# AN ANALYSIS OF THE MAIN CRITICAL FACTORS THAT AFFECT THE ACCEPTANCE OF TECHNOLOGY IN HOSPITAL MANAGEMENT SYSTEMS

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Approval of the Graduate School of Informatics

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# ABSTRACT

AN ANALYSIS OF THE MAIN CRITICAL FACTORS THAT AFFECT THE ACCEPTANCE OF TECHNOLOGY IN HOSPITAL MANAGEMENT SYSTEMS

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The purpose of this study is to develop a methodology by extending the *Technology Acceptance Model* (Davis, 1989) in order to contribute the acceptance of Hospital Management Systems in hospitals. The study also aims to extend the TAM by adding external variables. Thereby the relationships between perceived usefulness, perceived ease of use and external TAM factors and how these relationships will affect the behavioral intention to use the technology will be determined. In this study quantitative research methods are used. Quantitative research comprises from a questionnaire which is tested in Turkish government hospitals by hospital personnel, physicians, nurses, technicians and administrative personnel.

After collection of data from quantitative research the analysis of the data was conducted. The findings of the analysis gave the significant relationships between perceived usefulness, perceived ease of use, behavioral intention and external variables. In conclusion this study points out the effects and the compatibility of the critical factors of TAM on the user acceptance of Hospital Management Systems in Turkish hospitals.

Keywords: Hospital Management Systems, Quantitative research, Technology Acceptance Method, Perceived Usefulness, Behavioral Intention

# ÖZ

HASTANE YÖNETİM SISTEMLERİNDE TEKNOLOJİ KABUL MODELİNİ ETKİLEYEN TEMEL ÖNEMLİ ETKENLERİN İNCELEMESİ

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Bu çalışmanın amacı hastanelerde kullanılan Hastane Yönetim Sistemlerinin kullanımının kabul edilmesine katkıda bulunmak için (Davis, 1989) Teknoloji Kabul Modelinin genişletilmesiyle bir metot geliştirmektir. Bu çalışma ayrıca dışsal faktörlerin eklenmesiyle *Teknoloji Kabul Modelinin* geliştirilmesini amaçlamaktadır. Böylece algılanan fayda, algılanan kullanım kolaylığı ve dışsal teknoloji kabul modeli etmenleri arasındaki ilişki ve bu ilişkinin teknoloji kullanma niyetleri ölçülebilecektir. Bu çalışmada nicel analiz yöntemleri kullanılmıştır. Nicel analiz yöntemi Türkiye Devlet hastanelerinde doktorlar, hemşireler, teknisyenler ve yöneticiler tarafından doldurulan anket çalışmasından oluşmaktadır.

Anket sonuçları hastanelerden toplandıktan sonra ham verinin analiz süreci başlatıldı. Analizin sonuçları algılanan fayda, algılanan kullanım kolaylığı dışsal etmenler ve teknoloji kullanma niyeti arasında kayda değer bir ilişki olduğunu göstermiştir. Sonuç olarak bu çalışma *Teknoloji Kabul Modelindeki* kritik faktörlerin Türkiye'deki Hastane Yönetim Sistemlerinin kullanımının kabul edilmesi üzerindeki etkilerini ve uyumluluğunu göstermektedir.

Anahtar kelimeler: Hastane Yönetim Sistemleri, Nicel Analiz, Teknoloji Kabul Modeli, Algılanan Fayda, Teknoloji Kullanma Niyeti.

*This thesis is dedicated to:*

*My mother, father and my fiancée who supported me every time.*

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| | |
|---|---|
| **TAM** | Technology Acceptance Model |
| **IDT** | Innovation Diffusion Theory |
| **TRA** | Theory of Reasoned Action |
| **TPB** | Theory of Planned Behavior |
| **UTAUT** | Unified Theory of Acceptance and Use of Technology |
| **IT** | Information Technology |
| **SARUS** | The name of the Hospital Management System Software |
| **SPSS** | Software of statistical packages for social sciences |
| **SEM** | Structure Equation Model |
| **MISQ** | MIS Quarterly |
| **ISR** | Information Systems Research |
| **PLS** | Partial least squares |
| **KMO** | Kaiser-Meyer-Olkin Measure of Sampling Adequacy |
| **PU** | Perceived Usefulness |
| **PEU** | Perceived Ease of Use |
| **TRU** | Trust |
| **C** | Culture |
| **SE** | Self Efficacy |
| **FNC** | Financial Cost |
| **BI** | Behavioral Intention |
| **A** | Anxiety |
| **RD** | Result Demonstrability |
| **JS** | Job Relevancy |
| **EUS** | End User Support |
| **SN** | Social Norms |
| **HIS** | Hospital Information System |
| **AVE** | Average Variance Extraction |

# CHAPTER 1

## INTRODUCTION

Adopting the information systems in area of healthcare is crucial as many other areas. Governments, physicians, hospitals administrators are all aware of the benefits of using and developing healthcare technologies. In healthcare system one of the most important keystones is Information. The ways of using the information differ in each sub areas of health information system. The personal and medical information of patients, the salary and the seniority of the personnel, the income and outcome of the hospital, the stock level of the materials and medicines are some main components of hospital which is kept and processed throughout the system.

Although the information technology contributes to the organizational structure and progress of health care in hospitals, the resistance of users to use new technologies makes people unable to adopt the technology. The problem of user acceptance became an important issue as healthcare industry is now computerized and dependent on technology. The research about technology acceptance is very important field in Information Systems. Technology acceptance models are investigated to explain and predict the system usage. Although there has been great amount of work in this area, very little research has been studied in healthcare issues. In the literature the system usage is adapted as the prior usage of the applications by the users. The decisions of the users in adopting the system differ in time. Users can be adapted into the system at the very beginning of the implementation process however the actual benefits may not be achieved because of

lacking continued usage. Besides one of the most important benefits that are improving the quality of patient care, the health professionals are unconvinced about other advantages like, security of data, decreasing financial cost, decreasing amount of work, high speed of reaching the patient data from the system. They even believe that the cost of this kind of system will overweigh the benefits. This belief disappears eventually after realizing the positive effects of the Hospital Management & Information Systems. According to the studies of Ömürberk & Altın (2009) the users become aware of the benefits of information systems as the need for more secure, stable and effective systems has increased.

The reports of Institute of Medicine (2003) show that the rate of the medical errors in American hospitals varies between % 2.9 and % 3.7. About half of those errors are described to be preventable. It has been observed that about 44.000-98.000 patients lost their lives because of the medical mistakes. Report also states that the cost of those preventable mistakes is between 17-29 billion USD. Taking into account these statistical analyses it can be said that there is a need for improvement of the shortages of the medical information systems and describing the new characteristics of the information systems should have. So in order to improve the information systems in healthcare area the point of view of the users to the system should be investigated. The user acceptation of the technology can increase the adoption and decrease the error rates in health care.

## 1.1 The Purpose of the Study

The main purpose of this study is to develop a model for users' technology acceptance for Hospital Management & Information Systems. This model will be extended from the original *Technology Acceptance Model* (TAM) developed by (Davis, 1989). The study also aims to extend the TAM by adding external variables. In that regard, the relationships between perceived usefulness, perceived ease of use and external TAM factors and how these relationships will affect the behavioral intention to use will be determined. As Davis (1989) mentioned there had been numerous variables tested for the contribution to the TAM (Benbasat and Dexter, 1986; Franz and Robey, 1986; Markus and Bjorn- Anderson, 1987; Robey and

Farrow, 1982). However in these investigations, the key measures are not qualified enough to get significant results. The relations between the key factors vary from one to another due to the improper key measurements. There are two main factors in original TAM (1) "*perceived usefulness"* and (2)*"perceived ease of use"*. The importance of these factors has already been tested and proven in early studies of Davis (1989, 2000, and 2003) and many referring to it. However this study aims to comprehensively examine external TAM factors considering factors such as "*social norms, trust, self efficacy, training, end user support, result demonstrability, facilitating conditions, job relevance, voluntariness, facilitating conditions, anxiety, and culture*" and tests for significances of relations between there factors and the main TAM factors which have been accomplished to predict users' behavioral intention towards Hospital Management & Information Systems.

In this study quantitative research method is used. In quantitative research a questionnaire with 72 key measure is tested in Turkish government hospitals to hospital personnel, physicians, nurses, technicians and administrative personnel.

## 1.2 The Outline of the Thesis

The organization of the thesis is given as:

Chapter 1: In this chapter the problem of the user acceptance in hospitals against the Hospital Management & Information Systems and the purpose of the study are introduced.

Chapter 2: In this chapter the literature review about Technology Acceptance Model is introduced. The details about main factors and external factors of TAM are given.

Chapter 3: In this chapter the extended model is explained with each factor. The research hypotheses are explained and the research measure keys are introduced. The research methodology is described in this chapter. The details about the statistical instruments and the data collection phase are given in this part.

Chapter 4: In this chapter the statistical data analysis according to the data collected from hospitals is mentioned. The results of this analysis are given and the hypotheses are evaluated according to the results.

Chapter 5: In this chapter discussions and conclusion about the study is explained and future works are introduced.

# CHAPTER 2

# LITERATURE REVIEW

In this chapter the literature about Technology Acceptance Model is reviewed with its core components and external factors which directly or indirectly affect the model constructs. In part 2.1 general literatures about TAM are given with the main components such as perceived usefulness, perceived ease of use and behavioral intention. The summary of the reviewed studies in literature is also given in part 2.1. In part 2.2 the external variables used in TAM are explained and the literature review about these variables is presented. In part 2.3 the individual characteristics which affect the TAM are stated.

## 2.1 Technology Acceptance Model (TAM)

There are different technology acceptance research models reviewed in the literature such as: Davis' Technology Acceptance Model (TAM) (Davis 1989); Roger's Innovation Diffusion Theory (IDT) (Rogers, 1995); the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975); the Theory of Planned Behavior (TPB) (Ajzen, 1991); and Social Cognitive Theory (Bandura 1986; Compeau & Higgins 1995a; Compeau & Higgins, 1995b; Compeau, Higgins & Huff, 1999) The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. , 2003). From all these research models The Technology Acceptance Model (Davis, 1989), is widely used in healthcare industry studies and it has been revised and

extended according to new substantial factors. Davis' model provides well researched and beneficial structure with the analyzed factors which influence users' perceptions and attitudes towards information systems however the model is not sufficient for the current health care researches and there is a need to develop supporting new factors (Handy, Hunter and Whiddett, 2001).

The TAM had been tested by many studies in prediction of adoption behaviors for various technologies. In recent studies the extended versions of TAM model has been tested. However while decomposing the intention into factors; the 2 main factors remained same. (*Figure 1 Technology Acceptance Model Davis (1989)*)

In the original technology acceptance model the two main factors– *perceived usefulness* and *perceived ease of use* – are important to explain the tendency of users' intentions. According to Davis (1989) *Perceived usefulnes*s is "the degree to which a person believes that using a particular system will enhance his or her job performance". *Perceived ease of use* is "the degree to which a person believes that using a particular system will be effortless". These factors are also easy to understand for researchers and can be helpful in requirement analysis stage and development stages. The two factors perceived ease of use and perceived usefulness are very common in technology used domain areas so the two main factors can be used widely to solve the problem of acceptance of technology (Tung, Chang, and Chou, 2008)

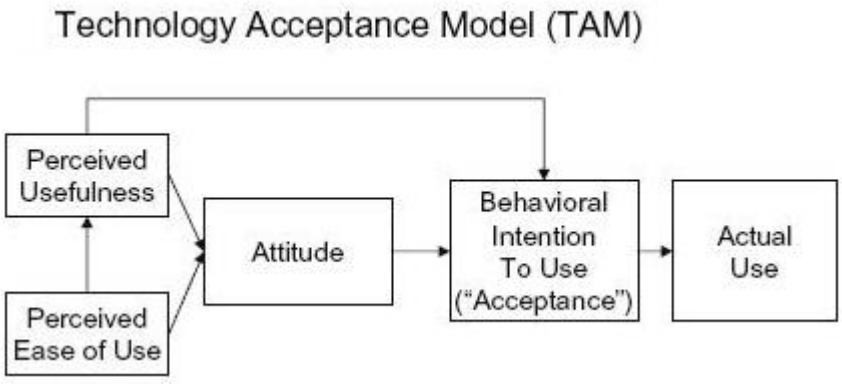


**Figure 1 Technology Acceptance Model Davis (1989)**

After first version of TAM is created and tested, TAM is revised with certain differences. The "*attitude*" is removed from the TAM since it did not precisely reflect the effect of *perceived ease of use* and *perceived usefulness* on *behavioral intention* as expected (Venkatesh and Davis, 1996).

*Behavioral Intention* is very common in predicting the user adoption and acceptance of technology. System usage is also a good indicator of IT success however a number of experimental studies proven that individual's behavioral intention is adequate for the prediction of acceptance of technology (Venkatesh, 2000). Ajzen (1991) states that, intentions show the motivational factors which influence a behavior. Intension offers how people will try to success and how much attention they are going to denote. Ajzen also claim that as a general rule, "the stronger the intention to engage in a behavior, the more likely should be its performance". The TAM asserts that intention is a particular domain to examine and predict a user's behavior toward a particular technology or system.

Besides *behavioral intention* the most common predictor of technology acceptance is *perceived usefulness*. In common perspective physicians want the Hospital Management System to be beneficial to their practice. Moreover, adapting to technology quickly and becoming familiar with its parts is possible for doctors with getting minimum user support. As a consequence the benefits of a system are more important for them than the ease of use of the system. Chismar and Patton (2003) also claim that physicians focus on the usefulness of the technology whereas the other professions focus on the ease of use of technology. *Perceived usefulness* is a fundamental indicator of usage intentions so understanding the essential parts of the *perceived usefulness* is important. The influence of the *perceived usefulness* should also be understood since it shows differences over time with increasing experience during the usage of the system. (Venkatesh, 2000)

*Perceived ease of use* is another important factor that effects the adoption of the technology by individuals. Handy et al. (2001) claims that in order to keep attention of users the system should have functional interfaces, accessible anytime

from anywhere and have simple usage. *Perceived ease of use* also influences the perceived usefulness. If the system is easy to use it can be predicted that the system would be more useful. However Venkatesh (2002) observed that the direct effect of *perceived ease of use* on intention decreases over time. Individual's usage of the system changes from implementation stage to real system usage. In early times users will have difficulties while using the system and it would be difficult to get used to new user interfaces. In this phase *perceived ease of use* is a great indicator of acceptance of system. However after a period of time users will adopt the system interface and will need to reach the information quickly. They will need qualified information; this information should be customized for each user. These factors will accumulate during the usage of the system and the effect of *perceived ease of use* on intention will decrease. Venkatesh (2002) found that individuals experiences increase with a system over a period of time and the relationship between *perceived ease of use* and *intention* disappears.

TAM suggests that the system usage is determined by the intention of users. It is also stated that the intention is related to *perceived usefulness* and *perceived ease of use.* Nonetheless physicians who use the Hospital Management Systems are a specific user group. Therefore the current factors in technology acceptance model don't express the motivation of the users and therefore some additional motivational factors are required to be searched (Tung et al., 2008). *Perceived usefulness* and *perceived ease of use* intervene the effects of external variables on intention to use. Those external variables are system characteristics, development process and training. Chau and Hu (2002) also state that not all TAM variables have the same effect on different kind of contexts.

In most research TAM and TAM2 have been tested and certain relationships between the factors of the model are found to be significant. However the studies show that the results were not consistent with each other. Technology Acceptance Model is still under development as there are many inconsistencies as shown in (*Table 1 Summary of Reviewed Studies of TAM in Healthcare*). In this table the

authors of the studies are listed below the "Study" heading. In these studies different kind of technologies are researched in healthcare area. Details of these technologies are given under the "Technology Studied" part. In the "Population Studied" part the sample type is given such as doctors, nurses and administrators. The number of the total participants is given in "Sample Size" column. Under the "Response Rate" column the percentage of the responses of the participants are given. Finally in the "Variance" part the predictive power of the research models in order to calculate the behavioral intention to use technologies are given. In this table the variances of the studies differences from each other which means that a certain model can't be proved for all kinds of technologies.

**Table 1 Summary of Reviewed Studies of TAM in Healthcare**

| Study | Technology Studied | Population Studied | Sample Size | Response Rate | Variance |
|---|---|---|---|---|---|
| Aggelidis et al. | Developing and testing a modified technology acceptance model taking into consideration other relevant models found in the literature | Greek hospital personnel 10.6% medical, 16.6% nursing and 72.8% administrative personnel | 341 | (83%), with 283 being the total number of respondents | 87% of the variance |
| Bertrand et al. | Virtual reality in clinical settings. | Individuals familiar with virtual reality from Canada, USA, Spain, France, Israel, Italy, UK, Australia, Germany, Greece, Japan, Korea, Luxembourg, Scotland | 190 | 21% | 85% |
| Chau et al. | Telemedicine technology | Physicians from different specialty areas in hospitals of Hong Kong | 408 | 24% | 40–44% |
| Chen et al. | Web-based learning to public health nurses (PHNs) | Three hundred and sixty-nine health centers in Taiwan. Public health nurses are questionered. | 202 | 85.2% | 45.2% |
| Chismar et al. | Internet and Internet-based health applications | Physicians (pediatricians) in Hawaii | 205 | 43% | 54% |
| Duyck et al. | Picture Archiving and Communication System (PACS) | Potential PACS-using physicians in Belgian university hospital | 600 | 34% | - |
| Gagnon et al. | The extended provincial | Physicians attending a conference on telehealth. | 60 | 70% | 81% Intention |

**Table 1 (Cont.)**

| Study | Technology Studied | Population Studied | Sample Size | Response Rate | Variance |
|---|---|---|---|---|---|
| | telemedicine network of Quebec | | | | |
| Gibson et al. | Electronic medical records (EMR) technologies | Physicians from a medical school from a large regional university and a large multi-physician practice | 102 | - | PEOU 59% PU 85% |
| Han et al. | Mobile medical information system | Physicians working in the healthcare sector in Finland | 578 | 42% | 70% |
| Handy et al. | Electronic medical records (EMR) systems and improved electronic communications | Doctors and midwives in Australia and New Zealand | 167 | Response rates of 64% for doctors and 59% for midwives | - |
| Kim et al. | Health information websites | A nationally representative random sample of adults was contacted through an online survey by a professional survey institution. | 250 | 91% | PU 71% PEOU 67% |
| Liu et al. | Web-based electronic medical records (EMR) | Senior health care trainees in dental hygiene, physician assistants, and radiology staff at hospitals and clinics in the US | 77 | 86% | 52% |
| Pare et al. | Regional physician order entry (POE) system aimed at speeding up the transmission of clinical data | Physicians | 125 | 72.8% | 78% attitude |
| Tung et al. | E-logistics information system in the medical industry. | Nurses in medical centers and hospitals in Taiwan | 350 | 73.71% | 70% BI 67% PU |
| Schaik et al. | Prototype of a portable computerized postural assessment technology | Physio-therapists in the UK | 49 | Not reported (laboratory study) | 39% (of actual use) |
| Wu et al. | Adverse event reporting systems | Physicians, nurses, medical technicians, pharmacists and administration staffs that worked for hospitals in Taiwan | 290 | 31% valid return rate | PU 65% ITU 59% |
| Wang et al. | Mobile health care systems (MHS) including mobile Picture Archiving and Communication Systems (PACS) and mobile order systems | Physicians, nurses, and medical technicians at medical centers/ hospitals in Taiwan that had partially or fully implemented a mobile health care systems | 123 | 42% | 70% |

**Table 1 (Cont.)**

| Study | Technology Studied | Population Studied | Sample Size | Response Rate | Variance |
|---|---|---|---|---|---|
| Yu et al. | Health IT applications by caregivers in long-term care facilities | The caregivers surveyed were the staff members from 15 long term care facilities that the research team had access to in the Ilawarra and Sydney region, NSW, Australia | 350 | 45.4% | 34% |

Davis's model offers a beneficial and well studied data for analyzing the factors which affects users' thought of information systems but the model lack of contextual and organizational factors; it just focuses on perceptions and attitudes of users on the system. In order to complete the defects of TAM (Venkatesh, 2002) resulted in the extension of the model and created TAM2 (*Figure 2 Technology Acceptance Model 2*). "TAM2 incorporates two additional constructs: social influence processes and cognitive instrumental processes. Four cognitive factors influence perceived usefulness: result demonstrability, job relevance, output quality, and perceived ease of use. The social factors influence perceived usefulness: image, social norm, and voluntariness" (Venkatesh, 2002).

