	3.04	0.012	1.67	3.88	4.27	4.19	4.12	4.19

Table 64 ANOVA Results for Mobile Literacy

	F	Sig.	1	2	3
Usefulness	3.70	0.027	3.91	3.78	4.14
Usefulness Q1	5.72	0.004	4.06	3.92	4.44
Usefulness Q4	4.25	0.016	3.94	4.12	4.51
Compatibility	3.76	0.026	3.59	3.68	4.10
Compatibility Q2	3.69	0.027	3.50	3.69	4.12
Computer Literacy	3.34	0.038	5.00	4.85	4.69
Concern Health	7.07	0.001	3.79	3.70	3.19
Concern Health Q2	4.14	0.018	3.71	3.88	3.20
Concern Health Q3	7.11	0.001	4.12	3.64	3.03
Exercise	4.16	0.017	3.56	2.83	2.71
Facilitating Cond.	3.51	0.032	4.21	4.37	4.64
Facilitating Cond. Q1	3.56	0.031	4.32	4.32	4.71
Image	6.24	0.002	2.79	2.24	3.17
Information Quality	3.40	0.036	3.62	3.27	3.78
Service Quality	3.50	0.033	4.00	3.56	3.95
Social Influence Q1	4.23	0.016	2.68	3.36	3.58

1 - I know all of the functionalities of my mobile phone and use all of them
2 - I know all of the functionalities of my mobile phone however use some of them
3 - I know and use only required functionalities of my mobile phone

Table 65 ANOVA Results for Information Seeking Preferences

	F	Sig.	Friends	Family	The Internet	Physicians
Intention Q3	2.84	0.040	3.60	3.61	4.06	4.13
Face-to-Face Comm	5.09	0.002	3.30	4.25	4.42	4.56
Net Health Search	8.70	0.000	3.40	2.69	4.39	3.65

F. Correlation Results

Table 66 Correlation Results

	Ease of Use	Usefulness	Attitude	Intention
Ease of Use	1	.488**	.475**	.363**
Usefulness	.488**	1	.623**	.469**
Attitude	.475**	.623**	1	.664**
Intention	.363**	.469**	.664**	1
Accessibility	.349**	.480**	.454**	.284**
Accuracy	.418**	.268**	.379**	.333**
Self Efficacy	.322**	.155	.204*	.184*
Behavioral Control	.309**	.143	.124	.164*
Compatibility	.440**	.508**	.474**	.361**
Cost	.052	-.020	-.023	-.040
Currency	.324**	.284**	.380**	.302**
Face-to-Face Comm.	.215**	.164*	.204*	.165*
Facilitating Conditions	.352**	.363**	.405**	.384**
Image	.204*	.418**	.277**	.141
Information Quality	.151	.426**	.256**	.176*
Input Effort	.219**	.033	.164*	.169*
Location	.030	.056	.040	.081
Quality of Support	.323**	.453**	.448**	.347**
Response Time	.463**	.214**	.400**	.339**
Security	.424**	.298**	.300**	.270**
Service Quality	.309**	.548**	.440**	.305**
Social Influence	.408**	.474**	.438**	.241**
Usage Time	.404**	.538**	.476**	.401**
Time Investment	.340**	.260**	.348**	.275**
Triability	.166*	.175*	.176*	.192*
Trust	.265**	.398**	.353**	.312**
Understandability	.370**	.270**	.180*	.116

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

* Correlation is significant at the 0.05 level (2-tailed).

G. Cluster Analysis Results

Table 67 Cluster Typology I - Number of Cases for Two Clusters

Clusters No	Number of Cases
1	85
2	76

Table 68 Cluster Typology I - Analysis Results for Two Clusters

Attribute	Level	F	Sig.	1	2
Input Type	Automatic	234.56	0.000	0.14	1.59
Face to Face Comm.	Available	66.62	0.000	1.17	0.27
Technical Support	Available	17.79	0.000	0.63	0.25
Response Time	Fast	2.69	0.103	0.33	0.55
Cost	Inexpensive	1.54	0.216	0.44	0.31