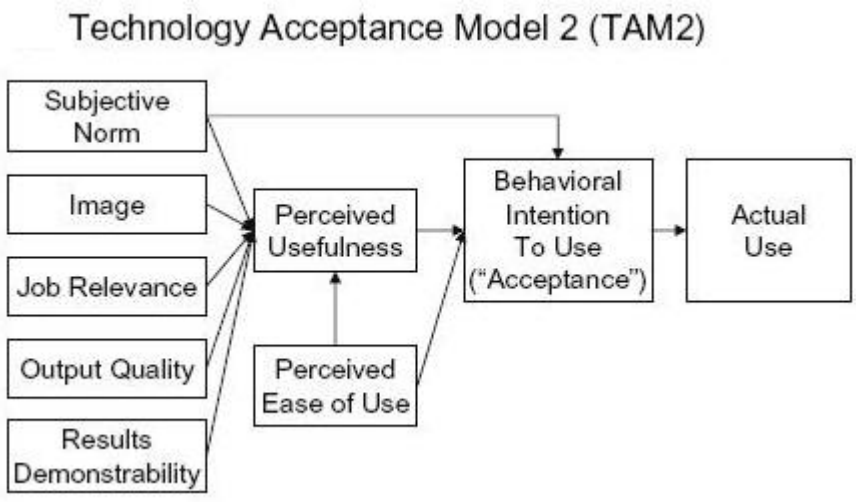


**Figure 2 Technology Acceptance Model 2 Venkatesh (2002)**

## 2.2 External Variables Used in Extended TAM

After the extension of TAM other external variables were also studied such *as End User Support, Facilitating Conditions, Voluntariness, Job Relevance, Result Demonstrability, Training, Self Efficacy, Financial Cost, Anxiety, Culture, Social Norm, Income and Trust*. The definitions of these variables and the references in which these variables used are given in (*Table 2 Summary of Variables Used in Extended TAM*)

**Table 2 Summary of Variables Used in Extended TAM**

| Variable | Definition | References from Literature |
|---|---|---|
| Perceived Usefulness | An individual's perception that using an IT system will enhance job performance | Anderson & Schwager (2004); Barker & Schaik & Simpson & Corbett (2003); Chau & Hu (2001); Chau & Hu (2002); Chau & Hu & Sheng & Fung (1999); Chismar & Wiley (2002); Chismar & Wiley (2003); Davis (1989); Duyck & Pynoo & Devolder &Voet & Adang & Vercruysse (2008); Gibson & Seeman (2005); Han & Mustonen & Seppanen & Kallio (2005); Handy & Hunter & Whidett (2001); Liu & Ma (2006); Tung & Chang (2008); Tung & Chang (2008); Scahik & Saltikov & Warren (2002); Venkatesh & Davis (2000); Wu & Shen & Lin & Greenes & Bates (2008); Wu & Wang & Lin (2007); Yu & Li & Gagnon (2009) |
| Perceived Ease of Use | An individual's perception that using an IT system will be free of effort | Anderson & Schwager (2004); Barker & Schaik & Simpson & Corbett (2003); Chau & Hu (2001); Chau & Hu (2002); Chismar & Wiley (2002); Chismar & Wiley (2003); Compeau & Higgins & Huff (1999); Davis (1989); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Gibson & Seeman (2005); Han & Mustonen & Seppanen & Kallio (2005); Handy & Hunter & Whiddett (2001); Liu & Ma (2006); Tung & Chang & Chou (2008); Tung & Chang (2008); Venkatesh & Davis (2000); Venkatesh & Morris & Davis (2003); Wu & Wang & Lin (2007); Yu & Li & Gagnon (2009) |
| Behavioral Intension | An individual's motivation or willingness to exert effort to perform the target behavior | Anderson & Schwager (2004); Barker & Schaik & Simpsons & Corbett (2003); Chau & Hu (2001); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Gibson & Seeman (2005); Han & Mustonen & Seppanen & KAlio (2005); Liu & Ma (2006); Tung & Chang & Chou (2008); Tung & Chang (2008); Wu & Wang & Lin (2007); |

**Table 2 (Cont.)**

| Variable | Definition | References from Literature |
|---|---|---|
| | | Yu & Li & Gagnon (2009) |
| End User Support | High levels of support that promotes more favorable beliefs about the system among users as well as MIS staffs | Handy & Hunter & Whiddett (2007) |
| Facilitating Conditions | The control beliefs relating to resource factors such as time and money and IT compatibility issues that may constrain usage | Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet & Adang & Ovaere & Vercruysse (2008); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Kripanont (2007); Schaper & Pervan (2007); Wu & Wnag & Lin (2007) |
| Voluntariness | The degree to which use of the innovation is perceived as being voluntary, or of free will | Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Venkatesh & Davis (2000); Yu & Li & Gagnon (2009) |
| Job Relevance | The capabilities of a system to enhance and individual's job performance | Chismar & Wiley (2002); Chismar & Wiley (2003); Venkatesh & Davis (2000) |
| Result Demonstrability | The degree to which the results of adopting/using the IS innovation are observable and communicatable to others | Chismar & Wiley (2002); Chismar & Wiley (2003); Venkatesh & Davis (2000) |
| Training | Training of the users about the system | Aggelidis & Chatzoglou (2009); Jayasuriya (1998); Wu & Shen & Lin & Greenes & Bates (2008) |
| Self Efficacy | The belief that one has the capability to perform a particular behavior | Compeau & Higgins & Huff (1999); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Tung & Chang (2008); Venkatesh & Morris & Davis (2003); Wu & Wang (2007) |
| Financial Cost | The extent to which a person believes that using the information systems will cost money | Handy & Hunter & Whiddett (2001); Tung & Chang & Chou (2008); Tung & Chang (2008) |
| Anxiety | An individual's apprehension, or even fear, when she/he is faced with the possibility of using computers | Compeau & Higgins & Huff (1999); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Tung & Chang (2008) |
| Culture | The collective programming of the mind which distinguishes the members of one human group from another | Bandyopadhyay & Fraccastoro (2007); Lubar (2006); Mccoy & Galletta & King (2006) |
| Social Norm | Person's perception that most people who are important to him think he should or should not perform the behavior in question | Chau & Hu (2001); Chau & Hu (2002); Chismar & Wiley (2002); Chismar & Wiley (2003); Kripanont (2007); Venkatesh & Davis (2000); Wu & Shen & Lin & Greenes & Bates (2008); Yu & Li & Gagnon (2009) |
| Trust | The extent to which one is willing to ascribe good intentions to, and have confidence in, the words and actions of other people (or systems) | Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008); Tung & Chang & Chou (2008); Wu & Shen & Lin & Greenes & Bates (2008) |

### 2.2.1 End User Support

Involvement of end users in the planning and implementation stages of Hospital Management Systems increases the user acceptance of technology. According to the findings of Handy et al. (2001) at the beginning of the system the end-user participation would attract them to use the system. 87% of doctors and midwives believe that having a representative from their own group in the planning stage of such a technological system would increase their intention to use the system. They believe that in such case it would be more understandable and easy to use the system and since they have a representative in the planning stage they would trust more on the system.

Although IT project managers and developers are capable of creating well designed systems, having a hospital representative in design and development group would be very useful for satisfying the necessities of the users.

Paré, Sicotte and Jacques (2006) state that "individuals are thought to develop feelings of ownership of an object when they have control over the system, associate with the system and put a lot of time and effort into the system". According to Pare et al. physicians can have inspection on the system by involving in the design of user interfaces and report forms. Their support would be very useful in means of creating user interface guides, the user training plans, and training of the doctors. End user support influences the other factors. Kim and Chang (2006) state that in most of the external variables; the end-user support and customization are found to be significant on perceived usefulness and perceived ease of use.

### 2.2.2 Facilitating Conditions

Facilitating conditions such as high computational power, comfortable working conditions, wide LCD screens etc. would increase user's intention to use the system. However Venkatesh (2003) states that while predicting intention the facilitating conditions are not influential. However the facilitating conditions is found to be significant in determining usage. These studies have shown that the effect of

facilitating conditions alone on usage is not clear (Duyck et al., 2008). Venkatesh (2003) also states that, if the age and experience factors are studied accordant with the facilitating conditions, the significance of the factor can be seen. This accordance can be explained that the facilitation conditions affect the experienced senior workers after a period of time of experience.

On the contrary, Aggelidis and Chatzoglou (2008) assume that the relationship between the facilitating condition and the usage is quite significant. In addition to usage the facilitating conditions, system usage support and increase in salaries are effective in determining the user's decisions about the hospital management systems. Better working conditions of the hospital personnel by means of information technologies attract the attention of other personnel in hospital. These working conditions lead the hospital personnel to adopt the hospital management systems. According to a research done by the Turkish Health Ministry, the wait for the computer based tomography result have decreased from 6 months to 1 day between years 1999 and 2009. During 10 years the facilitating conditions in hospitals have been improved. It is quite observable on (*Figure 3 Computer Based Tomography Centers*) that the rates of the computer based tomography centers increased to 356 at the end of 2009 so the patients can take their result more quickly in 2009 respect to 1999.

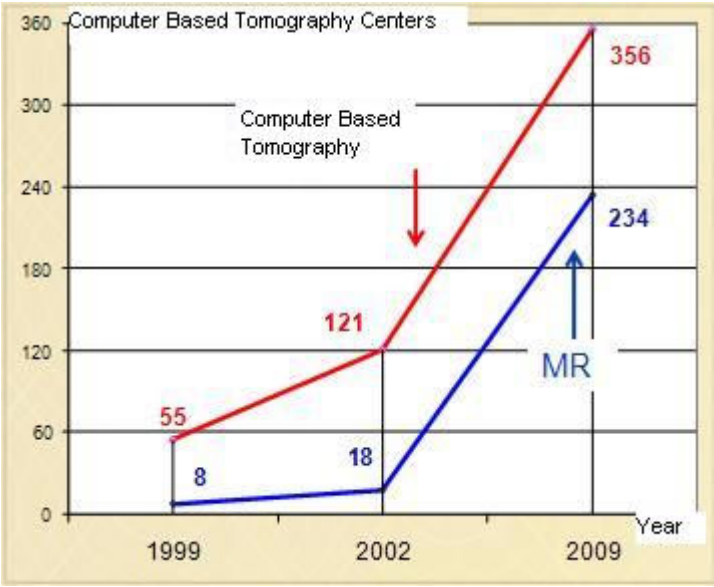


**Figure 3 Computer Based Tomography Centers in Turkey**

### 2.2.3 Voluntariness

Voluntariness is also another factor which affects the behavioral intention. Voluntariness as a moderating variable, defined as "the extent to which potential adopters perceive the adoption decision to be non-mandatory"(Venkatesh, 2002)

### 2.2.4 Job Relevance

Venkatesh (2002) defines job relevance as “an individual's perception regarding the degree to which the target system is applicable to his or her job in other words, job relevance is a function of the importance within one's job of the set of tasks the system is capable of supporting.”

Schaik et al. (2003) observed that if the software does not mediate and contribute to the work of the users, they will not accept the software. This fact is also applicable to the physicians.

### 2.2.5 Result Demonstrability

Result demonstrability is much related with the *perceived usefulness*. According to Handy's (2001) observations 30% of the users stated that they would not to use an application without clear benefits. Although the usage of application was compulsory, the users denied using it if they couldn't see the demonstrable benefits. Result demonstrability, defined by Moore and Benbasat (1991, p. 203) as the "tangibility of the results of using the innovation,". If a system creates influential job relevant outcomes required by a user it should reflect these results to the users in a proper way. Otherwise users are unlikely to understand the potential benefits of such an information system.

### 2.2.6 Training

Training increases the user's perception of self trust. It also increases the ability to use the system. Trust helps users became comfortable while using the Hospital Management Systems. The form of training is mostly comprised in the form of facilitating conditions. Taking into account of the benefits, *training* should be examined as independent structure. According to Aggelidis et al. (2008) training was the common issue in interviews. Aggelidis believes that through facilitating condition and ease of use, the *training* has a significant effect on behavioral intention. Besides, experimental studies have deduced that *training* has a positive impact on both *perceived usefulness* and *perceived ease of use*. *Training* also has significant effects on user self-efficacy. On the other hand Wu et al. (2006) states that training just have a great effect on self-efficacy and it do not have any significant effect on *perceived usefulness* and *perceived ease of use*. According t Wu's findings training does not have direct effect on behavioral intention either. Jayasuriya (1998) also believes that training does not have any impact on the usage of the information systems by the hospital personnel. That is why the training factor is not expected to be effective as main factors such as *perceived usefulness* and *perceived ease of use*.

### 2.2.7 Self Efficacy

Self efficacy is the belief of a user's capability of accomplishing a task. Self efficacy effects users' intention to use technology positively. *Self efficacy* mostly comes with the individual characteristics of users. *Self efficacy* can also be affected by other factors. Compeau, Higgins and Huff (1999) state that "an IT system must be about coaching, teaching, and encouraging individuals to ensure that they have the requisite skills and confidence in their skills to be successful in their use". Compeau et al. (1999) also states that the self efficacy can be an important factor on adapting the system over a period of time of implementation stage of the information system. However self-efficacy doesn't have any direct effect on intention.

### 2.2.8 Financial Cost

It is believed that perceived financial cost had an unfavorable effect on behavioral intention to use (Tung et al., 2008). Expensive technological system may reduce the user's intention to use. This factor is mostly related with the administrator staff of the hospitals. The information about financial condition and expense of hospital which is related with the treatment of the patients are also important for the better management in hospitals. So while estimating the cost of using the hospital management systems the financial cost should be well determined. According to the researches of the Prof Dr.Erhan Erebek (Dokuz Eylül Faculty of Medicine) the cost of the radiology and x-ray prints reduced with the Hospital Management & Information System applications and this increased the administrators' intention to use the system. As seen in (*Figure 4 Dokuz Eylül Faculty of Medicine Radiology prints costs*) the cost of the new system costs 5.235.000 $ between 2002 and 2009. However if the old techniques were used the system cost would be 15.500.000 $ in same year range.

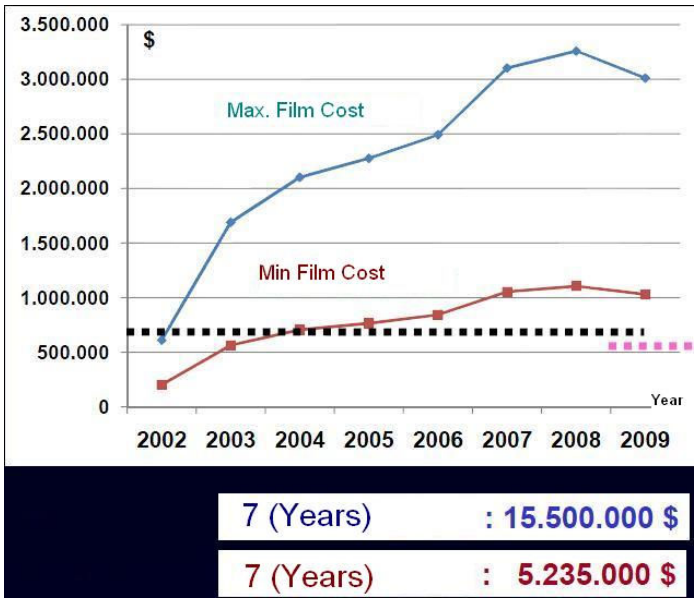


**Figure 4 Dokuz Eylül Faculty of Medicine Radiology prints costs**

### 2.2.9 Anxiety

Compeau et al. (1999) states that "Anxiety represents the negative side-the feelings of apprehension or anxiety that one experiences when using a computer". Behavioral intention is believed to be effected by computer anxiety significantly. On the other hand, users' expectations about involving into information systems can be affected by the computer self-efficacy noticeably. So the user's decisions can also be changed if the expectations of users are not satisfied.

### 2.2.10 Culture

Culture has different perspective to the acceptance of technology. Since all nations have different social cultural backgrounds they have different perception of using new technologies. Cardon and Marshall (2008) argue that in area of technology acceptance the most inconvenient, complicated and difficult factor to examine is "culture" factor.

Hofstede divided the culture factor into 4 sub elements:

*Individualism/Collectivism*:

"Societies in which the interests of the individual prevail over the interests of the group" versus "Societies in which the interests of the group prevail over the interest of the individual".

*Power Distance*:

"The extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally"

*Uncertainty Avoidance:*

"The extent to which the members of a culture feel threatened by uncertain or unknown situations"

*Masculinity/Femininity:*

"Masculinity stands for a society in which social gender roles are clearly distinct… Femininity stands for a society in which social gender roles overlap"

Most of the researches about the effect of culture on acceptance of technology are based on those 4 sub elements.

According to McCoy, Galletta and King (2006) the individualism and collectivism factor affect the standing of the people to the conformity on the requirements of the organizations. Individual decisions are mostly in the foreground and people are conservative in general manner in individualistic cultures. In individualistic cultures also social influence is low and people are not affected from other people's decisions while using the technology. People are less influenced from the general behaviors in society. On the other hand in collectivist societies the communities are more important than the person him/herself. So people are more concerned about other people's decisions (Bandyopadhyay and Fraccastoro, 2007). For example in Chinese, where collectivism is more dominant, it is clear that the behavior of people to each other is more familiar and the relationship between families and people is stronger (Lubar, 2006). In eastern culture the correlation between social norms and behavioral intention is more significant than the correlation between perceived usefulness and behavioral intention.

Power distance is another factor that affects the usage of systems. Hofstede (1991) defines Power distance as; “a measure of the interpersonal power between a superior and a subordinate as perceived by the subordinate”. In countries where power distance is high individuals believe that their boss is more powerful then the employees and all the decisions of the supervisors should be correct. So in such cultures scoring high on power distance, even though the employees are not sure of their seniors thought, they are liable to perform the assignments given by their seniors.

The uncertainty avoidance dimension determines “the degree to which individuals feel threatened by, and try to avoid, ambiguous situations by establishing formal rules and rejecting deviant ideas and behaviors” (McCoy et al., 2006). So, in order to lower the rate of anxiety, people required to be protected by the socials rules and norms. Contrary in low uncertainty avoidance culture individuals are more willing to take risks. They will have more ambition and have more motivations to learn and achieve new technologies. According to Hofstede, high level of UA “Uncertainty Avoidance” cultures shows more resistance to alter behaviors than lower level of UA cultures. Nevertheless, negative reaction to change does not mean a negative reaction to adapting new technology. As a result, people are afraid of uncertainty and this leads to a resistance to acceptance of the technology most often. Cardon’s (2008) findings show that the relation between the technology acceptance factors such as perceived usefulness and behavioral intentions are less than in some cultures where uncertainty avoidance is rate is high. According to Geert Hofstdede (1980) Turkish people shows high Uncertainty Avoidance and Power Distance properties.

Hofstede (1980) defines the masculinity/femininity dimension as; “a culture that ranks high on masculinity is associated with an emphasis on work goals, such as earnings, promotions, and assertiveness”. The result of the study of McCoy et al. (2006) shows that less masculine cultures’ people appreciates a more qualified living conditions and both women and men are have same goals. “Sweden, Norway, the

Netherlands, Denmark, and Costa Rica" are the examples of less masculine cultures. Men are more dominant and have direct effect on income of the family in high masculinity cultures while women are guided to do so. It is not difficult see that in less masculinity cultures the ease of use of the information systems are more important because those people are more related with the conformity of the living conditions and the main objectives are not given importance.

McCoy et al. (2006) state that in all social groups in the world should be tested with the technology acceptance model in order to get a balanced result. Since the technology acceptance model is a widely accepted model in predicting the adoption of the technology in most parts of the world, it should be covered for the cultural factors and revised to a new model. The current technology acceptance model is not a good fit for the cultures which have the properties of low Uncertainty Avoidance, high Power Distance, high Masculinity and high Collectivism.

### 2.2.11 Social Norm

*Social norm*, defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein and Ajzen, 1975). In early studies *social norm* was found to be very designative on predicting the behavioral intentions with respect to perceived ease of use and perceived control. The direct effect of the *social norm* can be stated in such an occurrence that people may agree on performing a behavior even if they don't want to perform when they are influenced by other people's opinions about performing the behavior. If people believe that others think they should use the technology, this condition will have a motivational effect on them while adopting new systems. So if employers or managers attract attention on a particular system by means of usefulness, the employees will also think that the system is useful for them and they will intend to use it.

In early findings of Davis (1989) the significance of *social norm* on behavioral intention was low taking into account the *perceived ease of use* and

usefulness, so Davis removed the *social norm* from the original technology acceptance model. However the need for a new investigation of the cases on which the social norms influences usage behavior wasn't approved. In TAM2 "the direct compliance based effect of *social norm* on intention over and above *perceived usefulness* and *perceived ease of use* was found to occur in mandatory, but not voluntary, system usage settings"(Venkatesh, 2002). In the implementation phase the effect of *social norm* on behavioral intention is distinctive within the compulsory organization. Nevertheless over time the experience of the users increases so that the effect of social norms on intention to use the system decreases.

From the physicians point of view technology can both intervene into the practice of doctors and change the impression on their professions. Moreover, like most of the professions, physicians are devoted themselves for their profession and commonly investigating the work of similar professionals for standardization of the work performance. So this could lead to an intention to use the technological systems (Gagnon et al. 2003)

On the other hand the results of the findings of Chismar et al. (2003) shows physicians' decisions will not be influenced from the decision of their friends by means of adapting to the information systems or how the peers behave them after adapting new technologies. *Social norms* are not effective on changing the decisions of the doctors while they are using the new technological systems. They also work as individuals not as a part of a community when deciding to agree new technologies so they are not interested in their peers decisions about using the software or not using and agreeing the software.

### 2.2.12 Income

Bandyopadhyay et al. (2007) propose that income will also have an important effect on social influence. The more salary people earn, the less concerns about other peoples' decisions of using new software and information systems they have.

### 2.2.13 Trust

Trust is the common base for the *perceived usefulness; perceived ease of use* so it appears that *trust* has direct influence on *behavioral intention*. Trust has also positive effect on *perceived usefulness*, and *perceived ease of use* (Tung et al., 2008). If the users feel more comfortable and legally safe while performing the behavior they will adopt the system more quickly. In health domain security of personnel information is very important. Access to that kind of information is a critical issue and should be controlled carefully. Besides privacy of medical information of patients security issues directly affects the human health in case of technological defects such as wrong records or missing records. Taking into account the importance of medical information, trust factor make hospital management system users perceive the system to be safer, and show the real benefits of the system to the user in a proper way that they could notice. So, their intention to use the system increases. In any case of problematic situation or crisis event, the users should trust on the technical support of the system for better solutions (Duyck et al., 2008).

## 2.3 The Individual Characteristics

The influence of the individual characteristics on intention cannot be seen at first glance however there are explicit statements in literature that the individual characteristics affects intention of the users' to use the technology. Handy et al. (2001) states that "The individual characteristics of the users, such as age, gender and prior computer experience were also hypothesized as having a direct influence on users' attitude towards the planned system".

### 2.3.1 Experience

Experience in deed has direct and indirect effect on intention to use since when a physicians experience increases; they become more aware of the benefits of information systems and software. Besides the experience has also an important effect job level directly. Behavioral intention plays an important role in predicting usage behavior. However it is noticeable that if the users have prior knowledge or

practice about using computers and software, the intention factor estimates the usage more apparently. In addition to this Kripanot (2007) states that "for inexperienced users' intentions were better predicted by the antecedent variables in the model than were the intentions of experienced users". However this intention can't be interpreted as behavior.

### 2.3.2 Expectations

Expectations on the other hand can be misleading effect on user's intention on usage. Users can have higher expectations while using new technological systems and this may cause a disappointment on them whenever the expectations turn out to be unreal. However users with more realistic expectations can have more satisfaction from the new technologies. When user has an expectation of getting a raise with the proper usage of technological systems, they could be regretful from the result because acceptance of technology not always means deserving a promotion. Acceptance of technology is quiet necessary in organizations but it is not a certain factor to get future prizes (Compeau et al., 1999).

### 2.3.3 Age

According to Chismar's (2002) findings, respondents in the 51 age group believe that using hospital management systems would not be difficult. Moreover respondents over 30 ages highly agreed on benefits of using hospital management systems on their professions. So it is believed that older users are paying less attention to perceived usefulness. Those users also believed that the decisions of friends and colleagues are about to use the new technologies and information systems. There is also a consistent relation between age and intention. Older people have greater intention to use information systems (Chau, Hu, Sheng and Fung, 1999). However Wu et al. (2006) suggests that "new and younger staff with less clinical experience is more fluent with the new technology". On the other hand Yu, Li and

Gagnon (2008) found that there is no significant relationship between age and experience when compared with other technology acceptance factors.

### 2.3.4 Gender

One of the researches of Chau et al. (1999) shows that from all of the users who involved into the research, the rate of intention to use new systems is more evident in male doctors than their female colleagues. There is a slight ironic situation that for older males the social influence is stronger than females. Although it is thought that females are more liable to the decisions of other people, Bandyopadhyay et al. (2007) has also found that older males have deeper intention to use technology.

# CHAPTER 3

# METHODOLOGY

In this chapter research methodology, which is used for determination of the progress of the study, and research model is presented. In part 3.1 the main problem to solve about user acceptance of Hospital Management Systems is mentioned and the research model is explained with the hypotheses. The relation between hypotheses and literature constructs are also given in this part. In part 3.2 the research methodology is explained precisely. The progress of the research methodology is clarified in this part. In part 3.3 data collection process is expressed with details before and after the results of the study is taken. In part 3.4 the information about how the data analysis will be performed, is stated. The tools and the methods used for analyzing the data in the research are given in this part.

## 3.1 Formulating Hypotheses and the Research Model

The purpose of the study is to generate an extended model to solve the problem of user acceptance in Hospital Management Systems domain. One of the main problems in Hospital Management Systems is the difficulty in adopting the system by the users. The process of using the information systems divides into two stages. First one is the implementation stage on which the system mostly takes over the burden of the works in Hospitals. In this stage the system will encounter a resistance from the users. This resistance may derive from inadequate experience on

using the technology or insufficient training of the application at the beginning of the implementation. Venkatesh (2002) also believes that at the beginning of the system usage the ease of use of the application is very crucial on predicting the acceptance of the system. The users don't want to meet difficulties while using the system at first time. The second stage covers the post-implementation of the system. In this stage the experience of the users increases and they will be interested in the usefulness of the system rather than the ease of use of the system. Besides in both stages the intention of the users can be affected from many other factors. As Chau et al. (2002) stated there could be different constructs for predicting the user acceptance in different domains. It is seen in literature that most of the variables used in small group of constructs for the studies. The population and the geography of the survey performed also differs in most of the studies in literature. So in this study fourteen variables are used for the research model.

In original TAM *perceived ease of use* and *perceived usefulness* are the two main constructs that influences the intention. According to Chismar et al. (2003) the *perceived usefulness* is an important predictor of the intentions of the users. Chismar et al. (2003) also claim that *perceived usefulness* is the only main factor for the physicians in order to predict the system usage. However this study not only covers the intentions of the physicians but also the nurses, technicians, administrators and personnel in hospitals. So, *perceived ease of use* would be an important factor on predicting the intention of the users. Moreover it is observed by Venkatesh (2002) that the perceived ease of use directly affects the *perceived usefulness* since the easiness of the system increases the efficiency thereby the usefulness of the system. Taking into account these factors three main hypotheses are listed below.

**H1** Perceived usefulness will positively affect the behavioral intention of the Hospital Management System users.

**H2a** Perceived ease of use will positively affect the behavioral intention of the Hospital Management System users.

**H2b** Perceived ease of use will have positive effect on the perceived usefulness of the Hospital Management System.

Having a representative in development and analysis stages of the hospital management systems could be very important for the acceptance of the system by the users of the system. Handy et al. (2001) purposes that incase of having a representative in the system planning stage, the users of the system would be more attracted from the system and believe that the usage of the system would be less complicated and easy to understand the system settings. The trust of the users to the system increases with the system design team, which includes one of their colleagues, by having clear medical terms and easiness of reaching the most frequently used items in the first place in system. So the main hypothesis about the end-user support is;

**H3** End User Support will positively affect the behavioral intention of the Hospital Management System users.

*Facilitating conditions* and *Training* are two important factors which give comfortable environment for the use of the system and decrease the difficulties in system while using the system. According to Aggelidis et al. (2008) better working conditions lead the users to use and adopt the system easily. The facilitating conditions indeed are really important in determining the usage since older equipments are difficult to manage and maintenance is also not easy so that the system may slow down time to time. This situation decreases both the patients and the hospital management systems users' motivation. The negative reaction of the patients to the system directly reflects the hospital personnel so they become less adoptive to the system. The LED screening systems make easier to follow the queue of the patients. The integrity of these facilitating conditions with the hospital management system could increase the intention to use the system. On the other hand training is another factor which rarely differs from the facilitating conditions. Although Wu et al. (2006) believe that training does not have direct effect on

*perceived usefulness* and *perceived ease of use*, trained users about the system would be more comfortable while using the system. While untrained users about the system have difficulties in managing the problems in system, the trained users are more comfortable in these problematic situations. Taking into account these factors two additional main hypotheses are listed below.

**H4** Facilitating Conditions will positively affect the behavioral intention of the Hospital Management System users.

**H5** Training will positively affect the behavioral intention of the Hospital Management System users.

*Voluntariness, Job Relevance and Result Demonstrability* are three main factors affect the system usage. According to Vankatesh (2002) *voluntariness* affects the *behavioral intention* to use the system positively. In non-mandatory systems the voluntariness may increase the intention since the user wants to benefit from the system without any enforcement. *Job Relevance* is also effective in predicting the user intention. The system or software that the hospital personnel use should be relevant to the work of the personnel and should contribute of their jobs. Schaik et al (2003). In hospitals there are different kinds of units for different branches. In order to control all these branches in hospital, the hospital management systems should have adequate modules. For example if a hospital management system does not have radiology integration management with the radiology equipment in the hospital and forces the users to enter the inputs from another screen or paper that radiology equipment provides, the system would be less useful for the users and their intention to use the system will decrease. *Result demonstrability* is an important factor in determining the user intention to use the technology. As Moorre et al. (1991) argued the results of the system should be given to the system users in a proper way so that the users could understand how beneficial the system is. The results such as statistical data of the income or the details of the treated patients could change the

perspective of the hospital management system users to the system. So there are three main hypotheses related to these factors which of them are;

**H6** Voluntariness will positively affect the behavioral intention of the Hospital Management System users.

**H7** Job Relevance will positively affect the behavioral intention of the Hospital Management System users.

**H8** Result Demonstrability will positively affect the behavioral intention of the Hospital Management System users.

The user's capability of system usage is an important factor in determining the intention to use. This context is described by the *self efficacy* factor. Compeau et al. (1999) pointed out that the *self efficacy* of the users is effective in system usage in the implementation phase of the system. Since the users face with new technology or system in implementation, the most self-confident and competent users will have quiet tender to use the system. The opposite side of the *self efficacy* is the anxiety factor. The anxious users would get close the system slow and surely so it would take much more time to adopt the system for them. The main hypotheses about these two factors are;

**H9** Self Efficacy will positively affect the behavioral intention of the Hospital Management System users.

**H10** Anxiety will negatively affect the behavioral intention of the Hospital Management System users.

The *financial cost* is an interesting factor when analyzed from the administrative perspective. The expensive hospital management system products or services would reduce the intention of the hospitals to indulge into the system. The

negative behavior of the administrative personnel influences the other hospital personnel's intention to use the system. This factor relates with the hypothesis;

**H11** Financial Cost will negatively affect the behavioral intention of the Hospital Management System users.

Hospital management system users would need to feel safe while using the system inside or outside of the hospital. According to Tung et al. (2008) the *trust* factor is very crucial in predicting the user acceptance. If the users feel more comfortable and legally safe while performing the behavior they will adopt the system more quickly. So trust factor could directly affect the intention which is given in hypothesis;

**H12** Trust will positively affect the behavioral intention of the Hospital Management System users.

The investigations on the effectiveness of technology acceptance model can differ from culture to culture. As McCoy et al. (2006) stated the validity of the TAM could not be considered same in all over the world. Certain factors can lead the people to behave differently to the new technologies. Hofstede (1984) also claimed that culture gives form to the people's behavior and intentions from the birth and during the life. So there are four important factors, which is related to the culture, can explain why people show different reactions to the new technologies. Hofstede (1984) defined these four factor as; Individualism/Collectivism, Power Distance, Uncertainty Avoidance and Masculinity/Femininity. In individualistic cultures people are more self-confident and work in a free manner without regarding other people's decisions. Individualistic cultures aren't affected from social environment. The self-confidence property of the individualistic cultures leads them to fulfill the organizational goals and adopt the technological systems in organization. Power distance rate is related with the general thought about the superiors' authorization

and power on the employees. In low power distance cultures the employees are less afraid of their superior's authorization and they can oppose the ideas if they aren't convinced. They could be free while deciding on the activities to be done without interference from the bosses. This freedom in working environment could increase the conformity and the intention to use the new technological system. Uncertainty avoidance is the factor that people avoid from performing suspicious tasks and obey the rules strictly. In low uncertainty avoidance cultures people are more willing to take risks in special life or in work. This factor increases the possibility of higher behavioral intention to use the new technologies since they would have less fear and more enthusiasm about the system. In masculine cultures the people are more related to the personal goals and benefits. This could be a clue for the need of usefulness of the information systems generally. The femininity is also effective in behavioral intention since the feminine cultures are more related with the ease of the works and the quality of the wok done. With these perspectives of the culture factor four hypotheses are listed below.

**H13a** Individualism will positively affect the behavioral intention of the Hospital Management System users.

**H13b** Low power distance will positively affect the behavioral intention of the Hospital Management System users.

**H13c** Low uncertainty avoidance will positively affect the behavioral intention of the Hospital Management System users.

**H13d** Masculinity will positively affect the behavioral intention of the Hospital Management System users.

*Social norm* factor is the perceptions of the people about other peoples' thoughts that they should lead their behavior. Ajzen (1991) believes that *social norm* influences the behavioral intention since other peoples' decisions about one person can have motivational effect on that person. This motivation can lead to an increase

in intention to use the technology. So *social norm* factor could directly affect the intention which is given in hypothesis;

**H14** Social Norm will positively affect the behavioral intention of the Hospital Management System users.

This study is based on the Technology Acceptance Model Davis (1989) since the usage of the TAM is widely accepted research model in healthcare domain as mentioned in part 2.1. Venkatesh and Davis (1996) suggested that he "attitude" factor doesn't reflect the influence of perceived ease of use and perceived usefulness on behavioral intention so in this study the "Attitude" factor is omitted from the research model. In initial research model the factors; *Behavioral Intension, Perceived Ease of Use, Perceived Usefulness, Result Demonstrability, Job Relevance, Voluntariness, Facilitating Conditions, Training, End User Support, Self Efficacy, Financial Cost, Anxiety, Trust, Social Norms, Culture* are used. The research model can be seen in (*Figure 5 Research Model*).

External Variables

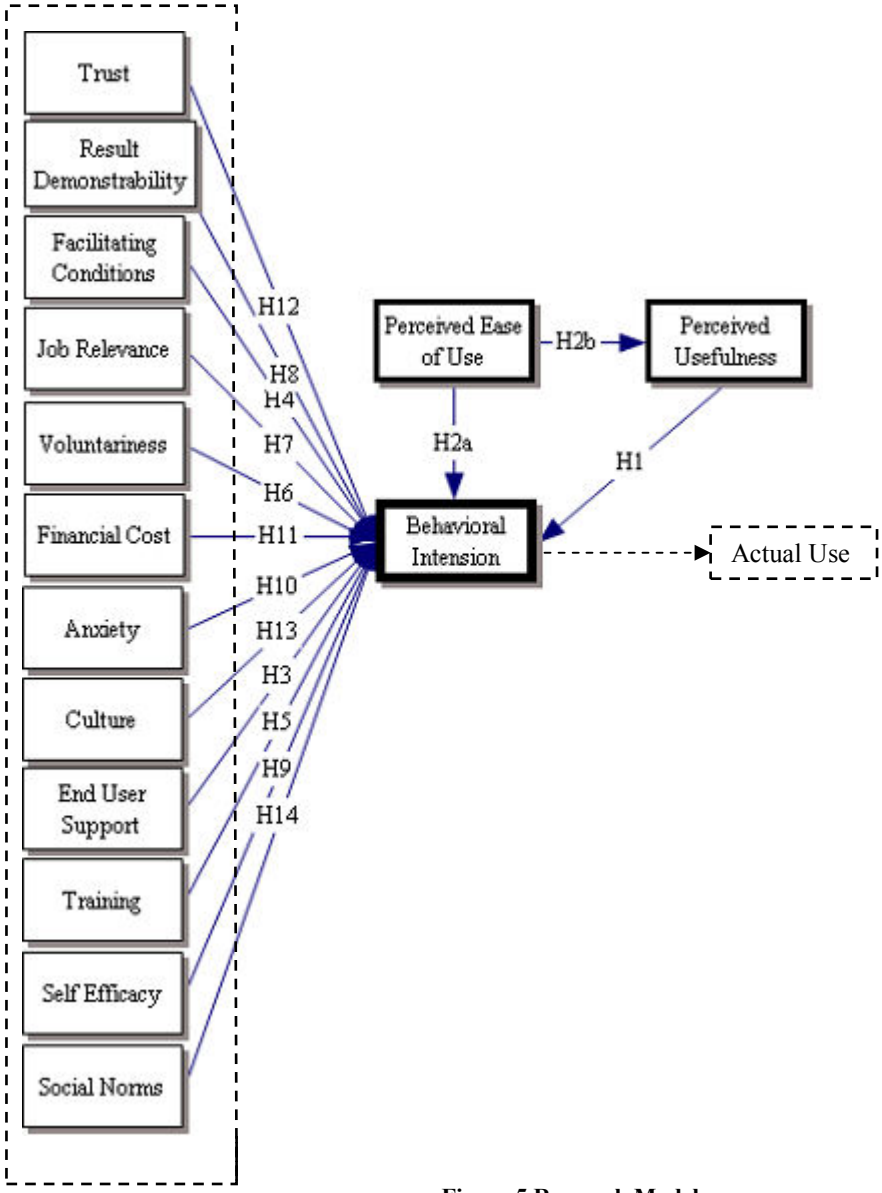


**Figure 5 Research Model**

### 3.2 Research Method

The research process (*Figure 6 Research Method*) starts with the literature review about the acceptance of technology. In the first phase the research of the existent studies in healthcare domain is done. After the research the technology acceptance model factors in healthcare domain are determined. Then the extended

technology acceptance model is formed. The last part of the literature phase is forming the hypotheses by relating the factors.

The second phase is collecting data. In this phase quantitative research tools are developed. In this study the quantitative research tools are determined as questionnaire. In this research tool the target group is specified. After the questionnaire had given, the data they filled are collected in order to use in the third phase.

In the third part the data is analyzed statistically and the hypotheses are tested. First the validity and reliability tests are done. Then the structural equation model is applied. It is seen that the model does not reach the required convenience level so the model is enhanced. The next step is the first step of this phase which is validity and reliability test. The structural equation model is applied again and required convenience level is reached. After reaching the convenience level the questionnaire is applied on target group. The data is gathered from the questionnaires and statistical analysis is performed. Renewed structural equation model is formed and hypotheses are tested.

The fourth part is the cross survey in which the cross comparison is applied. In the following and the final part the results are given. The conclusion is drawn, discussion is done and future works is given is this part.

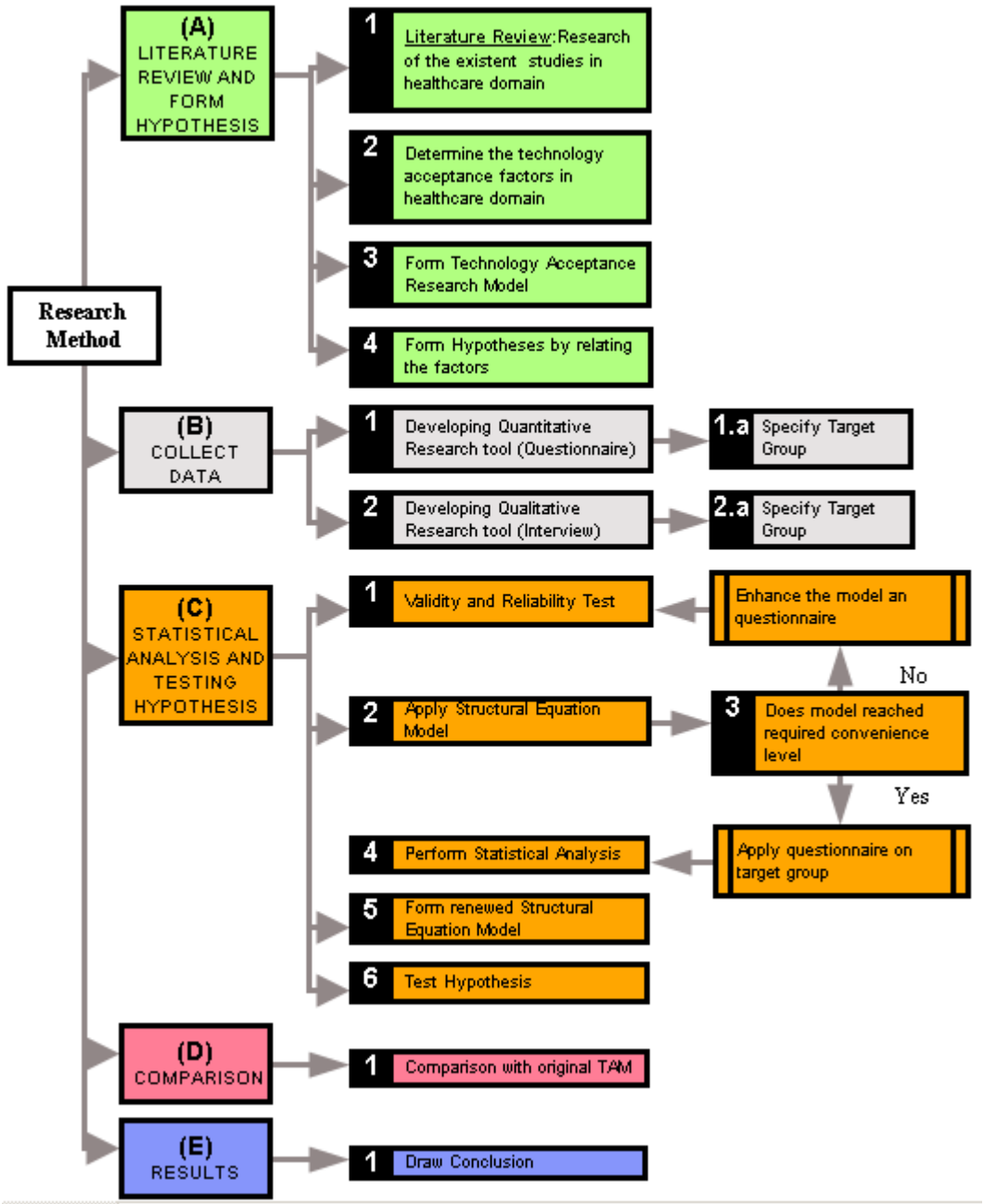


**Figure 6 Research Method**

In literature review a total of 43 journal and books are researched. In the information about these researches are recorded into excel format with details of author, year, title, journal, sample type, sample size, research method, response rates, total variances, domain, research model and relationships tested in studies. A sample table is created within the healthcare domain which is given in (*Table 1 Summary of Reviewed Studies of TAM in Healthcare)*. Each of the journals is also researched from the Science Citation Index Expanded "http://science.thomsonreuters.com" in order to reach more scientific results and scientific information. The list of this research is given in (*Table 3 Journals & References with Science Citation Index*). In this table the name of the journals are given in "Journal" column. The domains of the studies are mentioned under the "Domains" column. The research models and survey methods of the studies are given in "Research Models & Methods" column. Under the "References" column the references of the studies are given with publication years.