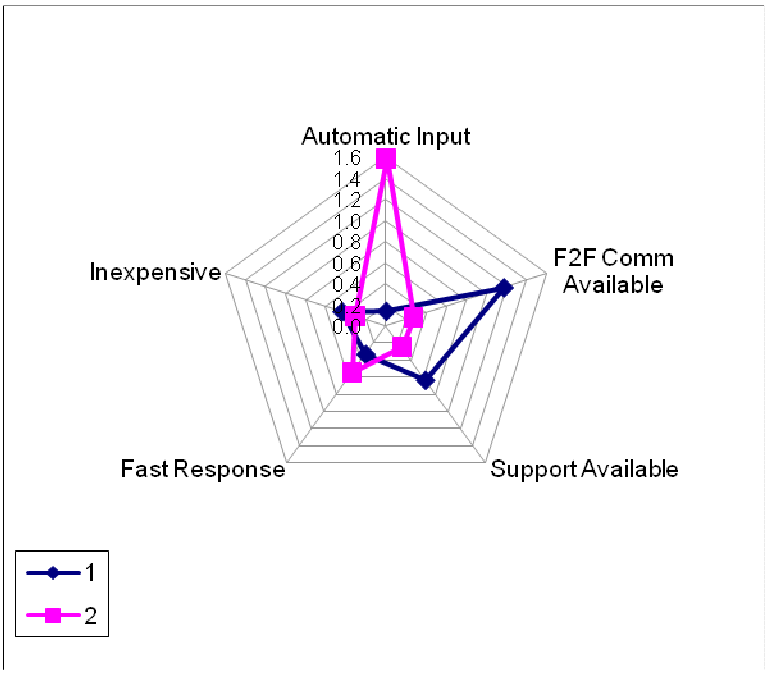


Fig. 51 Cluster typology I - analysis results for two clusters

Table 69 Cluster Typology I - Number of Cases for Three Clusters

Clusters No	Number of Cases
1	77
2	72
3	12

Table 70 Cluster Typology I - Analysis Results for Three Clusters

Attribute	Level	F	Sig.	1	2	3
Input Type	Automatic	138.89	0.000	0.19	1.66	-0.04
Face to Face Comm.	Available	48.72	0.000	1.27	0.34	-0.15
Technical Support	Available	11.43	0.000	0.67	0.25	0.21
Response Time	Fast	29.35	0.000	0.48	0.63	-1.06
Cost	Inexpensive	1.68	0.189	0.46	0.34	0.13

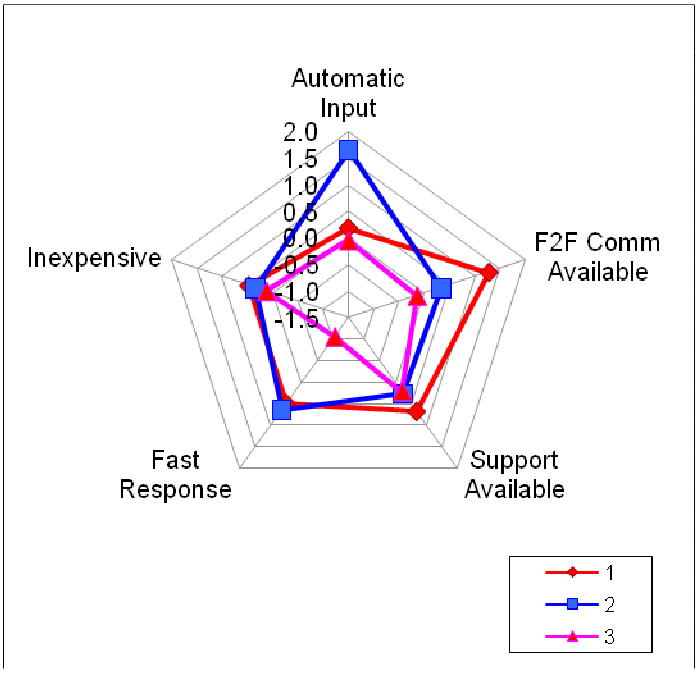


Fig. 52 Cluster typology I - analysis results for three clusters

Table 71 Cluster Typology II - Number of Cases for Two Clusters

Clusters No	Number of Cases
1	77
2	75

Table 72 Cluster Typology II - Analysis Results for Two Clusters

Attribute	F	Sig.	1	2
Concern Health	8.79	0.004	3.73	3.3
Mobile Service Experience	1.50	0.222	1.62	1.87
Usage Time	1.17	0.281	4.18	4.01
Compatibility	0.03	0.854	3.84	3.81
Weight Problem	455.08	0.000	1.48	4.11
Exercise	12.14	0.001	3.34	2.55