**Table 3 Journals & References with Science Citation Index**

| Journal | Domains | Research Models & Methods | References |
|---|---|---|---|
| International Journal of Medical Informatics | health, education | UTAUT, Extended TAM Questionnaire | Aggelidis & Chatzoglou (2009); Kim & Chang (2007); Tung & Chang &Chou (2008), Yu & Li & Gagnon (2009) |
| Management Science | health, education, business | TAM 2, TRA Questionnaire | Chismar & Wiley (2003); Davis & Bagozzi & Warshaw (1989); Venkates & Davis (2000) |
| European Journal of Information Systems | education | TAM Questionnaire | McCoy & Galletta & King (2006) |
| Behavior & Information Technology | health | TAM Questionnaire | Schaik & Saltikov & Warren (2002) |
| Informatics for Health and Social Care | health | TAM Enrolment and evaluation | Barker & Schaik & Simpson & Corbett (2003) |
| Information & Management | health | Extended TAM Questionnaire | Chau & Hu (2002) |

**Table 3 (Cont.)**

| Journal | Domains | Research Models & Methods | References |
|---|---|---|---|
| Journal of Digital Imaging | health | UTAUT Questionnaire | Duyck & Pynoo & Devolder & Voet & Adang & Ovaere & Vercruysse (2008) |
| Management Information Systems Quarterly | information systems, business | UTAUT, TAM, Social Cognitive Theory Questionnaire | Compeau & Higgins & Huff (1999); Davis & Bagozzi & Warshaw (1989); Venkatesh & Morris & Davis (2003) |
| Psychological Review | health | Not reported | Bandura (1977) |
| Psychological Bulletin | psychology | Not reported | Anderson & Gerbing (1988) |
| American Medical Informatics | health | TAM 2 Questionnaire | Chismar & Wiley (2003) |
| International Journal for Quality in Health Care | health | Extended TAM Questionnaire | Wu & Wang & Lin & Greenes & Bates (2008) |
| Journal of the American Medical Informatics Association | health | Extended TAM Questionnaire | Pare & Sicotte & Jacques (2006) |
| Methods of Information In Medicine | health | UTAUT Questionnaire | Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008) |

In this study the experiences of the hospital personnel and the beliefs of the personnel about the operational mechanism of the Hospital Management Systems are important research elements to be recorded. In order to acquire the information about the beliefs of the hospital personnel against the system the quantitative research method is used in this study. In the scope of the quantitative research the survey research method is used. Alain and Keneth (1993) describe the survey research as "Survey research is a quantitative method, requiring standardized information from and/or about the subjects being studied". In this thesis the subject is the group of hospital personnel who uses the hospital management system. On the other hand the experiences of the professionals may not be understood or analyzed properly with quantitative methods. The interpretations of the professionals and the meanings that they give to the solutions of the problems require another way of investigation. So the qualitative research method also used in the study for interpreting the social interactions in healthcare domain. According to Bryman (2003) the set of results

which is combined from both the qualitative research and quantitative research could be more credible and persuasive. Bryman (2003) calls this form the Triangulation which refers the combination of more than one research methods in order to get more convergent and confident results.

In survey investigation a questionnaire is prepared which includes total of 75 factor questions and 7 demographic questions. The questionnaire is translated into Turkish and the English and the Turkish versions of the questionnaire are given in *APPENDIX A: QUESTIONNAIRE (ENGLISH VERSION), APPENDIX B: QUESTIONNAIRE (TURKISH VERSION)*. The questionnaire is composed of 2 parts and in first part the demographic properties such as age, gender education, employment year and profession are questioned. There are also 2 more questions in this part in order to get information about the computer usage and hospital management system usage of the users with certain intervals. In the second part of the questionnaire questions about the TAM factors are asked. The answers are scaled as *1- Totally Agree, 2- Agree, 3- Indecisive, 4 Disagree, 5- Totally disagree.* At the end of the questionnaire a user comment part is placed in order to get the interpretations and advices of the users about the questionnaire. The research questions are taken from the literature for each factor in technology acceptance model. The details of the questions are given in (*Table 4 Measure of keys from literature reviews*). In this table the survey items are numbered with abbreviations. These numbers are given in "Item" column of the table. In the "Question" column the questions in the survey are given. The references to the questions are given under the "Literature" column.

**Table 4 Measure of keys from literature reviews**

| ITEM | QUESTION | LITERATURE |
|---|---|---|
| Perceived Usefulness | | |
| **PU1** | Using (HIS) improves the quality of the work I do | Chismar & Wiley-Patton (2002,2003) ; Yua & Li & Gagnon (2008); Wu & Shen (2008) |
| **PU2** | Using (HIS) gives me greater control over my work | Davis (1989) |
| **PU3** | HIS enables me to accomplish tasks more quickly | Handy & Whiddett & Hunter (2001); Gibson & Seeman (2005); Han & Mustonen& Seppänen & Kallio (2005) ; Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet, Adang & Vercruysse (2008) |
| **PU4** | HIS supports critical aspects of my job | Barker & Schaik & Simpson & Corbett (2003) |
| **PU5** | Using (HIS) increases my productivity | Chismar & Wiley-Patton (2002,2003); Gibson & Seeman (2005); Tung & Chang & Chou (2008); Venkatesh & Davis (2000); Han & Mustonen& Seppänen & Kallio (2005) ; Barker & Schaik & Simpson & Corbett (2003); Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet & Adang & Vercruysse (2008) |
| **PU6** | Using (HIS) increase my job performance | Yua & Li & Gagnon (2008); Wu & Shen (2008); Venkatesh & Davis (2000); Wu & Wang & Lin (2006); Tung & Chang (2007); Liu & Ma (2006) |
| **PU7** | Using (HIS) allows me to accomplish more work than would otherwise be possible | Davis (1989) |
| **PU8** | Using (HIS) enhances my effectiveness on the job | Chismar& Wiley-Patton (2002,2003) Gibson & Seeman (2005); Tung & Chang & Chou (2008); Venkatesh & Davis (2000); Barker & Schaik & Simpson & Corbett (2003); Chau & Hu (2001,2002); Wu & Wang & Lin (2006); Liu & Ma (2006) |
| **PU9** | Using (HIS) makes it easier to do my job | Handy & Whiddett & Hunter (2001); Han & Mustonen& Seppänen & Kallio (2005) ; Liu & Ma (2006) |
| **PU10** | (HIS) Enables decisions based on better evidence | Schaik & Saltikov & Warren (2000) |
| **PU11** | (HIS) Allows tasks to be done more accurately | Barker & Schaik & Simpson & Corbett (2003) |
| **PU12** | (HIS) Increases chance of getting a raise | Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **PU13** | (HIS) Improves patient care and management | Handy & Whiddett & Hunter (2001); Gibson & Seeman (2005); Hu & Sheng& Chau & Tam & Fung (1999); Chau & Hu (2001, 2002) |
| **PU14** | Overall, I find the (HIS) useful in my job | Chismar & Wiley-Patton (2002,2003); Tung & Chang & Chou (2008); Venkatesh & Davis (2000); Han & Mustonen& Seppänen & Kallio (2005) ; Wu & Wang & Lin (2006); Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| Perceived ease of use | | |
| **PEOU1** | Learning to operate (HIS) is easy for me | Gibson & Seeman (2005); Tung & Chang & Chou (2008); Yua & Li & Gagnon (2008); Wu & Shen (2008); Han & Mustonen& Seppänen & Kallio (2005) ; Chau & Hu (2001, 2002); Wu & Wang & Lin (2006); Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008); |
| **PEOU2** | Interacting with the (HIS) is often frustrating | Compeau & Higgins & Huff (1999); |

**Table 4 (Cont.)**

| ITEM | QUESTION | LITERATURE |
|---|---|---|
| **PEOU3** | I find it easy to get the (HIS) to do what I want to do | Chismar & Wiley-Patton (2002,2003) Venkatesh & Davis (2000); Chau & Hu (2002); Wu & Wang & Lin (2006); Tung & Chang (2007); Liu & Ma (2006) |
| **PEOU4** | It is easy for me to remember how to perform tasks using the (HIS) | Davis (1989) |
| **PEOU5** | Interacting with the (HIS) does not require a lot of mental effort | Venkatesh & Davis (2000); Chismar & Wiley-Patton (2002,2003) |
| **PEOU6** | My interaction with the (HIS) is clear and understandable | Handy & Whiddett & Hunter (2001); Chismar & Wiley-Patton (2002,2003); Gibson & Seeman (2005); Tung & Chang & Chou (2008); Venkatesh & Davis (2000); Barker & Schaik & Simpson & Corbett (2003); Tung & Chang (2007); Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **PEOU7** | It is easy for me to become a skilful user of (HIS) | Han & Mustonen& Seppänen & Kallio (2005) ; Chau & Hu (2001); Wu & Wang & Lin (2006); Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **PEOU8** | (HIS) Does not demand much care and attention | Tung & Chang & Chou (2008); Tung & Chang (2007) |
| **PEOU9** | Navigation is easy in (HIS) | Liu & Ma (2006) |
| **PEOU10** | (HIS) is flexible to use/interact with | Gibson & Seeman (2005) |
| **PEOU11** | Overall, I find the (HIS) easy to use | Chismar & Wiley-Patton (2002,2003); Gibson & Seeman (2005); Tung & Chang & Chou (2008); Yua & Li & Gagnon (2008); Venkatesh & Davis (2000);Han & Mustonen& Seppänen & Kallio (2005) ;Chau & Hu (2001,2002); Tung & Chang (2007); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| Behavioral intention | | |
| **BI1** | I am able to use (HIS) for patient care and management | Gibson & Seeman (2005); Chau & Hu (2001) |
| **BI2** | I intend to use (HIS) in my work. | Han & Mustonen& Seppänen & Kallio (2005) ; Chau & Hu (2001); Wu & Wang & Lin (2006); Tung & Chang (2007); Liu & Ma (2006); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **BI3** | Given the opportunity, I would like to use (HIS). | Yua & Li & Gagnon (2008); Tung & Chang & Chou (2008) |
| **BI4** | I would prefer using (HIS) for recording observations rather than using a paper form at the end of an examination | Barker & Schaik & Simpson & Corbett (2003) |
| **BI5** | I expect I that will use (HIS). | Tung & Chang (2007); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| End User Support | | |
| **EUS1** | Having a hospital representative participate in the development of the (HIS) will make me more likely to agree to use (HIS) | Handy & Whiddett and Hunter (2001) |
| **EUS2** | I would be more likely to use an (HIS) that I, or a member of my profession, had been consulted about | Handy & Whiddett and Hunter (2001) |
| **EUS3** | I would like to use (HIS) with assistance of someone who used the system before. | Handy & Whiddett and Hunter (2001) |

**Table 4 (Cont.)**

| ITEM | QUESTION | LITERATURE |
|---|---|---|
| Facilitating conditions | | |
| **FC1** | (HIS) have necessary resources to use system | Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **FC2** | (HIS) is compatibility with other systems | Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **FC3** | (HIS) has availability of technical assistance a specific person (or group) is available for assistance with (HIS) difficulties | Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008); Wu & Wang & Lin (2006) |
| **FC4** | (HIS) have knowledge to use system | Anderson & Schwager (2004) |
| Voluntariness | | |
| **V1** | My use of (HIS) is voluntary. | Yua & Li & Gagnon (2008); Venkatesh & Davis (2000); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **V2** | My supervisor does not require me to use the system | Venkatesh & Davis (2000); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008); Yua & Li & Gagnon (2008) |
| **V3** | Although it might be helpful, using (HIS) is certainly not compulsory in my job. | Yua & Li & Gagnon (2008); Venkatesh & Davis (2000); Anderson & Schwager (2004); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| Job Relevance | | |
| **JR1** | Usage of (HIS) is relevant to the delivery of pediatric care | Chismar & Wiley-Patton (2002,2003); Venkatesh & Davis (2000) |
| **JR2** | Usage of (HIS) is important to the delivery of pediatric care | Chismar & Wiley-Patton (2002, 2003); Venkatesh & Davis (2000) |
| Result Demonstrability | | |
| **RD1** | The results of using (HIS) will be apparent to me | Chismar & Wiley-Patton (2002, 2003); Venkatesh & Davis (2000) |
| **RD2** | I would have difficulty explaining why using (HIS) may or may not be beneficial. | Chismar & Wiley-Patton (2002, 2003); Venkatesh & Davis (2000) |
| **RD3** | I believe I could communicate to others the consequences of using the system. | Venkatesh & Davis (2000); Chismar & Wiley-Patton (2002, 2003) |
| **RD4** | (HIS) could reduce the cost of my care delivery | Chismar & Wiley-Patton (2002, 2003) |
| Training | | |
| **T1** | My skills learned from (HIS) are helpful in learning how to use (HIS) | Li & Chang (2008) |
| **T2** | I can apply the skills I learned from (HIS) to the use of | Li & Chang (2008) |
| **T3** | Specialized programs or consultant about training are available to me | Wu & Wang & Lin (2006) |
| **T4** | Specialized instruction and education concerning software about (HIS) is available to me | Wu & Wang & Lin (2006) |
| **T5** | The knowledge I learned from (HIS) enables me to spend less time to learn | Li & Chang (2008) |
| Self Efficacy | | |
| **SE1** | I could complete the job using (HIS) if there was no one around to tell me what to do as I go | Wu & Wang & Lin (2006); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008); |
| **SE2** | I could complete the job using (HIS) if I had used similar system before this one to do the same job | Wu & Wang & Lin (2006) |
| **SE3** | I expect to become proficient in using (HIS) | Tung & Chang (2007) |

**Table 4 (Cont.)**

| ITEM | QUESTION | LITERATURE |
|---|---|---|
| **SE4** | I would feel confident that I can use (HIS) | Tung & Chang (2007) |
| **SE5** | I will be able to complete a task using (HIS) if I could call someone for help if I got stuck | Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| Financial Cost | | |
| **FNC1** | My willingness to use an (HIS) will depend on the perceived personal cost (time or money) | Handy & Whiddett & Hunter (2001) |
| **FNC2** | I think the equipments required to deploy electronic logistics information system is expensive | Tung & Chang & Chou (2008) |
| **FNC3** | I think it costs a lot to learn electronic logistics information system | Tung & Chang & Chou (2008) |
| **FNC4** | (HIS) is not expensive taking into account its contributions to hospital. | Tung & Chang & Chou (2008) |
| Anxiety | | |
| **A1** | I feel apprehensive about using (HIS) | Tung & Chang (2007); Compeau & Higgins & Huff (1999); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008); |
| **A2** | It scares me to think that I could cause (HIS) to destroy a large amount of information by hitting the wrong key | Tung & Chang (2007); Compeau & Higgins & Huff (1999); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **A3** | I hesitate to use (HIS) for fear of making mistakes that I cannot correct | Tung & Chang (2007); Compeau & Higgins & Huff (1999); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| **A4** | (HIS) are somewhat intimidating to me | Tung & Chang (2007); Compeau & Higgins & Huff (1999); Duyck & Pynoo & Devolder & Voet& Adang & Vercruysse (2008) |
| Culture | | |
| **C1** | There are some jobs in which a man can always do better than a woman | Lubar (2006) |
| **C2** | It is more important for men to have a professional career than it is for women to have a professional career | Lubar (2006) |
| **C3** | Being accepted as a member of a group is more important than having autonomy and independence | Lubar (2006) |
| **C4** | Employees should not question their manager's decisions | Lubar (2006) |
| **C5** | Rules and regulations are important because they inform workers what the organization expects of them | Lubar (2006) |
| Social Norm | | |
| **SN1** | People who influence my behavior think that I should use the system | Venkatesh & Davis (2000); Chismar & Wiley-Patton (2002;2003); Kripanont (2007); Chau & Hu (2001,2002) |
| **SN2** | People who are important to me think that I should use the system | Venkatesh & Davis (2000); Chismar & Wiley-Patton (2002;2003); Chau & Hu (2001,2002) |
| **SN3** | My colleagues will encourage me to use (HIS) | Yua & Li & Gagnon (2008); Wu & Shen (2008) |
| **SN4** | My manager influences my intention to use (HIS) | Yua & Li & Gagnon (2008); Wu & Shen (2008) |
| Trust | | |
| **TRU1** | I feel assured that legal and technological structures adequately protect me from problems on (HIS) | Wu & Shen (2008) |
| **TRU2** | I would feel comfortable using (HIS) | Wu & Shen (2008) |

After the questionnaire is formed, the demographic properties of the users are investigated and suitable hospitals are researched for survey. The questionnaire distributed to the hospitals which are detailed in part 3.3 Data Collection. Since the survey includes 82 questions the attention of the users to the survey decreased while collecting data with printout surveys. So in order to ease the survey process of the users the online version of the questionnaire is formed. Since the online questionnaire is reachable any time and users can reach the survey from their computers the survey process becomes very easy for the participants. This online questionnaire is presented to the users from the hospital management systems home page of the hospitals. The address of the online questionnaire is :
"http://213.139.194.218/sarus/HospitalOperationManagement/HBYSanket/anket.htm
"

### 3.3 Data Collection

In data collection phase the target group was the users of the SARUS Hospital Management & Information System. SARUS is a Hospital Management & Information System software package which can be used in Turkish Government hospitals and Turkish Government Education & Research hospitals. SARUS is composed of medical modules and financial & management modules. Doctors access information via internet either on treatments or from their office with the help of SARUS. Nurses can also access the patients' information and arrange the medical services. The currency flow, stock and supplier information are followed over the system. The decision makers also watch the system 7/24 in order to make clear decisions about the hospital. SARUS supplies flow of the forms and documentation to the hospital staff.

Before starting the survey the required permissions are supplied from both the hospitals and METU Research Center for Applied Ethics. The required forms; project information, volunteer participation, application and survey questionnaire are approved by Research Center for Applied Ethics.

The survey questionnaire is applied to 270 people in a three month period. The sample type includes doctors, nurses, technicians, administrators, information system operators, hospital officers and medical secretaries in hospitals. The data is collected from 3 main hospitals Zekai Tahir Burak Government Hospital, Numune Research Hospital and Antalya Research Hospital in which the SARUS is actively working. Small amount of data is also collected from other SARUS using hospitals such as Göztepe Research Hospital, Bergama Government Hospital and Bartın Government Hospital. In addition to the paper based survey questionnaires the online survey questionnaires are also presented to the users. The online survey can be reachable from anywhere with the help of internet so the users had a choice to fill out the surveys in both ways. Social networks such as facebook, social health forum are used for the variety of the data sets. However the response rate was too low from the social networks. Face to face communication was more efficient in this survey since most of the participants who filled out paper based questionnaires were more enthusiastic about the study. Most of the respondents wanted detailed information about the survey and they asked about the questions that they could not understand in the questionnaire. This shows that the users need to be guided in the survey. All of the respondents' questions are answered during the survey so the rate of misunderstanding about the meanings of the questions decreased. The participants are also volunteered for the survey and they are not given any credits for their participation. The results of the paper based survey are collected from the hospitals and integrated into the SPSS 17.0 software package for analysis. The results of the online survey are also imported into the SPSS with the import tool.

As shown in (*Table 5 Sample Demographics*) out of 270 participants the rate of male participants is 41.9% and the rate of female participants is 57.8%. The age of the participants becomes dense in 25-30 year range. The age ratio of the participants is given respectively as; between 20-25 ages 20%, between 25-30 ages 35.9%, between 30-35 ages 22.2%, between 35-40 ages 13.3%, between 40-45 ages 6.3%, between 45-50 ages 1.1%. Majority of the participants are observed to be nurses. The

rates of the participants according to their professions are introduced as; doctors 17%, nurses 25.6%, technicians 5.6%, administrators 1.6%, IS operators 10.7%, officers 3.7%, medical secretaries 13%, and other users 8.1%.