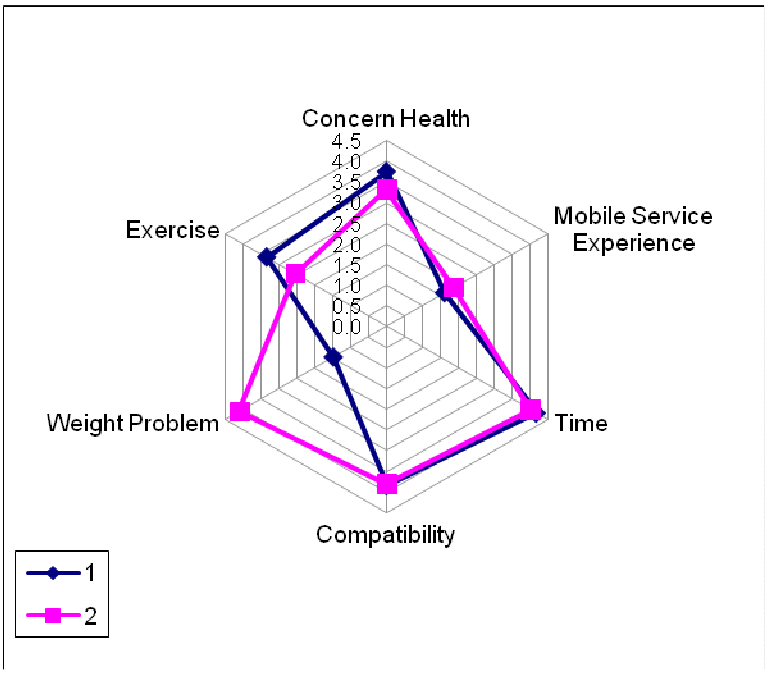


Fig. 53 Cluster typology II - analysis results for two clusters

Table 73 Cluster Typology II - Number of Cases for Three Clusters

Clusters No	Number of Cases
1	29
2	69
3	54

Table 74 Cluster Typology II - Analysis Results for Three Clusters

Attribute	F	Sig.	1	2	3
Concern Health	11.51	0.000	3.61	3.17	3.92
Mobile Service Experience	265.28	0.000	3.97	1.26	1.17
Usage Time	0.24	0.786	4.21	4.09	4.06
Compatibility	0.73	0.486	3.83	3.92	3.69
Weight Problem	24.67	0.000	3.31	3.35	1.76
Exercise	67.15	0.000	3.31	1.90	4.09

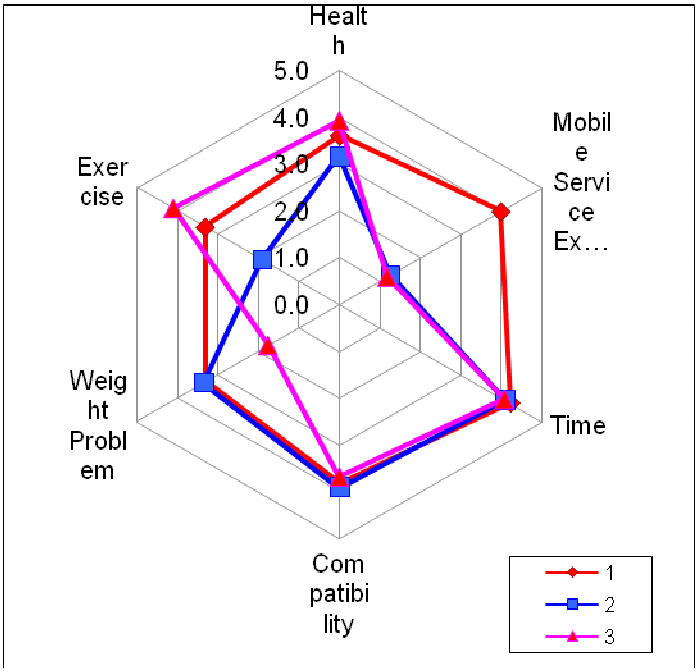


Fig. 54 Cluster typology II - analysis results for three clusters

H. Regression Analysis Results

Table 75 Model Summary of Regression 1

Model Summary (b)					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.664a	0.44	0.437	0.67497	1.992
a. Predictors: (Constant), Attitude					
b. Dependent Variable: Intention					

Table 76 ANOVA Analysis of Regression 1

ANOVA(b)						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.774	1	53.774	118.034	.000a
	Residual	68.337	150	0.456		
	Total	122.11	151			
a. Predictors: (Constant), Attitude						
b. Dependent Variable: Intention						

Table 77 Coefficients of Regression 1

Coefficients(a)						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.806	0.291		2.766	0.006
	Attitude	0.735	0.068	0.664	10.864	0
a. Dependent Variable: Intention						

Table 78 Model Summary of Regression 2

Model Summary (c)					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.623a	0.388	0.384	0.63677	
2	.653b	.427	.419	.61855	2.231

a. Predictors: (Constant), Usefulness
b. Predictors: (Constant), Usefulness, Ease_of_Use
c. Dependent Variable: Attitude

Table 79 ANOVA Analysis of Regression 2

ANOVA(c)						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38.597	1	38.597	95.189	.000a
	Residual	60.822	150	.405		
	Total	99.419	151			
2	Regression	42.412	2	21.206	55.426	.000b
	Residual	57.007	149	.383		
	Total	99.419	151			

a. Predictors: (Constant), Usefulness
b. Predictors: (Constant), Usefulness, Ease_of_Use
c. Dependent Variable: Attitude

Table 80 Coefficients of Regression 2

Coefficients(a)						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.496	.285		5.253	.000
	Usefulness	.692	.071	.623	9.756	.000
2	(Constant)	.993	.319		3.113	.002
	Usefulness	.570	.079	.514	7.225	.000
	Ease_of_Use	.230	.073	.224	3.158	.002

a. Dependent Variable: Attitude

Table 81 Model Summary of Regression 3

Model Summary (i)					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.548a	.300	.296	.61305	
2	.672b	.452	.445	.54427	
3	.708c	.501	.491	.52113	
4	.741d	.548	.536	.49747	
5	.761e	.579	.565	.48182	
6	.775f	.600	.583	.47144	
7	.784g	.615	.597	.46392	
8	.791h	.626	.605	.45895	1.784

a. Predictors: (Constant), Service_Quality
b. Predictors: (Constant), Service_Quality, Compatibility
c. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support
d. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality
e. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time
f. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time, Image
g. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time, Image, Accessibility
h. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time, Image, Accessibility, Ease_of_Use
i. Dependent Variable: Usefulness

Table 82 ANOVA Analysis of Regression 3

ANOVA(i)						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	24.182	1	24.182	64.343	.000a
	Residual	56.375	150	.376		
	Total	80.558	151			
2	Regression	36.419	2	18.210	61.471	.000b
	Residual	44.138	149	.296		
	Total	80.558	151			
3	Regression	40.364	3	13.455	49.542	.000c
	Residual	40.194	148	.272		
	Total	80.558	151			
4	Regression	44.178	4	11.045	44.629	.000d
	Residual	36.379	147	.247		
	Total	80.558	151			
5	Regression	46.664	5	9.333	40.202	.000e
	Residual	33.894	146	.232		
	Total	80.558	151			
6	Regression	48.331	6	8.055	36.243	.000f
	Residual	32.227	145	.222		
	Total	80.558	151			
7	Regression	49.566	7	7.081	32.900	.000g
	Residual	30.992	144	.215		
	Total	80.558	151			
8	Regression	50.437	8	6.305	29.932	.000h
	Residual	30.120	143	.211		
	Total	80.558	151			

a. Predictors: (Constant), Service_Quality
b. Predictors: (Constant), Service_Quality, Compatibility
c. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support
d. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality
e. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time
f. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time, Image
g. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time, Image, Accessibility
h. Predictors: (Constant), Service_Quality, Compatibility, Quality_Support, Info_Quality, Time, Image, Accessibility, Ease_of_Use
i. Dependent Variable: Usefulness

Table 83 Coefficients of Regression 3

Coefficients(a)						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.337	.207		11.304	.000
	Service_Quality	.423	.053	.548	8.021	.000
2	(Constant)	1.528	.222		6.868	.000
	Service_Quality	.349	.048	.453	7.258	.000
	Compatibility	.284	.044	.401	6.427	.000
3	(Constant)	.916	.267		3.433	.001
	Service_Quality	.279	.050	.361	5.606	.000
	Compatibility	.270	.043	.380	6.338	.000
	Quality_Support	.227	.059	.242	3.811	.000
4	(Constant)	.641	.264		2.429	.016
	Service_Quality	.211	.050	.273	4.171	.000
	Compatibility	.263	.041	.371	6.471	.000
	Quality_Support	.226	.057	.242	3.987	.000
	Info_Quality	.158	.040	.236	3.926	.000
5	(Constant)	.465	.261		1.779	.077
	Service_Quality	.176	.050	.228	3.513	.001
	Compatibility	.195	.044	.276	4.396	.000
	Quality_Support	.200	.056	.214	3.600	.000
	Info_Quality	.159	.039	.237	4.079	.000
	Time	.164	.050	.216	3.272	.001
6	(Constant)	.528	.257		2.056	.042
	Service_Quality	.153	.050	0.199	3.086	.002
	Compatibility	.192	.044	.270	4.405	.000
	Quality_Support	.182	.055	.195	3.327	.001
	Info_Quality	.142	.039	.212	3.673	.000
	Time	.155	.049	.204	3.146	.002
	Image	.077	.028	.157	2.739	.007
7	(Constant)	.363	.262		1.384	.169
	Service_Quality	.140	.049	.181	2.839	.005
	Compatibility	.161	.045	.227	3.609	.000
	Quality_Support	.165	.054	.177	3.037	.003
	Info_Quality	.138	.038	.206	3.633	.000
	Time	.143	.049	.189	2.948	.004
	Image	.073	.028	.149	2.635	.009
	Accessibility	.110	.046	.144	2.395	.018