**Table 5 Sample Demographics**

| | | Gender | | | |
|---|---|---|---|---|---|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | ,00 | 1 | ,4 | ,4 | ,4 |
| | Male | 113 | 41,9 | 41,9 | 42,2 |
| | Female | 156 | 57,8 | 57,8 | 100,0 |
| | Total | 270 | 100,0 | 100,0 | |
| | | **Education** | | | |
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | ,00 | 3 | 1,1 | 1,1 | 1,1 |
| | High School | 56 | 20,7 | 20,8 | 21,9 |
| | Bachelor's Degree | 166 | 61,5 | 61,7 | 83,6 |
| | Master's Degree | 29 | 10,7 | 10,8 | 94,4 |
| | PhD. Degree (Doctors) | 15 | 5,6 | 5,6 | 100,0 |
| | Total | 269 | 99,6 | 100,0 | |
| Missing | System | 1 | ,4 | | |
| Total | | 270 | 100,0 | | |
| | | **Profession** | | | |
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | ,00 | 39 | 14,4 | 14,5 | 14,5 |
| | Doctor | 46 | 17,0 | 17,1 | 31,6 |
| | Nurse | 69 | 25,6 | 25,7 | 57,2 |
| | Technician | 15 | 5,6 | 5,6 | 62,8 |
| | Administrator | 4 | 1,5 | 1,5 | 64,3 |
| | Other | 22 | 8,1 | 8,2 | 72,5 |
| | Information System Operator | 29 | 10,7 | 10,8 | 83,3 |
| | Officer | 10 | 3,7 | 3,7 | 87,0 |
| | Medical Secretary | 35 | 13,0 | 13,0 | 100,0 |
| | Total | 269 | 99,6 | 100,0 | |
| Missing | System | 1 | ,4 | | |
| Total | | 270 | 100,0 | | |
| | | **Computer Usage** | | | |

**Table 5 (Cont.)**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | ,00 | 1 | ,4 | ,4 | ,4 |
| | Less than 1 hour | 3 | 1,1 | 1,1 | 1,5 |
| | 1-2 hours a week | 5 | 1,9 | 1,9 | 3,3 |
| | 2-4 hours a week | 10 | 3,7 | 3,7 | 7,1 |
| | 4-6 hours a week | 11 | 4,1 | 4,1 | 11,2 |
| | 6-8 hours a week | 19 | 7,0 | 7,1 | 18,2 |
| | More than 8 hours | 220 | 81,5 | 81,8 | 100,0 |
| | Total | 269 | 99,6 | 100,0 | |
| Missing | System | 1 | ,4 | | |
| Total | | 270 | 100,0 | | |
| | | **HBYS Usage** | | | |
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | ,00 | 2 | ,7 | ,7 | ,7 |
| | Never | 5 | 1,9 | 1,9 | 2,6 |
| | Once a day | 19 | 7,0 | 7,1 | 9,7 |
| | More than once a day | 220 | 81,5 | 81,8 | 91,4 |
| | 2 times a day | 12 | 4,4 | 4,5 | 95,9 |
| | 2-3 times a week | 9 | 3,3 | 3,3 | 99,3 |
| | Once a week | 2 | ,7 | ,7 | 100,0 |
| | Total | 269 | 99,6 | 100,0 | |
| Missing | System | 1 | ,4 | | |
| Total | | 270 | 100,0 | | |
| | | **Work Year** | | | |
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | ,00 | 29 | 10,7 | 11,0 | 11,0 |
| | 1,00 | 19 | 7,0 | 7,2 | 18,3 |
| | 2,00 | 32 | 11,9 | 12,2 | 30,4 |
| | 3,00 | 28 | 10,4 | 10,6 | 41,1 |
| | 4,00 | 25 | 9,3 | 9,5 | 50,6 |
| | 5,00 | 33 | 12,2 | 12,5 | 63,1 |
| | 6-10 | 43 | 15,9 | 16,3 | 79,5 |
| | 10-15 | 35 | 13,0 | 13,3 | 92,8 |
| | 15-20 | 13 | 4,8 | 4,9 | 97,7 |
| | 20-25 | 5 | 1,9 | 1,9 | 99,6 |
| | 25-30 | 1 | ,4 | ,4 | 100,0 |
| | Total | 263 | 97,4 | 100,0 | |
| Missing | System | 7 | 2,6 | | |

**Table 5 (Cont.)**

| | | Gender | | | |
|---|---|---|---|---|---|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | ,00 | 1 | ,4 | ,4 | ,4 |
| | Male | 113 | 41,9 | 41,9 | 42,2 |
| | Female | 156 | 57,8 | 57,8 | 100,0 |
| Total | | 270 | 100,0 | | |
| | | **Age** | | | |
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | 20-25 | 54 | 20,0 | 20,2 | 20,2 |
| | 25-30 | 97 | 35,9 | 36,3 | 56,6 |
| | 30-35 | 60 | 22,2 | 22,5 | 79,0 |
| | 35-40 | 36 | 13,3 | 13,5 | 92,5 |
| | 40-45 | 17 | 6,3 | 6,4 | 98,9 |
| | 45-50 | 3 | 1,1 | 1,1 | 100,0 |
| | Total | 267 | 98,9 | 100,0 | |
| Missing | System | 3 | 1,1 | | |
| Total | | 270 | 100,0 | | |

### 3.4 Data Analysis

In data analysis Structure Equation Model (SEM) is used for its general acceptance in literature with the behavioral science researches. In this model the multivariate data sets can be modeled according to the measure keys of the proposed components on which the investigators are studying Hair et al (1998). SEM also interprets the correlation between the components of the study. In literature SEM as a model is used in most of the studies in three specific journals which of them are MIS Quarterly (MISQ), Information & Management and Information Systems Research (ISR). According to the researches of Gefen, Straub, and Boudreau (2000) the rate of the SEM usage in the studies are 45% (ISR) and 25% (MISQ). In late 1990's 18% of the articles in these journals used the SEM for their exploratory and confirmatory methods. Gefen et al. (2000) also suggest that SEM (the combination of structural model and measurement) has important abilities such as; combining the factor analysis with the hypothesis testing in one method and analyzing the measurement errors as a component of the measurement model.

In order to use SEM it is important to choose the correct method of SEM. The model has two main analysis types which of them are covariance analysis and partial least squares Thompson et al. (1995). The two analyses have different kind of properties. In covariance analysis the algorithm collates the main covariance structure fit with the most proper covariance structure fit. This analysis type compares the studied model with the general thoughts of the society which give the multivariate data to the study. However in partial least squares (PLS) the main issue is calculating the significances between the factors of the model or calculating the variance. According to Thompson et al. (1995) PLS is more suitable for the small amount of data since it does not require normal distribution whereas the covariance SEM requires at least 150 data sets for analysis.

SEM is separated into two models which of them are measurement model and structural model Gefen et al. (2000). The measurement model forms the related factors from the given measurement keys which the researcher studies. The variables are assigned to the factors of the study with the help of a statistical software program. After the related factors are created the structural model defines the significant relations between the factors. In measurement model the core part is factor analysis. Factor analysis estimates the relation between the variables and includes these related variables in one construct Costello and Osborne (2005). Second important part in measurement model is reliability analysis. Reliability analysis determines the reliability of the scales or variables by repeating the measurements a number of times. In this study the measurement model is tested by the software of statistical packages for social sciences SPSS 17.0. SPSS is chosen for the study since it has a user friendly interface, easy to learn and use. Data sets from other programs can easily be imported into the SPSS with its import and export properties. Since the study includes data sets from the database, the import tool of the SPSS increases the conversion phase. In structural model of SEM the significances between the factors can be calculated. The structure model examines the significant and insignificant relations between the constructs. It also calculates how much variance that the model

explains the technology acceptance. In this study Smart PLS 2.0 is used for the structural model of SEM Ringle, Wende & Will (2005).

# CHAPTER 4

# RESULTS and FINDINGS

In this chapter the results of the statistical data analysis of the study is explained. Structural Equation Model is used in the analysis of the study which is introduced in part 3.4 Data Analysis. The recommended model steps are followed during the analyses which of them are Measurement Model and Structural Model. In part 4.1 the usage of Measurement Model is explained and detailed analysis techniques are described as sub parts. In part 4.1.1 The Validity analysis of the study is presented. The factor analysis is also detailed in this part. In part 4.1.2 Reliability analysis of the study is presented. Reliabilities of the each factor are presented in this part which can also be called as internal validity. In part 4.2 how the Structural Model is progressed is given with details. In 4.2.1 the initial model testing with PLS is processed. In this part the required analyses are performed and the significance of the model is appeared. In 4.2.2 the modified model testing with PLS is processed. In this part the required analyses are performed with the modified model which is shaped after the first model and the significance of the model is appeared. In 4.2.3 the modified model is compared with the original TAM in order to prove the goodness of the final model. In this part the hypotheses are also referred.

## 4.1 Measurement Model

Measurement Model is the exploratory analysis of the study which tests the validity of the hypotheses. This model has two important testing techniques which of them are validity analysis and reliability analysis. In validity analysis the measurement item loadings are calculated and the variables used in survey are placed under the estimated factors. In reliability analysis the internal validity of each factor are calculated. If the Cronbach's alpha of the factors exceeds the recommended value this means that the factor is reliable for further analysis of the study. In this study SPSS 17.0 software package is used for the measurement analysis.

### 4.1.1 Validity Analysis

In validity analysis factors are determined from the analysis tools of SPSS. This technique can also be called as factor analysis in literature. In factor analysis the variables are located into the latent factors according to the loading degrees. The validity of the each variable is tested in case of any misunderstanding of the questions by the applicants or the invalid measure keys for the presented model. First of all, the anti image correlation of the model is tested. This test is done with the factor analysis technique of the SPSS. The anti-image of the correlation matrix is the negative of the partial correlations, partialling out all other variables. Anti image correlation found the appropriateness of the measures to be analyzed, one by one. In anti image correlation if the diagonal values are above 0.50 the variable should be excluded from the analysis. After applying this technique 6 items are removed from analyses which of them are given in (*Table 6 Removed variables after anti image correlation*). In this table the "Anti image correlation" column shows the value of removed items. The values of these items are below 0.50 so they are needed to be removed from the research model. These items can't be set under certain factors for the further analysis.

**Table 6 Removed variables after anti image correlation**

| Item | Anti image correlation |
|---|---|
| **FNC1 My willingness to use an (HIS) will depend on the perceived personal cost (time or money)** | 0,414 |
| **FNC2 I think the equipments required to deploy electronic logistics information system is expensive** | 0,316 |
| **FNC3 I think it costs a lot to learn electronic logistics information system** | 0,471 |
| **C1 There are some jobs in which a man can always do better than a woman** | 0,463 |
| **C2 It is more important for men to have a professional career than it is for women to have a professional career** | 0,482 |
| **SN4 My manager influences my intention to use (HIS)** | 0,473 |

After the anti image correlation test the KMO and Bartlett's Test applied to the data set. KMO and Bartlett's Test tests the appropriateness of the factor analysis by looking the correlation of the patterns. The adequacy of the samples are determined with these tests. The result of the KMO test ranges from 0 to1. If the range is higher that means the analysis is more suitable. In order to get appropriate results the KMO value should be greater than 0.50 (Marija Norusis, 2005). As shown in *Table 7 KMO and Bartlett's Test* the KMO value is 0.885>0.50 which means that the data is suitable for analysis. In Bartlett's test the null hypothesis are tested. If variables have equal variances this could be found by Bartlett's test. In order to get affirmative results the Bartlett's value should be lower than 0.05. In this analysis the Bartlett's result is 0.000 [$\chi_2$ (1225) = 7399, $p<0.05$] which suitable for the analysis.

**Table 7 KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,885 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 7399,126 |
| | df | 1225 |
| | Sig. | ,000 |

The factor analysis is proven to be suitable with the KMO & Bartlett's Test and the data is now available for the factor analysis. In order to perform factor

analysis the “data reduction>factor analysis” technique of SPSS is used. In a factor analysis not all factors are used. Only the factors used whose eigenvalue is greater than 1. Eigenvalues are the total of squares of the factor loadings.

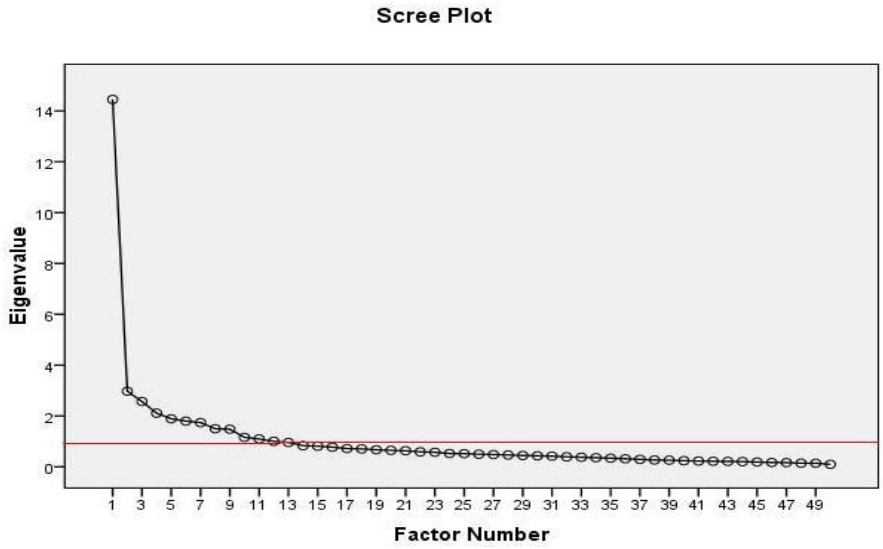


**Figure 7 Eigen values**

The eigenvalues which is greater than 1 is seen in (*Figure 7 Eigen values*). This figure and the factor analysis shows that 12 factors are observable in this study. In order to maximize the variances of the factors the varimax rotation is used in factor analysis. Varimax rotation is a change of coordinates which maximizes the sum of the variances of the squared loadings. Varimax rotation is often used in surveys to see how groupings of questions (items) measure the same concept. According to Barbara G. Tabachnick, & Linda S. Fidell, (2001) the probability of the sampling that is examined from the variables can be increased by maximum likelihood extraction method. Maximum likelihood estimates the population values for factor loadings. So in this study the varimax rotation and maximum likelihood extraction methods are used for factor analysis. Since survey questions are translated into Turkish and some factors are studied for the first time in Turkish culture there may be a misunderstanding of the questions and the analysis showed different variances for some measurement items in survey. After the first factor analysis there were 20 observed factors shown in rotated component matrix table. For the factors

which have 1 variable, the factor analysis will be unnecessary because the factor cannot be measured with 1 item. Besides the items which have loadings below the value 0.40 should be removed from the analysis. Taking into account this limitations the variables "PU12, PEU2, PEU7, PEU8, PEU10, TRU1, TRU2, C3, C4, C5, V1, V2, V3, SE1, SE2, SE3, SE5, FNC4" are removed from the analysis which of them are given detailed in (*Table 8 Items removed after the first factor analysis*)

**Table 8 Items removed after the first factor analysis**

| Item | Item Detail |
|---|---|
| **PU12** | (HIS) Increases chance of getting a raise |
| **PEU2** | Interacting with the (HIS) is often frustrating |
| **PEU7** | It is easy for me to become a skilful user of (HIS) |
| **PEU8** | (HIS) Does not demand much care and attention |
| **PEU10** | (HIS) is flexible to use/interact with |
| **TRU1** | I feel assured that legal and technological structures adequately protect me from problems on (HIS) |
| **TRU2** | I would feel comfortable using (HIS) |
| **C3** | Being accepted as a member of a group is more important than having autonomy and independence |
| **C4** | Employees should not question their manager's decisions |
| **C5** | Rules and regulations are important because they inform workers what the organization expects of them |
| **V1** | My use of (HIS) is voluntary. |
| **V2** | My supervisor does not require me to use the system |
| **V3** | Although it might be helpful, using (HIS) is certainly not compulsory in my job. |
| **SE1** | I could complete the job using (HIS) if there was no one around to tell me what to do as I go |
| **SE2** | I could complete the job using (HIS) if I had used similar system before this one to do the same job |
| **SE3** | I expect to become proficient in using (HIS) |
| **SE5** | I will be able to complete a task using (HIS) if I could call someone for help if I got stuck |
| **FNC4** | (HIS) is not expensive taking into account its contributions to hospital. |

After removing 18 variables from the measurements the second factor analysis is performed with 56 variables in order to get more regular results. The results of the factor analysis are shown in tables; Total variance explained, communalities, factor transformation matrix and rotated component matrix. In total variance table the number of the factors calculated in analysis is given and variances

of these factors in order to measure the model are introduced (*APPENDIX C: RESULTS OF THE MEASUREMENT MODEL (SPSS 17.0 STATISTICAL RESULTS)*. Observing the total variance table the first factor has the greatest variance "28.8" among all factors. In rotated component matrix table factor loadings of each variable are given. These variables are grouped and form the factor. As shown in table (*Table 9 Rotated Factor Matrix*) 12 factors are appeared. However, the 12th factor has not an important factor loading which is greater than 0.40 so this factor is removed from the further analysis. It is also observable that the items "SE4" and "BI4" have different factor loadings from their own predicted factors and these two items creates another factor together.

**Table 9 Rotated Factor Matrix**

**Rotated Factor Matrix[a]**

| | Factor | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| PU6 | ,732 | | | | | | | | | | | |
| PU4 | ,653 | | | | | | | | | | | |
| PU7 | ,623 | | | | | | | | | | | |
| PU2 | ,603 | | | | | | | | | | | |
| PU11 | ,600 | | | | | | | | | | | |
| PU1 | ,591 | | | | | | | | | | | |
| PU9 | ,588 | | | | | | | | | | | |
| PU8 | ,573 | | | | | | | | | | | |
| PU5 | ,570 | | | | | | | | | | | |
| PU10 | ,534 | | | | | | | | | | | |
| PU3 | ,533 | | | | | | | | | | | |
| PU14 | ,472 | | | | | | | | | | | |
| PU13 | ,416 | | | | | | | | | | | |
| PEU1 | | ,741 | | | | | | | | | | |
| PEU3 | | ,638 | | | | | | | | | | |

**Table 9 (Cont.)**

**Rotated Factor Matrix[a]**

| | Factor | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| PEU5 | | ,607 | | | | | | | | | | |
| PEU9 | | ,598 | | | | | | | | | | |
| PEU4 | | ,549 | | | | | | | | | | |
| PEU6 | | ,533 | | | | | | | | | | |
| PEU11 | | ,491 | | | | | | | | | | |
| A2 | | | -,822 | | | | | | | | | |
| A3 | | | -,731 | | | | | | | | | |
| A4 | | | -,662 | | | | | | | | | |
| A1 I | | | -,625 | | | | | | | | | |
| RD1 | | | | ,874 | | | | | | | | |
| RD3 | | | | ,639 | | | | | | | | |
| RD4 | | | | ,496 | | | | | | | | |
| RD2 | | | | ,426 | | | | | | | | |
| T1 | | | | | ,656 | | | | | | | |
| T3 | | | | | ,613 | | | | | | | |
| T2 | | | | | ,541 | | | | | | | |
| T4 | | | | | ,470 | | | | | | | |
| FC1 | | | | | | ,710 | | | | | | |
| FC2 | | | | | | ,574 | | | | | | |
| FC4 | | | | | | ,546 | | | | | | |
| FC3 | | | | | | ,546 | | | | | | |
| JR1 | | | | | | | ,855 | | | | | |
| JR2 | | | | | | | ,776 | | | | | |
| EUS2 | | | | | | | | ,781 | | | | |
| EUS3 | | | | | | | | ,613 | | | | |
| EUS1 | | | | | | | | ,575 | | | | |
| SE4 | | | | | | | | | ,544 | | | |
| BI4 | | | | | | | | | ,509 | | | |

**Table 9 (Cont.)**

**Rotated Factor Matrix[a]**

| | Factor | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| BI3 | | | | | | | | | | ,607 | | |
| BI2 | | | | | | | | | | ,606 | | |
| BI5 | | | | | | | | | | ,504 | | |
| BI1 | | | | | | | | | | ,467 | | |
| SN3 | | | | | | | | | | | ,709 | |
| SN1 | | | | | | | | | | | ,647 | |
| SN2 | | | | | | | | | | | ,638 | |

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 11 iterations.

### 4.1.2 Reliability Analysis

The reliability analysis shows if the factor is reliable or not for further analysis. The respondents of the survey may comment the questions differently from other respondents since they could misunderstand the questions. In this case the reliability analysis shows these meaningless variables in given factors. In reliability analysis the Cronbach's alpha of the factors should be greater than 0.70 for a reliable result. If the factor consists of 2 or 3 variables, this rate can decrease to 0.60. After applying the reliability analysis it is observed that "Result Demonstrability" factor has lower Cronbach's alpha value. Since in this factor the item RD2 "I would have difficulty explaining why using (HIS) may or may not be beneficial." Has a reverse meaning from other variables in the factor, the transform technique of SPSS applied to the item "RD2". The values of the item are reversed such as 1->5, 2->4, 4->2 and 5->1. After transforming the item the reliability analysis is applied to the Result Demonstrability factor and the Cronbach's alpha value is observed to be higher than 0.70. As shown in (*Table 10 Reliability Analysis*) out of 11 factors only the latent

factor which consists of (SE4, BI4) is below the value 0.70 (0.567<0.70). In that case this factor would be unreliable for the study and is removed from the further analysis. So the remaining 10 factors are observed as reliable for the study.

**Table 10 Reliability Analysis**

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Cronbach's Alpha: ,914 N of Items: 13 (PU12 removed) | Perceived Usefulness | | | |
| PU1 | 22,6617 | 61,971 | ,644 | ,908 |
| PU2 | 22,4796 | 61,728 | ,595 | ,909 |
| PU3 | 22,3792 | 60,289 | ,592 | ,910 |
| PU4 | 22,4572 | 60,518 | ,698 | ,906 |
| PU5 | 22,6059 | 61,352 | ,621 | ,908 |
| PU6 | 22,4833 | 57,997 | ,831 | ,900 |
| PU7 | 22,5093 | 59,863 | ,713 | ,905 |
| PU8 | 22,3569 | 60,693 | ,643 | ,908 |
| PU9 | 22,2862 | 59,623 | ,686 | ,906 |
| PU10 | 22,1970 | 59,853 | ,602 | ,910 |
| PU11 | 22,6097 | 61,172 | ,665 | ,907 |
| PU13 | 22,1078 | 61,268 | ,505 | ,914 |
| PU14 | 22,5242 | 61,474 | ,582 | ,910 |
| Cronbach's Alpha: , 830 N of Items: 7 | Perceived Ease of Use | | | |
| PEU1 | 11,4889 | 14,794 | ,611 | ,802 |
| PEU3 | 11,4185 | 14,542 | ,629 | ,799 |
| PEU4 | 11,2296 | 14,334 | ,626 | ,798 |
| PEU5 | 11,1704 | 15,160 | ,513 | ,816 |
| PEU6 | 11,1444 | 14,414 | ,593 | ,804 |
| PEU9 | 11,1259 | 14,482 | ,631 | ,798 |
| PEU11 | 11,1111 | 14,620 | ,461 | ,829 |

**Table 10 (Cont.)**

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Cronbach's Alpha: , 820<br>N of Items: 4 | Behavioral Intention | | | |
| BI1 | 5,5948 | 5,787 | ,625 | ,782 |
| BI2 | 5,6097 | 5,231 | ,728 | ,733 |
| BI3 | 5,6468 | 5,274 | ,645 | ,775 |
| BI5 | 5,6320 | 6,017 | ,580 | ,802 |
| Cronbach's Alpha: , 731<br>N of Items: 3 | End User Support | | | |
| EUS1 | 4,3815 | 3,352 | ,532 | ,669 |
| EUS2 | 4,3704 | 3,082 | ,619 | ,568 |
| EUS3 | 4,2111 | 3,022 | ,518 | ,694 |
| **Cronbach's Alpha: , 567<br>N of Items: 2** | **Latent Factor** | | | |
| BI4 | 1,5815 | ,690 | ,395 | [a] |
| SE4 | 1,6704 | ,735 | ,395 | [a] |
| Cronbach's Alpha: , 813<br>N of Items: 4 | Facilitating Conditions | | | |
| FC1 | 6,4296 | 6,001 | ,669 | ,747 |
| FC2 | 6,2926 | 5,650 | ,641 | ,762 |
| FC3 | 6,4815 | 5,909 | ,655 | ,753 |
| FC4 | 6,6852 | 6,782 | ,569 | ,793 |
| Cronbach's Alpha: , 869<br>N of Items: 2 | Job Relevancy | | | |
| JR1 | 1,9704 | ,802 | ,771 | .[a] |
| JR2 | 2,0926 | ,947 | ,771 | .[a] |
| Cronbach's Alpha: , 823<br>N of Items: 4 | Result Demonstrability | | | |
| RD1 | 6,6370 | 4,864 | ,823 | ,694 |
| RD2_transform | 6,6593 | 5,958 | ,478 | ,852 |
| RD3 | 6,6185 | 5,084 | ,728 | ,739 |
| RD4 | 6,3407 | 5,601 | ,585 | ,806 |

Table 10 (Cont.)

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Cronbach's Alpha: , 783<br>N of Items: 4 | Training | | | |
| T1 | 6,1444 | 5,321 | ,573 | ,739 |
| T2 | 6,1963 | 5,459 | ,593 | ,733 |
| T3 | 6,1556 | 4,481 | ,655 | ,695 |
| T4 | 6,1259 | 4,869 | ,555 | ,751 |
| Cronbach's Alpha: , 825<br>N of Items: 4 | Anxiety | | | |
| A1 | 11,6543 | 9,712 | ,603 | ,801 |
| A2 | 12,0037 | 7,907 | ,714 | ,750 |
| A3 | 11,9368 | 8,440 | ,696 | ,758 |
| A4 | 11,6022 | 9,860 | ,602 | ,802 |
| Cronbach's Alpha: , 710<br>N of Items: 2 | Social Norms | | | |
| SN1 | 4,8593 | 3,549 | ,549 | ,596 |
| SN2 | 5,3185 | 4,196 | ,485 | ,670 |
| Number of Total Items : 51 | | | | |

## 4.2 Structural Model

After the measurement model 4 factors was dropped from the study which of them are; voluntariness, culture, trust and self efficacy. In this part the structure analysis of the study is worked. As structural model tool the Smart PLS 2.0 is chosen since it is more functional and easy to use according to other PLS software such as XLStat. The reporting dimension is also very effective while getting the calculation of the correlation between the factors Ringle et al (2005). Firstly the initial structural model is drawn with the factors; perceived ease of use, perceived usefulness,

behavioral intention, job relevancy, result demonstrability, anxiety, training, facilitating conditions, social norms and end user support. While drawing the initial model schema the relations between factors are stated. The path coefficients and the t-values between the factors are calculated. In order to get the t-values of the relations the path coefficients are used. T-values are calculated with the bootstrap method of the PLS. The bootstrap method tries to draw near the distribution of the parameter estimates. According to Ringle et al (2005) in order to get a meaningful result from the analysis over 200 runs are needed. It can be said that the more run in bootstrap method the more efficient results are reached. Another important issue in PLS is the AVE (Average Variance Extraction). With the help of AVE the discriminant validity is assessed. The criteria for a valid analysis can be explained that the correlation of each construct in AVE result should be larger than the correlations with the other constructs Gefen et al. (2000).

After getting the results of the first pls analysis the significance of the path coefficients are drawn, the $R^2$ of the constructs are calculated for the goodness of the model fit. With the results of the initial model structure analysis the insignificant relations are determined and the model is modified for a better structure. In the modified model the calculation of path coefficient, t-value, AVE and $R^2$ are done. Finally the modified model is compared with the original TAM by means of goodness of the model fit. The hypotheses which are rejected and accepted are given at the end of the structural model analysis.

### 4.2.1 The initial structural model

The results of the measurement model showed that some hypotheses are not appropriate for the technology acceptance model. So the hypotheses; H1, H2a, H2b, H3, H4, H5, H7, H8, H10, H14 are tested in the initial structural model. First of all the AVE Square is calculated and the correlation table is created for validity of the analysis. The root square of AVE is shown with bold in (*Table 11 Latent Variable Correlations with square root* of AVE values). According to Gefen et al. (2000) the

AVE measures the variance of the constructs by considering the measurement errors. If the square root of the AVE is greater than 0,50 the structural analysis can be considered to be valid in other case the analysis becomes questionable. In the initial model testing the square roots of AVE values are over the accepted rate so the validity of the analysis is proven to be meaningful.

**Table 11 Latent Variable Correlations with square root of AVE values**

| | A | BI | EUS | FC | JR | PEU | PU | RD | SN | T |
|---|---|---|---|---|---|---|---|---|---|---|
| A | **0,807** | | | | | | | | | |
| BI | -0,363 | **0,805** | | | | | | | | |
| EUS | -0,017 | 0,376 | **0,799** | | | | | | | |
| FC | -0,271 | 0,490 | 0,450 | **0,800** | | | | | | |
| JR | -0,224 | 0,418 | 0,219 | 0,273 | **0,941** | | | | | |
| PEU | -0,206 | 0,461 | 0,329 | 0,396 | 0,308 | **0,704** | | | | |
| PU | -0,360 | 0,664 | 0,340 | 0,578 | 0,425 | 0,566 | **0,708** | | | |
| RD | -0,285 | 0,560 | 0,291 | 0,483 | 0,331 | 0,335 | 0,611 | **0,813** | | |
| SN | -0,003 | 0,173 | 0,221 | 0,176 | 0,112 | 0,202 | 0,243 | 0,248 | **0,788** | |
| T | -0,326 | 0,46 | 0,269 | 0,474 | 0,403 | 0,342 | 0,542 | 0,575 | 0,137 | **0,780** |

In order to understand the fitness of the model the model's predictive power $R^2$ is used in literature. High $R^2$ values represent significant and good model fits. $R^2$ means the calculated variance of the construct explained by other independent constructs. In the initial model the $R^2$ of the important constructs are 0,534 (Behavioral Intention) and 0,321 (Perceived Usefulness). When investigating the literature the $R^2$ value can be considered as an acceptable value. In addition to the validity of the model tested the correlations between the factors are also tested. The path coefficients of the model is driven with the Smart PLS and charted with Inspiration 8.0 graphic software (*Figure 8 Path coefficients of initial model*).

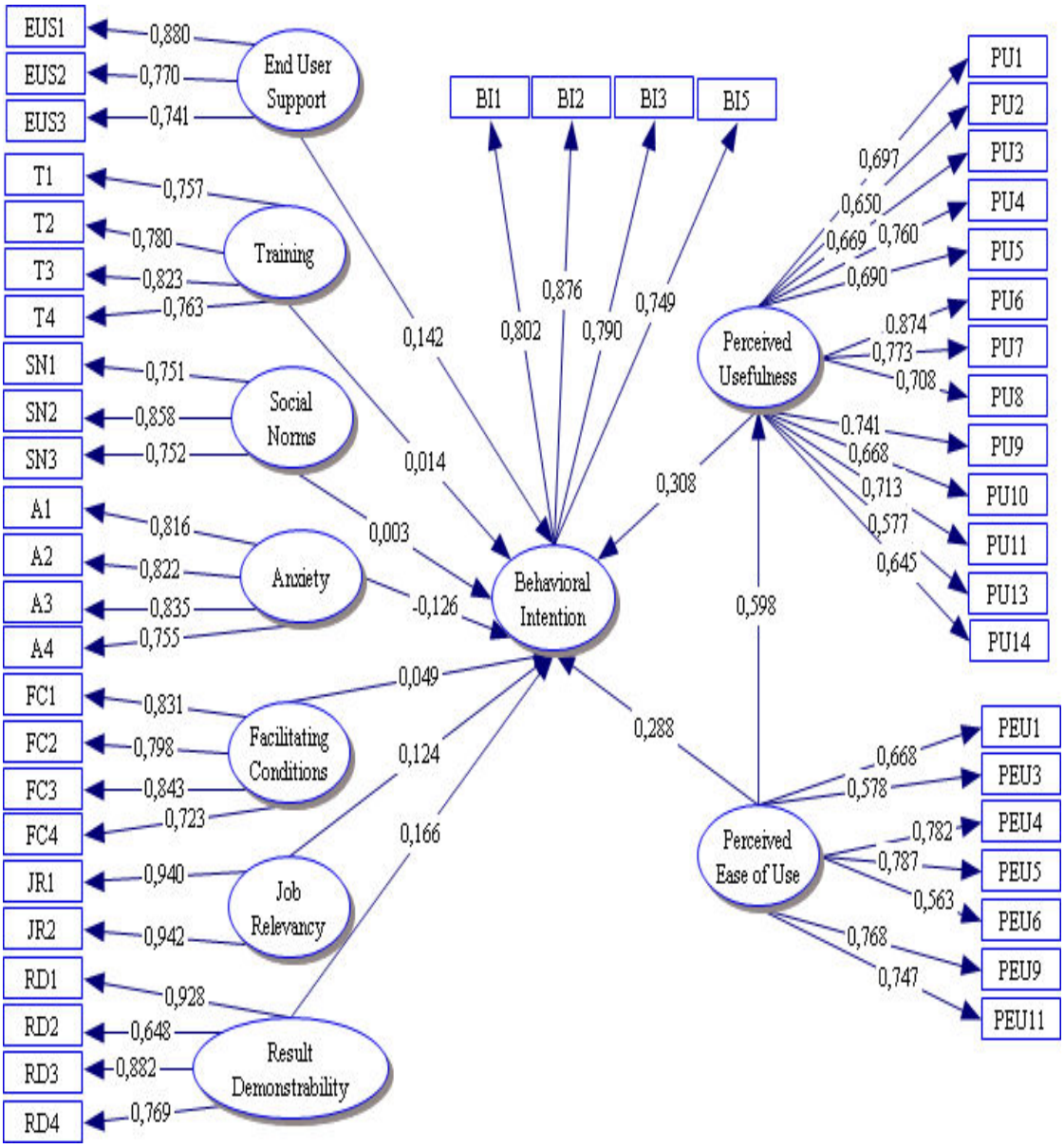


**Figure 8 Path coefficients of initial model**

In order to test the relation between the factors the bootstrap method of PLS is used. As mentioned in 4.2 Structural model, the bootstrap method needs over 200 runs for a better result in analyzing the validity of the model. According to the Hesterberg T. , David S. Moore, Monaghan S, Clipson A, Epstein R. (2005) the bootstrap method resample the original population and it introduces what would be

populated from the sample of original population. In this study the run amount is 500 for a meaningful result. The bootstrap results are given in (*Table 12 Bootstrap results of the initial model*). In this table “Orig Sample” and “Sample Mean” columns show the bootstrap distribution values of the original sample and the mean of the bootstrap. In “Standard Deviation” and “Standard Error” columns how much variation there is from the "average" is calculated. “T Statistics” column shows the calculation of bootstrapping value (Sample Mean is divided by Standard Deviation). T statistics determines if the relationship between factors are casual or statistically proven. Under the “P value” column the confidence interval of the relationship between factors are calculated. If the confidence interval lower than 0,1 it means that the relationship is confident. In this table the t-statistics which is extracted from the path coefficients values and the p-values which is extracted from t-statistics are given. T-statistics and p-values are the decisive values of the significance of the path coefficients. The p values determine the probability of the random sampling and given the difference between the population and samples. In the initial model testing the significant paths are given as Perceived Ease of Use -> Behavioral Intention ($p<0,01$) , Perceived Ease of Use -> Perceived Usefulness ($p<0,01$), Perceived Usefulness -> Behavioral Intention ($p<0,01$), Anxiety -> Behavioral Intention ($p<0,05$), End User Support -> Behavioral Intention ($p<0, 1$), Result Demonstrability -> Behavioral Intention ($p<0, 1$), and Job Relevancy -> Behavioral Intention can be assigned as ($p<=0, 1$). On the other hand some paths’ p value are over 0,1 so they can be considered as insignificant. These paths are Facilitating Conditions -> Behavioral Intention, Social Norms -> Behavioral Intention, Training -> Behavioral Intention. The significance of the path coefficients are given in (*Figure 9 The significance of initial model and R square values*).

**Table 12 Bootstrap results of the initial model**

| Path | Orig. Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | Standard Error (STERR) | T Statistics (\|O/STERR\|) | P value |
|---|---|---|---|---|---|---|
| **Anxiety -> Behavioral Intention** | -0,1279 | -0,1262 | 0,0738 | 0,0738 | 1,7332 | 0,0418 |
| **End User Support -> Behavioral Intention** | 0,1372 | 0,1423 | 0,1055 | 0,1055 | 1,3003 | 0,0970 |
| **Facilitating Conditions -> Behavioral Intention** | 0,0458 | 0,049 | 0,1155 | 0,1155 | 0,3968 | 0,3458 |
| **Job Relevancy -> Behavioral Intention** | 0,119 | 0,1248 | 0,0975 | 0,0975 | 1,2203 | 0,1114 |
| **Perceived Ease of Use -> Behavioral Intention** | 0,2757 | 0,2883 | 0,1074 | 0,1074 | 2,5674 | 0,0052 |
| **Perceived Ease of Use -> Perceived Usefulness** | 0,5671 | 0,5983 | 0,0854 | 0,0854 | 6,639 | p<0.01 |
| **Perceived Usefulness -> Behavioral Intention** | 0,33 | 0,308 | 0,1279 | 0,1279 | 2,5801 | 0,0050 |
| **Result Demonstrability -> Behavioral Intention** | 0,1959 | 0,1661 | 0,1268 | 0,1268 | 1,5449 | 0,0615 |
| **Social Norms -> Behavioral Intention** | -0,0225 | 0,003 | 0,0875 | 0,0875 | 0,2574 | 0,3984 |
| **Training -> Behavioral Intention** | -0,0004 | 0,0146 | 0,1225 | 0,1225 | 0,0036 | 0,4985 |

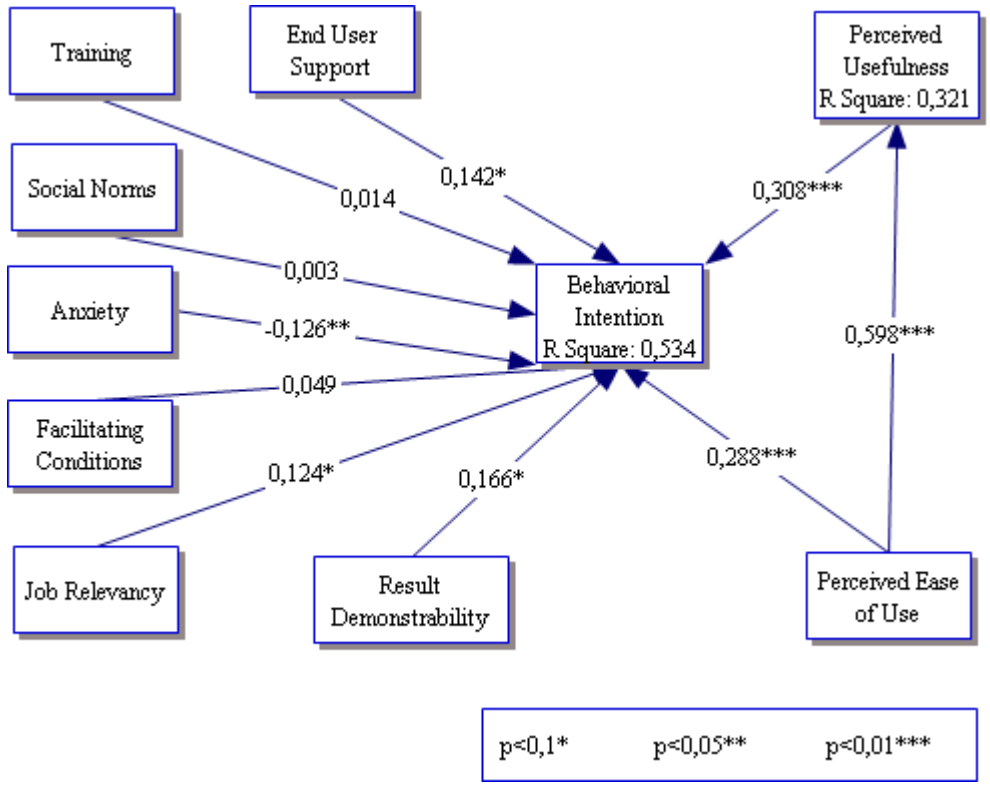


**Figure 9 The significance of initial model and R square values**

### 4.2.2 The final structural model

After the initial model is tested the insignificant paths are determined and these factors are excluded from the final model. In this phase the Facilitating conditions, *Training* and *Social norms* factors are removed from the model since they have insignificant p values over 0,1. As mentioned in 4.2.1 initial structural model the square root value of AVE and latent factor correlations are calculated in the final model. The square root values of AVE are given with bold in (*Table 14 Bootstrap results of the final model*). In the final model testing the square roots of AVE values are over the accepted rate so the validity of the analysis is proven to be meaningful.

**Table 13 Final model Latent Variable Correlations with square root of AVE values**

| | A | BI | EUS | JR | PEU | PU | RD |
|---|---|---|---|---|---|---|---|
| A | **0,807** | | | | | | |
| BI | -0,363 | **0,805** | | | | | |
| EUS | -0,017 | 0,376 | **0,799** | | | | |
| JR | -0,224 | 0,418 | 0,219 | **0,941** | | | |
| PEU | -0,206 | 0,461 | 0,329 | 0,308 | **0,704** | | |
| PU | -0,360 | 0,664 | 0,340 | 0,425 | 0,566 | **0,708** | |
| RD | -0,285 | 0,560 | 0,291 | 0,331 | 0,335 | 0,611 | **0,813** |

With the validation of the AVE values the path coefficients of the model is calculated and drawn with the Inspiration 8.0 software (*Figure 10 Path coefficients of final model*).

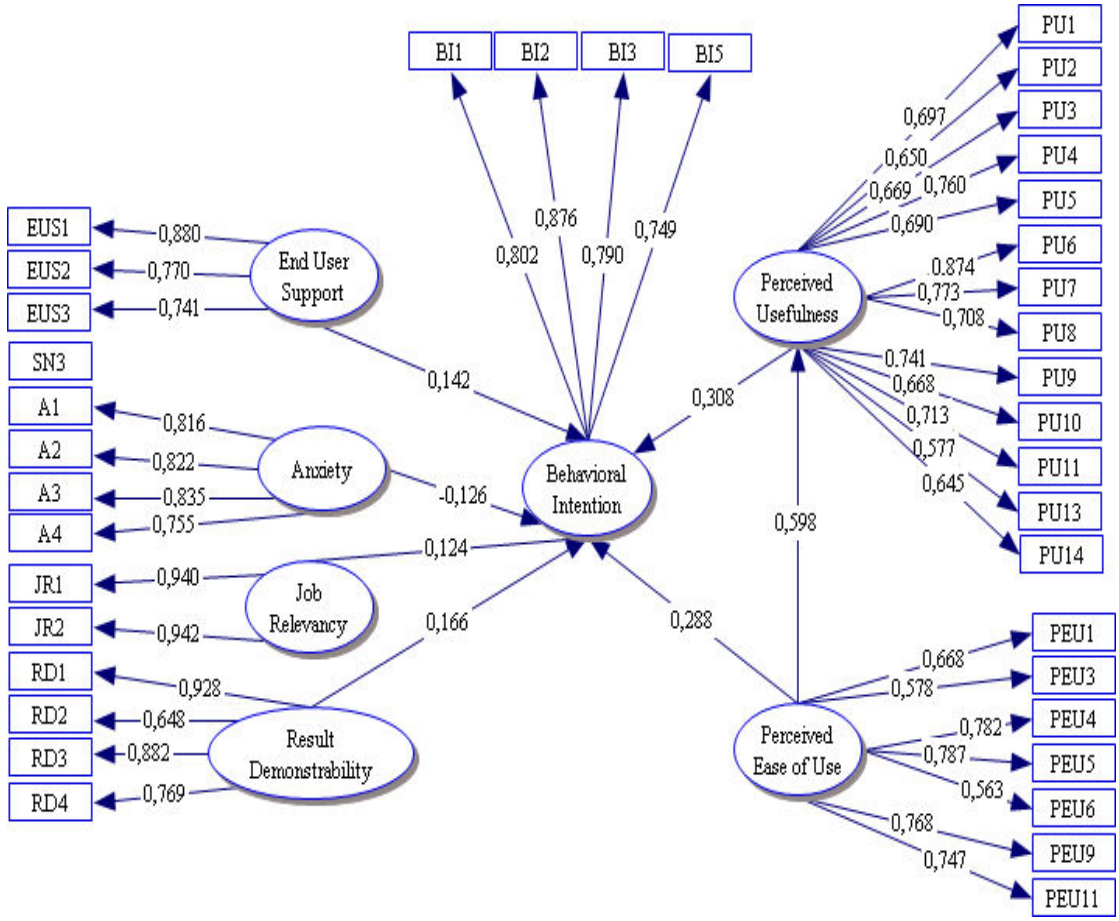


**Figure 10 Path coefficients of final model**

In this figure the path coefficients values between the factors are given. The item loadings are also specified in the figure between the factors and survey items. The item loadings explains the relations between the item and factor. High values of item loadings better convenience of the item to the factor. In the final model perceived usefulness has the most significant effect on behavioral intention to use such as “0,308”. Other external factors have also significant effect on behavioral intention to use such as Job Relevancy “0,124”, Result Demonstrability “0,166”, End User Support “0,142” and Anxiety “-0,126”. Anxiety has negative effect on behavioral intention since which means that the anxious users are more reluctant to use the system.