Table 83 Continue

Coefficients(a)						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
8	(Constant)	.179	.275		.650	.517
	Service_Quality	.132	.049	.171	2.707	.008
	Compatibility	.138	.046	.194	3.011	.003
	Quality_Support	.146	.055	.156	2.678	.008
	Info_Quality	.137	.038	.205	3.647	.000
	Time	.130	.049	.171	2.673	.008
	Image	.071	.027	.144	2.580	.011
	Accessibility	.100	.046	.130	2.188	.030
	Ease_of_Use	.114	.056	.124	2.034	.044
a. Dependent Variable: Usefulness						

Table 84 Model Summary of Regression 4

Model Summary (f)					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.463a	.215	.210	.70462	
2	.594b	.353	.344	.64178	
3	.648c	.420	.409	.60946	
4	.678d	.460	.445	.59043	
5	.694e	.481	.464	.58039	2.171

a. Predictors: (Constant), Response_Time
b. Predictors: (Constant), Response_Time, Compatibility
c. Predictors: (Constant), Response_Time, Compatibility, Social_Influence
d. Predictors: (Constant), Response_Time, Compatibility, Social_Influence, Understandability
e. Predictors: (Constant), Response_Time, Compatibility, Social_Influence, Understandability, Self_Efficacy
f. Dependent Variable: Ease_of_Use

Table 85 ANOVA Analysis of Regression 4

ANOVA(f)						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.366	1	20.366	41.021	.000a
	Residual	74.473	150	.496		
	Total	94.839	151			
2	Regression	33.470	2	16.735	40.631	.000b
	Residual	61.369	149	.412		
	Total	94.839	151			
3	Regression	39.866	3	13.289	35.776	.000c
	Residual	54.973	148	.371		
	Total	94.839	151			
4	Regression	43.595	4	10.899	31.264	.000d
	Residual	51.245	147	.349		
	Total	94.839	151			
5	Regression	45.659	5	9.132	27.110	.000e
	Residual	49.180	146	.337		
	Total	94.839	151			

a. Predictors: (Constant), Response_Time
b. Predictors: (Constant), Response_Time, Compatibility
c. Predictors: (Constant), Response_Time, Compatibility, Social_Influence
d. Predictors: (Constant), Response_Time, Compatibility, Social_Influence, Understandability
e. Predictors: (Constant), Response_Time, Compatibility, Social_Influence, Understandability, Self_Efficacy
f. Dependent Variable: Ease_of_Use

Table 86 Coefficients of Regression 4

Coefficients(a)						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.178	.487		2.418	.017
	Response_Time	.649	.101	.463	6.405	.000
2	(Constant)	.470	.461		1.019	.310
	Response_Time	.565	.093	.404	6.049	.000
	Compatibility	.290	.051	.376	5.640	.000
3	(Constant)	.222	.442		.503	.615
	Response_Time	.523	.089	.373	5.853	.000
	Compatibility	.239	.050	.310	4.749	.000
	Social_Influence	.189	.046	.271	4.150	.000
4	(Constant)	.019	.433		.043	.966
	Response_Time	.505	.087	.361	5.827	.000
	Compatibility	.200	.050	.261	4.001	.000
	Social_Influence	.172	.045	.246	3.864	.000
	Understandability	.136	.042	.209	3.270	.001
5	(Constant)	-.356	.451		-.789	.431
	Response_Time	.378	.100	.270	3.791	.000
	Compatibility	.195	.049	.254	3.959	.000
	Social_Influence	.186	.044	.266	4.214	.000
	Understandability	.142	.041	.217	3.458	.001
	Self_Efficacy	.198	.080	.173	2.476	.014
a. Dependent Variable: Ease_of_Use						

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