After the path coefficients are calculated the bootstrap method is applied to the model. The result of the bootstrap method is given in (*Table 14 Bootstrap results of the final model*). In the final model the results of the t-statistics and p values showed some differences compared with the initial model bootstrap results. In the initial model the p value of the path Result Demonstrability -> Behavioral Intention was (p<0, 1) however in the final model the p value is lower than (p<0,05). Besides the path End User Support -> Behavioral Intention (p<0, 1), come closer to (p<0,05) in the final model. The p value of the path Job Relevancy -> Behavioral Intention is also observed to be closer to (p<0, 1) compared to the initial model. The p values of other paths are remained same which of them are; Perceived Ease of Use -> Behavioral Intention (p<0,01) , Perceived Ease of Use -> Perceived Usefulness (p<0,01), Perceived Usefulness -> Behavioral Intention (p<0,01), Anxiety -> Behavioral Intention (p<0,05).

**Table 14 Bootstrap results of the final model**

| Path | Orig. Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | Standard Error (STERR) | T Statistics (\|O/STERR\|) | P value |
|---|---|---|---|---|---|---|
| **Anxiety -> Behavioral Intention** | -0,1348 | -0,1393 | 0,0718 | 0,0718 | 1,8784 | 0,0304 |
| **End User Support -> Behavioral Intention** | 0,1454 | 0,1542 | 0,0925 | 0,0925 | 1,5722 | 0,0582 |
| **Job Relevancy -> Behavioral Intention** | 0,1173 | 0,129 | 0,0925 | 0,0925 | 1,2691 | 0,1024 |
| **Perceived Ease of Use -> Behavioral Intention** | 0,2834 | 0,3009 | 0,0936 | 0,0936 | 3,0266 | 0,0013 |
| **Perceived Ease of Use -> Perceived Usefulness** | 0,567 | 0,5996 | 0,0905 | 0,0905 | 6,265 | p<0.01 |
| **Perceived Usefulness -> Behavioral Intention** | 0,3433 | 0,3272 | 0,1284 | 0,1284 | 2,6729 | 0,0038 |
| **Result Demonstrability -> Behavioral Intention** | 0,2004 | 0,191 | 0,1075 | 0,1075 | 1,864 | 0,0314 |

In the final model it is observed that the $R^2$ values of the Behavioral Intention and Perceived Usefulness are not changed. $R^2$ values of these factors are 0,534 and 0,321 respectively. As seen in (*Figure 11 The significance of final model and R square values*) the *Perceived Usefulness and Perceived Ease of Use* has great effect (0,288 and 0,308 respectively) on *Behavioral Intention*. Besides, the effect of *Perceived Ease of Use on Perceived Usefulness* is observed to be highly significant (0,598). Out of other four external factors only the Anxiety has negative effect on *Behavioral Intention* (-0,126). The relation between *Behavioral Intention and Job Relevancy* is acceptable as significant since it is too close to the significant p value (p<0,1). The final model provides that *End User Support, Job Relevancy and Result*

*Demonstrability* also have effects on *Behavioral Intention*(0,142; 0,126; 0,166 respectively).

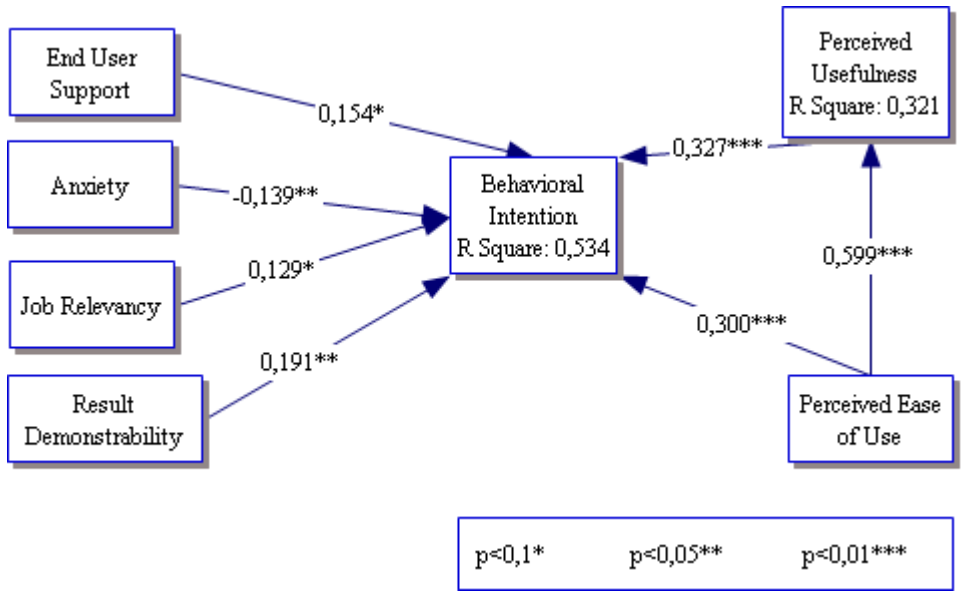


**Figure 11 The significance of final model and R square values**

### 4.2.3 Comparison with the original TAM & results of hypotheses

According to Venkatesh et al. (2000) Davis TAM model focuses on perceptions and attitudes of users on the system. There need to be some other contextual and organizational factors. In this part the modified model of the study is compared with the original TAM (*Figure 12 Original TAM*). In the original model the $R^2$ value of the Perceived Usefulness is greater than the modified model (original 0,479 & modified 0,321). However, the $R^2$ of the modified model is higher than the original model (original 0,452 & modified 0,534). In this case it is observed that the modified model explains the intention to use the technology better than the original TAM model. Differently from the original model, in modified model 4 external factors are included such as: *End User Support, Anxiety, Job Relevancy, Result Demonstrability*. It is also seen in the modified model that *Anxiety* has negative

effect on *Behavioral Intention* which means anxious users could be more reluctant to the Hospital Management Systems.

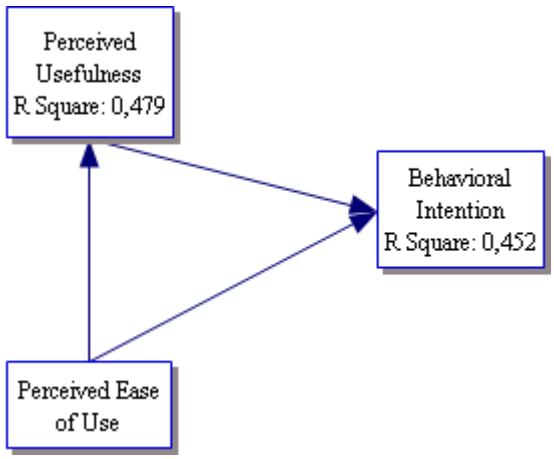


**Figure 12 Original TAM**

In part 4.1 Measurement Analysis, the items which have meaningless factor loadings are removed from the further analysis. So with the factor analysis and reliability analysis the factors "*Culture, Financial Cost, Self Efficacy, Voluntariness, Trust*" are excluded from the model. However in the qualitative research *Self Efficacy* and *Trust* factors are mentioned to be important by the doctors interviewed. Doctors believe that *self efficacy* influences the intention of the users to use the system but they also think that not all users are capable of having self efficacy. Trust is also supported by the doctors since the confidence between users and the system would be more effective in behavioral intention to use the system. They believe that the users can make mistakes during the working hours and if users don't feel safe while using the system they became hesitate on using the system at all. Still the statistical results show that these factors can't be proved for further analysis and not accepted as reliable. This case means that the responding hypotheses are also rejected with the measurement model analyses which of them are;

H6 - Voluntariness will positively affect the behavioral intention of the Hospital Management System users

H9 - Self Efficacy will positively affect the behavioral intention of the Hospital Management System users

H11 - Financial Cost will negatively affect the behavioral intention of the Hospital Management System users

H12 - Trust will positively affect the behavioral intention of the Hospital Management System users

H13a - Individualism will positively affect the behavioral intention of the Hospital Management System users

H13b - Low power distance will positively affect the behavioral intention of the Hospital Management System users

H13c - Low uncertainty avoidance will positively affect the behavioral intention of the Hospital Management System users

H13d - Masculinity/Femininity will positively affect the behavioral intention of the Hospital Management System users

In part 4.2 Structural model the factors which have insignificant path coefficient values are excluded from the model. So the factors "Training, Facilitating Conditions, Social Norms" are removed from the study. The qualitative research also shows that *training*, *facilitating conditions* and *social norms* are important factors in technology acceptance issue. According to the doctors Training is very effective on behavioral intention. Trained users are more capable of using the system and adapted easily to the system but doctors states that in Turkish hospitals the users are not directly involved in to the training sessions. They propose that the training activity should be well organized in order to get the attraction of the users and adapt the system. Facilitating conditions are supposed to be important by the doctors. Some of them believes that the facilitating conditions in hospitals are not enough for the users so this may cause the insignificancy of this factor in the study. Some doctors also believe that *social norms* may have important effect on behavioral intention. Interaction and curiosity between the colleagues would evoke the them to use system

or at least examine it. Doctors believe that the thought of their colleagues are very important for them in information technology as well as in healthcare area. Nevertheless the statistical analysis of PLS shows that there is not a significant relationship between those factors and behavioral intention. The hypotheses corresponding to the factors are also rejected which of them are;

H4 - Facilitating Conditions will positively affect the behavioral intention of the Hospital Management System users

H5 - Training will positively affect the behavioral intention of the Hospital Management System users

H14 - Social Norm will positively affect the behavioral intention of the Hospital Management System users

**Table 15 Hypotheses Tested**

| Hypotheses | Results |
|---|---|
| **H1-** Perceived usefulness will positively affect the behavioral intention of the Hospital Management System users | **Supported** |
| **H2a** - Perceived ease of use will positively affect the behavioral intention of the Hospital Management System users | **Supported** |
| **H2b** - Perceived ease of use will have positive effect on the perceived usefulness of the Hospital Management System | **Supported** |
| **H3** - End User Support will positively affect the behavioral intention of the Hospital Management System users | **Supported** |
| **H4** - Facilitating Conditions will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Structural Analysis)** |
| **H5** - Training will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Structural Analysis)** |
| **H6** - Voluntariness will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H7** - Job Relevance will positively affect the behavioral intention of the Hospital Management System users | **Supported** |
| **H8** - Result Demonstrability will positively affect the behavioral intention of the Hospital Management System users | **Supported** |
| **H9** - Self Efficacy will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H10 -** Anxiety will negatively affect the behavioral intention of the Hospital Management System users | **Supported** |
| **H11** - Financial Cost will negatively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |

**Table 15 (Cont.)**

| Hypotheses | Results |
|---|---|
| **H12** - Trust will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H13a** - Individualism will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H13b** - Low power distance will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H13c** - Low uncertainty avoidance will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H13d** - Masculinity will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Factor Analysis)** |
| **H14 -** Social Norm will positively affect the behavioral intention of the Hospital Management System users | **Not supported (Structural Analysis)** |

# CHAPTER 5

# CONCLUSION and DISCUSSION

In this chapter the aim of the study and the results of the study are summarized. The important parts of the research model are discussed. The significant and insignificant items are explained. Finally the future works about the technology acceptance in healthcare is referred.

## 5.1 Discussion

This study covers the investigation of the general factors which is proposed to have strong relations with the acceptance of the technology within the hospitals. In the lights of this observation a new model is prepared for describing the technology acceptance of the users while using the Hospital Management & Information Systems. The model was inspired from the original Technology Acceptance Model developed by Davis (1989). This model consists of three important factors which of them are *perceived usefulness*, *perceived ease of use* and *behavioral intention*. In this study all of the factors of TAM are used as the core of the modified model. After the measurement and structural analyses are performed these components are proven to be very significant while explaining the effectiveness of the model in user acceptance.

As the measurement and structural model testing tool the SEM is used in the study. Firstly the measurement model is tested in order to calculate the loadings of the item weights on their expected factor. The analysis began with the validity

analysis and continued with the reliability analysis. In both analyses the valid factors are determined and these factors are tested in the second phase of SEM. Since the participants of the survey were mostly the doctors, nurses and the medical secretaries in hospitals the *Financial Cost* factor was not be significant in this study. This factos is mostly related with the opinions of the administrators in hospital and the percantage of the administrators in the survey was 1.5%. The *Culture* factor couldn't be proved either in this study. This factor has 4 sub factors which has only one survey item per a sub factor in the questionairre. So these items would not give statisticaly significant values in the anaylsis. The participants of the survey were also confused since the *Culture* factor questions were generally different from other survey items in healthcare mean. In the second phase the structural model is tested. In the structural model analysis the $R^2$ values and the significances between the factors are calculated. The AVE values are also calculated for the convergent validity of the researched model. During the structural model analysis some insignificance are observed in *facilitating conditions*, *social norms* and *training* so after the initial model a modified model is created and analyzed again. In the modified model the $R^2$ was not different from the initial model but the significance of factors is higher than the initial model.

Chismar et. al. (2003) suggests that healthcare workers focus on the usefulness of the technology whereas the other professions focus on the ease of use of technology. This study also proved that *perceived usefulness* has the most significant effect on intention to use the technology. The second important factor was p*erceived ease of use* in the model. The significance of the *perceived ease of use* increased in the modified model after removing the insignificant factors. In studies of Bertrand & Bouchard (2008), Han, Mustonen, Seppanen, & Kallio (2005) and Chismar et. al. (2003) the perceived ease of use was determined as insignificant factor. However in this research the significance between perceived ease of use and behavioral intention is proved. It is observably seen that the significance between perceived ease of use and perceived usefulness is very high which also proves the hypothesis H2b. As Venkatesh (2002) supposes, the perceived ease of use directly affects the perceived usefulness since the easiness of the system increases the

efficiency thereby the usefulness of the system. *Job relevancy* and *result demonstrability* has also strong effects on explaining the intention of the users in using the technology. This situation shows that users are much more related with the effective results which are given by the system. Chismar et. al. (2002) also proposed that out of 5 external factors "job relevance, result demonstrability, social norms, output quality and image" only the "job relevance and result demonstrability" has significant effects on behavioral intention. *End user support* and *anxiety* are remaining significant factors in the modified model. Users feel more comfortable while using the Hospital Management Systems when there is a support to the system within the users. So the en*d user support* factor is significant according to the results of the analysis. In addition to *end user support*, *anxiety* has significant effect to behavioral intention. Compeau et al. (1999) proposed that *anxiety* has not been a significant on *behavioral intention*. All of the questionnaire items of *Anxiety* factor in Compeaus' survey are also used in this study. However in this study the significance between *anxiety* and *behavioral intention* is supported. This difference can be resulted from the cultural differences or the sample types of the surveys. Moreover *anxiety* has a negative effect which explains that anxious users are more reluctant to use the information technology. According to Şenkal (2010) the *Anxiety* factor is one of the most significant factor in technology acceptance. Şenkal's study shows that the private hospitals in Turkey give importance to the *perceived usefulness* and *perceived ease of use*. In this study the variance of the *behavioral intention* is 66% which is also high compared to the literature. In this survey the sample type included the government and research hospitals.

## 5.2 Conclusion

Technology acceptance model has been tested and accepted successfully in many studies. In these studies relations between the certain factors are found to be significant with reliable statistics. In deed there are conflicts between some studies which lead the model to be developed. So in this research 15 factors are included in the research model of technology acceptance in order to improve the TAM. Out of 18

hypotheses 7 hypotheses are proved and others were rejected. The details of the measurement and structural analysis are given in 4th chapter. In this study 12 external factors are added to the main TAM of Davis. Davis technology acceptance model consists of only 3 factors which of them are perceived usefulness, perceived ease of use and behavioral intention. In order to prove the goodness of the model with compared to the original TAM both models are analyzed in the study. The extended technology acceptance model explained the intention with $R^2$ %54 while the original TAM has lower $R^2$ %45. This analysis proved that the modified model in this research would be more meaningful in expressing the intention of the users while using the technology in Hospital Management & Information Systems.

### 5.3 Limitations and Future research

Improving the research model it is seen that 7 factors which are rejected because of invalid results while analyzing the model. This may be caused by the translation of the survey questions into Turkish. The translation mistakes can lead the users to misunderstand the question. The questions such as "Navigation is easy in (HIS), (HIS) is flexible to use/interact with, I expect I that will use (HIS), (HIS) has availability of technical assistance, People who influence my behavior think that I should use the system" can be misunderstood by the participants of the survey. Explanations of the questions may not be clear when translating them in to Turkish. Moreover the amount of the questions in the survey is very large compared with the surveys in literature. So while performing 82 questioned survey the users may lose their concentration. Besides, since the working environment is hospitals the survey performing conditions enforced the users. The users may lose concentration in a case of an emergency patient situation or hospital routines. In this study the quantitative and qualitative research methods are used. Since the quantitative research took 3 months time to gather the survey results and the work load of the doctors and personnel was too heavy the qualitative research is done in small period of time such as 1 week. In qualitative research the doctors in hospital are interviewed about the

survey items whereas in quantitative research the questionnaire is performed in hospitals.

While preparing a study in health domain with TAM, the external factors and social conditions are important for efficient results. The studies about health domain show that the progress in the Information System of an organization should be well observed. There are certain keystones which each element of TAM could reflect different variances, in each processes of IS. This final model of technology acceptance can also be researched in other technology domains. A modified version of TAM is also studied by Nurcan Alkış (2010). Nurcan (2010) proposed that the modified TAM which includes "Computer Attitude and Anxiety" factors have the variance of 0,59 in education domain. The social and cultural effect should not be underestimated while predicting the acceptance of technology by people. In future studies it can be noted that a world-wide analyze would be more effective in finding the most correct results about the effect of factors to user intention in TAM. Most of the studies relates with the hospital users and the interaction between those users and the Hospital Management Systems. Therefore the future studies can focus on both hospital management system users and patients who can also be able to use the system by him/her.

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# APPENDICES

## APPENDIX A: QUESTIONNAIRE (ENGLISH VERSION)

### HOSPITAL MANAGEMENT & INFORMATION SYSTEM TECHNOLOGY ACCEPTANCE MODEL QUESTIONNAIRE

***Purpose***: The purpose of this questionnaire is to measure perceived usefulness, perceived ease of use and intention to use the Hospital Management & Information System (SARUS). The factors; facilitating conditions, job relevance, end user support, result demonstrability, end user support, financial cost, training, voluntariness, anxiety and self efficiency will also be measured if those effect perceived usefulness, perceived ease of use and intention to use in Hospital Management & Information System.

Please fill out the following. The questionnaire will take about 5 minutes. Your comments will help us to design further improvements so your comments are very important. You can send your questions and advices about the research by e-mail or write down at the end of the questionnaire. Thank you in advance for your time.

Researcher: Can PEKER
Position: Software Developer
Telephone: 0(312) 265 04 03
E-mail: can.peker@mail.ees.com.tr

**Personal Information:**
The questions below are prepared for the determination of the personnel information about age, gender, education, employment period, profession and computer usage. Please check (☑) in the parenthesis for appropriate choices and fill out personal information.

1. Age: _____

2. Gender: Male ( ) Female ( )

3. Education: High School ( ) Under Graduate ( ) Graduate ( ) Master ( ) PhD ( )

4. Employment Year: Year of Start: ___/___/_____

5. Profession: Doctor ( ) Nurse ( ) Technician ( ) Administrator ( ) Other ( )
_____ Please fill out if you choose other

6. How many hours per week do you use computer?
Never ( ) Less than 1 hour ( ) 1-2 hours a week ( )
2-4 hours a week ( )
4-6 hours a week ( ) 6-8 hours a week ( ) More than 8 hours ( )

7. How frequent do you use HIS?

Never ( ) Once a day ( ) More than once a day ( )
2 times a day ( ) 2-3 times a week ( ) Once a week ( )

**The Opinions and Intension to use the Hospital Management System:**

The questions below are prepared for the determination of perceived usefulness, perceived ease of use and intention to use the Hospital Management & Information System (SARUS). The Answers are **1- Totally Agree, 2- Agree, 3- Indecisive, 4 Disagree, 5- Totally disagree**

Please check (☑) the response that closest fits your opinion:

| | Totally Agree | Agree | Indecisive | Disagree | Totally Disagree |
|---|---|---|---|---|---|
| Perceived Usefulness | | | | | |
| Using (HIS) improves the quality of the work I do | | | | | |
| Using (HIS) gives me greater control over my work | | | | | |
| HIS enables me to accomplish tasks more quickly | | | | | |
| HIS supports critical aspects of my job | | | | | |
| Using (HIS) increases my productivity | | | | | |
| Using (HIS) increase my job performance | | | | | |
| Using (HIS) allows me to accomplish more work than would otherwise be possible | | | | | |
| Using (HIS) enhances my effectiveness on the job | | | | | |
| Using (HIS) makes it easier to do my job | | | | | |
| (HIS) Enables decisions based on better evidence | | | | | |
| (HIS) Allows tasks to be done more accurately | | | | | |
| (HIS) Increases chance of getting a raise | | | | | |
| (HIS) Improves patient care and management | | | | | |
| Overall, I find the (HIS) useful in my job | | | | | |
| Perceived ease of use | | | | | |
| Learning to operate (HIS) is easy for me | | | | | |
| Interacting with the (HIS) is often frustrating | | | | | |
| I find it easy to get the (HIS) to do what I want to do | | | | | |
| It is easy for me to remember how to perform tasks using the (HIS) | | | | | |
| Interacting with the (HIS) does not require a lot of mental effort | | | | | |
| My interaction with the (HIS) is clear and understandable | | | | | |
| It is easy for me to become a skilful user of (HIS) | | | | | |
| (HIS) Does not demand much care and attention | | | | | |
| Navigation is easy in (HIS) | | | | | |
| (HIS) is flexible to use/interact with | | | | | |
| Overall, I find the (HIS) easy to use | | | | | |
| Behavioral intention | | | | | |
| I am able to use (HIS) for patient care and management | | | | | |
| Given the opportunity, I would like to use (HIS). | | | | | |
| I intend to use (HIS) in my work. | | | | | |
| I would prefer using (HIS) for recording observations rather than using a paper form at the end of an examination | | | | | |
| I expect I that will use (HIS). | | | | | |
| End User Support | | | | | |
| I would be more likely to use an (HIS) that I, or a member of my profession, had been | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| consulted about | | | | | |
| Having a hospital representative participate in the development of the (HIS) will make me more likely to agree to use (HIS) | | | | | |
| I would like to use (HIS) with assistance of someone who used the system before. | | | | | |
| Facilitating conditions | | | | | |
| (HIS) have necessary resources to use system | | | | | |
| (HIS) is compatibility with other systems | | | | | |
| (HIS) has availability of technical assistance<br>A specific person (or group) is available for assistance with (HIS) difficulties | | | | | |
| (HIS) have knowledge to use system | | | | | |
| Voluntariness | | | | | |
| My use of (HIS) is voluntary. | | | | | |
| My supervisor does not require me to use the system | | | | | |
| Although it might be helpful, using (HIS) is certainly not compulsory in my job. | | | | | |
| Job Relevance | | | | | |
| Usage of (HIS) is relevant to the delivery of pediatric care | | | | | |
| Usage of (HIS) is important to the delivery of pediatric care | | | | | |
| Result Demonstrability | | | | | |
| The results of using (HIS) will be apparent to me | | | | | |
| I would have difficulty explaining why using (HIS) may or may not be beneficial. | | | | | |
| I believe I could communicate to others the consequences of using the system. | | | | | |
| (HIS) could reduce the cost of my care delivery | | | | | |
| Training | | | | | |
| My skills learned from (HIS) are helpful in learning how to use (HIS). | | | | | |
| I can apply the skills I learned from (HIS) to the use of. | | | | | |
| Specialized programs or consultant about training are available to me. | | | | | |
| Specialized instruction and education concerning software about (HIS) is available to me. | | | | | |
| The knowledge I learned from (HIS) enables me to spend less time to learn. | | | | | |
| Self Efficacy | | | | | |
| I could complete the job using (HIS) if there was no one around to tell me what to do as I go. | | | | | |
| I could complete the job using (HIS) if I had used similar system before this one to do the same job. | | | | | |
| I expect to become proficient in using (HIS) . | | | | | |
| I would feel confident that I can use (HIS) . | | | | | |
| I will be able to complete a task using (HIS) if I could call someone for help if I got stuck. | | | | | |
| Financial Cost | | | | | |
| My willingness to use an (HIS) will depend on the perceived personal cost (time or money). | | | | | |
| I think the equipments required to deploy electronic logistics information system is expensive. | | | | | |
| I think it costs a lot to learn electronic logistics information system. | | | | | |
| (HIS) is not expensive taking into account its contributions to hospital. | | | | | |
| Anxiety | | | | | |
| I feel apprehensive about using (HIS) | | | | | |
| It scares me to think that I could cause (HIS) to destroy a large amount of information by hitting the wrong key | | | | | |
| I hesitate to use (HIS) for fear of making mistakes that I cannot correct | | | | | |
| (HIS) are somewhat intimidating to me | | | | | |
| Culture | | | | | |
| There are some jobs in which a man can always do better than a woman | | | | | |
| It is more important for men to have a professional career than it is for women to have a professional career | | | | | |
| Being accepted as a member of a group is more important than having autonomy and independence | | | | | |
| Employees should not question their manager's decisions | | | | | |
| Rules and regulations are important because they inform workers what the organization expects of them | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Social Norm | | | | | |
| People who influence my behavior think that I should use the system | | | | | |
| People who are important to me think that I should use the system | | | | | |
| My colleagues will encourage me to use (HIS) | | | | | |
| My manager influences my intention to use (HIS) | | | | | |
| Trust | | | | | |
| I feel assured that legal and technological structures adequately protect me from problems on (HIS) | | | | | |
| I would feel comfortable using (HIS) | | | | | |

*COMMENTS about the Questionnaire or Hospital Management and Information Systems:*

Thank you in advance for your time.

# APPENDIX B: QUESTIONNAIRE (TURKISH VERSION)

## HASTANE BİLGİ ve YÖNETİM SİSTEMİ
## TEKNOLOJİ KABUL MODELİ ANKETİ

***Amaç***: Bu anket, Hastane Yönetim ve Bilgi Sistemlerinde kullanıcıların algılanan kullanım kolaylığı, algılanan yararlılık ve tutumlarını ölçme amacıyla oluşturulmuştur. Ayrıca Son Kullanıcı Desteği, Kolaylaştırıcı Koşullar, Gönüllülük, İş Anlamlılık, Sonuç Gösterilebilirliği, Eğitim, Kişisel Etkinlik, Maliyet ve Endişe etmenlerinin Hastane Bilgi ve Yönetim Sisteminde algılanan kullanım kolaylığı, algılanan yararlılık ve niyete karşı olan etkileri ölçülecektir.

Lütfen aşağıdaki bilgileri kendi düşünceleriniz doğrultusunda doldurunuz. Anket yaklaşık olarak 5 dakika sürecektir. Yorumlarınız daha iyi geliştirmeler yapmamıza yardımcı olacaktır. Araştırma hakkında soru ve önerilerinizi e-posta ile ya da anketin sonundaki yorum bölümüne yazarak iletebilirsiniz. Zaman ayırdığınız için teşekkür ederim.

Araştırmacı: Can PEKER
Unvan: Yazılım Uzmanı
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**Kişisel Bilgiler:**
Aşağıdaki sorular yaş, cinsiyet, eğitim, çalışma süresi, meslek ve bilgisayar kullanımı gibi kişisel özelliklerin Teknoloji Kabul Modeline olan etkisini ölçmek için oluşturulmuştur. Lütfen her bir soru için size en uygun gelen cevabı parantezler içerisine (☑) ile işaretleyiniz.

3. Yaş: _____

4. Cinsiyet: Erkek ( ) Kadın ( )

3. Eğitim: İlköğretim ( ) Lise ( ) Üniversite ( )
Yüksek Lisans ( ) Doktora ( )

4. Hizmet Süreniz: ____ Yıl _____Ay

5. Meslek: Doktor ( ) Hemşire ( ) Teknisyen ( ) Yönetici ( ) Diğer ( )
_____

Diğeri seçtiyseniz lütfen mesleğinizi belirtiniz

8. Haftada kaç saat bilgisayar kullanıyorsunuz?

Hiç ( ) Haftada Bir Saatten Az ( ) Haftada 1–2 Saat ( )
Haftada 2–4 Saat ( )
Haftada 4–6 Saat ( ) Haftada 6–8 Saat ( ) Haftada 8 Saatten Fazla ( )

9. Hangi sıklıkta Hastane Yönetim Sistemi uygulamasını kullanıyorsunuz?

Hiç ( ) Her gün Bir Defa ( ) Her gün Birkaç Kez ( )
Gün Aşırı (İki Günde Bir) ( ) Haftada 2 veya 3 Kez ( )
Haftada 1 Kez ( )

**Hastane Yönetim Sistemi ile ilgili Tutum ve Görüşler:**

Aşağıdaki sorular algılanan kullanım kolaylığı, algılanan yararlılık ve tutumun Hastane Yönetim ve Bilgi Sistemlerinde Teknoloji Kabul Modeline olan etkisini ölçmek için oluşturulmuştur. Cevaplar 1**- Kesinlikle Katılıyorum, 2- Katılıyorum, 3- Kararsızım, 4 Katılmıyorum, 5- Kesinlikle Katılmıyorum** şeklinde verilebilir.

Lütfen her bir soru için size en uygun gelen cevabı (☑) ile işaretleyiniz.

| | KESINLIKLE KATILIYORUM | KATILIYORUM | KARARSIZIM | KATILMIYORUM | KESINLIKLE KATILMIYORUM |
|---|---|---|---|---|---|
| **Algılanan Yararlılık** | | | | | |
| Hastane Bilgi Sistemi yaptığım işin kalitesini arttırır. | | | | | |
| Hastane Bilgi Sistemi işim üzerinde daha fazla kontrol sahibi olmamı sağlar. | | | | | |
| Hastane Bilgi Sistemi işlerimi hızlı bir şekilde tamamlamama yardımcı olur. | | | | | |
| Hastane Bilgi Sistemini işim için önemli unsurları destekler. | | | | | |
| Hastane Bilgi Sistemini kullanmak verimliliğimi arttırır. | | | | | |
| Hastane Bilgi Sistemini kullanmak performansımı arttırır. | | | | | |
| Hastane Bilgi Sistemi geleneksel çalışma yöntemlerine göre daha fazla iş başarmamı sağlar. | | | | | |
| Hastane Bilgi Sistemini kullanmak etkinliğimi arttırır. | | | | | |
| Hastane Bilgi Sistemini kullanarak işlerimi daha kolay yapabiliyorum. | | | | | |
| Hastane Bilgi Sistemi kararlarımı almamda daha doğru veriler sağlar. | | | | | |
| Hastane Bilgi Sistemi görevlerin daha doğru yapılması sağlar. | | | | | |
| Hastane Bilgi Sistemi işimde yükselme şansımı arttırır. | | | | | |
| Hastane Bilgi Sistemi hasta bakımı ve yönetimini geliştirir. | | | | | |
| Genelde, Hastane Bilgi Sistemi yararlıdır.. | | | | | |
| **Algılanan Kullanım Kolaylığı** | | | | | |
| Hastane Bilgi Sistemini kullanmak kolaydır. | | | | | |
| Hastane Bilgi Sistemi ile etkileşim kurmak genellikle sıkıcıdır. | | | | | |
| Hastane Bilgi Sisteminde işlerimi kolaylıkla yapabilirim. | | | | | |
| Hastane Bilgi Sistemini kullanarak görevlerimi nasıl gerçekleştireceğimi hatırlamak çok kolaydır. | | | | | |
| Hastane Bilgi Sistemi için çok fazla zihinsel çaba harcamam gerekmez. | | | | | |
| Hastane Bilgi Sistemi benim için açık ve anlaşılır bir sistemdir. | | | | | |
| Hastane Bilgi Sistemini kullanmaya geçiş kolay oldu. | | | | | |
| Hastane Bilgi Sistemi çok fazla ilgi ve bakım gerektirmez. | | | | | |
| Hastane Bilgi Sistemi uygulamasında yönlendirme çok kolaydır. | | | | | |
| Hastane Bilgi Sistemi kullanımı ve etkileşimi çok esnektir. | | | | | |
| Genel olarak Hastane Bilgi Sistemi kullanımı kolaydır. | | | | | |
| **Niyet** | | | | | |
| Hastane Bilgi Sistemini hastaların bakımı ve tedavisi ve tüm hizmetlerin yönetimi için kullanabilirim | | | | | |
| Fırsat verilirse Hastane Bilgi Sistemini kullanmak isterim. | | | | | |
| Hastane Bilgi sistemini işimde kullanmak isterim. | | | | | |
| Muayene sonunda hasta kayıtlarını kâğıt formlar yerine Hastane Bilgi Sistemine kaydetmeyi tercih ederim. | | | | | |
| Hastane Bilgi Sistemini kullanacağımı umut ediyorum. | | | | | |
| **Son Kullanıcı Desteği** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mesleğimle ilgili bana danışılmış olsaydı, Hastane Bilgi Sistemini kullanmayı daha çok isterdim. | | | | | |
| Hastane Bilgi Sistemi uygulama geliştirme ortamına bir hastane temsilcisinin katılmış olması, Hastane Bilgi Sistemini daha rahat kullanmamı sağlardı. | | | | | |
| Daha önce Hastane Bilgi Sistemi kullanmış birinden yardım alarak sisteme geçiş yapmak isterdim. | | | | | |
| Kolaylaştırıcı Koşullar | | | | | |
| Hastane Bilgi Sistemini kullanmak için gerekli kaynaklara sahibim. | | | | | |
| Hastane Bilgi Sistemi diğer sistemlerle uyumludur. | | | | | |
| Hastane Bilgi Sistemi teknik desteği vardır. | | | | | |
| Hastane Bilgi Sistemini kullanmak için gerekli bilgiye sahibim. | | | | | |
| Gönüllülük | | | | | |
| Hastane Bilgi Sistemini gönüllü olarak kullanıyorum. | | | | | |
| Yöneticim Hastane Bilgi Sistemini kullanmama ihtiyaç duymuyor. | | | | | |
| Yardımcı olmasına rağmen Hastane Bilgi Sistemi kesin olarak zorunlu değil. | | | | | |
| İş Anlamlılık | | | | | |
| Hastane Bilgi Sisteminin kullanımı hasta bakımı hizmeti ile ilgilidir. | | | | | |
| Hastane Bilgi Sisteminin kullanımı hasta bakımı hizmeti için önemlidir. | | | | | |
| Sonuç Gösterilebilirliği | | | | | |
| Hastan Bilgi Sistemi kullanımının sonuçlarını görebiliyorum. | | | | | |
| Hastane Bilgi Sisteminin yararlılığını açıklamada zorluk çekiyorum . | | | | | |
| Diğer çalışanlar ile Hastane Bilgi Sistemi kullanımının sonuçlarını konuşabileceğime inanıyorum. | | | | | |
| Hastane Bilgi Sistemi hasta bakımı maliyetini düşürmektedir. | | | | | |
| Eğitim | | | | | |
| Hastane Bilgi Sistemi geçmiş tecrübelerim yeni Hastane Bilgi Sistemini kullanmama yardımcı oldu. | | | | | |
| Geçmiş tecrübelerimi Hastane Bilgi Sistemini kullanmakta uygulayabilirim. | | | | | |
| Hastane Bilgi Sistemi eğitimini verecek uzmanlar ve danışmanlar vardır. | | | | | |
| Hastane Bilgi Sistemi eğitimi için sistem içinde uygulamalar vardır. | | | | | |
| Hastane Bilgi Sistemi eğitimlerinde aldığım bilgi sistemi daha çabuk öğrenmemi sağlar. | | | | | |
| Kişisel Etkinlik | | | | | |
| Adım adım ne yapacağımı söyleyecek biri olmadan da kullanabiliyorum. | | | | | |
| Hastane Bilgi Sistemindeki işimi daha önce hiç benzer bir yazılım kullanmamış olsam da kullanabilirdim. | | | | | |
| Hastane Bilgi Sistemi kullanma konusunda uzman olacağımı düşünüyorum. | | | | | |
| Hastane Bilgi Sistemini kullanabileceğim konusunda kendime güvenim var. | | | | | |
| Hastane Bilgi Sisteminde işimi yaparken nadiren kritik fonksiyonların kullanımında yardımcı olacak biri olsa yeter. | | | | | |
| Maliyet | | | | | |
| Hastane Bilgi Sistemini kullanma isteğim harcanan zaman ve paraya bağlıdır. | | | | | |
| Hastane Bilgi Sistemini kullanmak için gerekli olan tüm donanım ve ekipmanların pahalı olduğunu düşünüyorum. | | | | | |
| Hastane Bilgi Sistemini öğrenmek çok maliyetlidir. | | | | | |
| Hastane Bilgi Sistemi, kazandırdıklarını açısından değerlendirildiğinde pahalı değildir. | | | | | |
| Endişe | | | | | |
| Hastane Bilgi Sistemi kullanma konusunda endişeliyim. | | | | | |
| Hastane Bilgi Sistemini kullanırken yanlış bir tuşa basarak çok fazla veriyi kaybetmek beni çok endişelendiriyor. | | | | | |
| Düzeltemeyeceğim hatalar yapmaktan korktuğum için Hastane Bilgi Sistemini kullanırken tereddüt ediyorum. | | | | | |
| Hastane Bilgi Sistemi bana korkutucu geliyor. | | | | | |
| Kültür | | | | | |
| Hastane Bilgi Sisteminde erkeklerin kadınlardan daha iyi yapabildiği işler | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| vardır. | | | | | |
| Erkekler için profesyonel kariyere sahip olmak kadınlar için profesyonel kariyere sahip olmaktan daha önemlidir. | | | | | |
| Bir grubun üyesi olarak kabul edilmek bireysel özgürlükten daha önemlidir. | | | | | |
| Çalışanlar yöneticilerin kararlarını sorgulamamalıdır. | | | | | |
| Kurallar ve düzenlemeler, hastanenin çalışanlardan beklentisini açıkladığı için önemlidir. | | | | | |
| Kişisel Norm | | | | | |
| Davranışlarım üzerinde etkisi olan arkadaşlarım Hastane Bilgi Sistemini kullanmam gerektiğini düşünüyor. | | | | | |
| Hastanede benim için önem arzaden kişiler Hastane Bilgi Sistemini kullanmam gerektiğini düşünüyor. | | | | | |
| Çalışma arkadaşlarım Hastane Bilgi Sistemini kullanmamda bana destek veriyor. | | | | | |
| Yöneticim Hastane Bilgi Sistemini kullanmaya karşı olan niyetimi etkiliyor. | | | | | |
| Güven | | | | | |
| Hastane Bilgi Sisteminde oluşan hatalardan yasal olarak etkilenmeyeceğim için kendimi güvende hissediyorum. | | | | | |
| Hastane Bilgi Sistemini kullanırken kendimi rahat hissediyorum. | | | | | |

*Anket ve Hastane Yönetim Bilgi Sistemleri hakkında Yorum ve Düşünceleriniz:*

Zaman ayırdığınız için teşekkür ederim.

# APPENDIX C: RESULTS OF THE MEASUREMENT MODEL (SPSS 17.0 STATISTICAL RESULTS)

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation | Variance | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| PU1 | 270 | 1,00 | 5,00 | 1,6407 | ,79063 | ,625 | 1,733 | ,148 | 4,564 | ,295 |
| PU2 | 270 | 1,00 | 5,00 | 1,8259 | ,86832 | ,754 | 1,684 | ,148 | 3,913 | ,295 |
| PU3 | 270 | ,00 | 5,00 | 1,9259 | 1,01021 | 1,021 | 1,283 | ,148 | 1,739 | ,295 |
| PU4 | 270 | ,00 | 5,00 | 1,8444 | ,86111 | ,742 | 1,185 | ,148 | 1,962 | ,295 |
| PU5 | 270 | ,00 | 5,00 | 1,7000 | ,87233 | ,761 | 1,436 | ,148 | 2,570 | ,295 |
| PU6 | 270 | 1,00 | 5,00 | 1,8222 | ,92762 | ,860 | 1,487 | ,148 | 2,579 | ,295 |
| PU7 | 270 | 1,00 | 5,00 | 1,7926 | ,90102 | ,812 | 1,466 | ,148 | 2,518 | ,295 |
| PU8 | 269 | 1,00 | 5,00 | 1,9480 | ,90865 | ,826 | 1,095 | ,149 | 1,332 | ,296 |
| PU9 | 270 | 1,00 | 5,00 | 2,0185 | ,95026 | ,903 | 1,115 | ,148 | 1,365 | ,295 |
| PU10 | 270 | 1,00 | 5,00 | 2,1037 | 1,04026 | 1,082 | 1,168 | ,148 | 1,087 | ,295 |
| PU11 | 270 | 1,00 | 5,00 | 1,6963 | ,83843 | ,703 | 1,766 | ,148 | 4,263 | ,295 |
| PU12 | 270 | ,00 | 5,00 | 2,5593 | 1,24738 | 1,556 | ,385 | ,148 | -,772 | ,295 |
| PU13 | 270 | 1,00 | 5,00 | 2,1926 | 1,04541 | 1,093 | ,925 | ,148 | ,431 | ,295 |
| PU14 | 270 | ,00 | 5,00 | 1,7815 | ,90867 | ,826 | 1,135 | ,148 | 1,101 | ,295 |
| PEU1 | 270 | 1,00 | 5,00 | 1,6259 | ,82529 | ,681 | 1,591 | ,148 | 3,154 | ,295 |
| PEU2 | 269 | 1,00 | 5,00 | 3,9665 | 1,08018 | 1,167 | -1,114 | ,149 | ,590 | ,296 |
| PEU3 | 270 | ,00 | 5,00 | 1,6963 | ,85162 | ,725 | 1,318 | ,148 | 2,355 | ,295 |
| PEU4 | 270 | ,00 | 5,00 | 1,8852 | ,89076 | ,793 | 1,118 | ,148 | 1,368 | ,295 |
| PEU5 | 270 | 1,00 | 5,00 | 1,9444 | ,86262 | ,744 | ,983 | ,148 | 1,131 | ,295 |
| PEU6 | 270 | ,00 | 5,00 | 1,9704 | ,91205 | ,832 | ,947 | ,148 | ,952 | ,295 |
| PEU7 | 268 | ,00 | 5,00 | 2,6978 | 1,10246 | 1,215 | ,435 | ,149 | -,275 | ,297 |
| PEU8 | 270 | 1,00 | 5,00 | 3,2259 | 1,16520 | 1,358 | -,094 | ,148 | -1,000 | ,295 |
| PEU9 | 270 | 1,00 | 5,00 | 1,9889 | ,86003 | ,740 | ,728 | ,148 | ,220 | ,295 |
| PEU10 | 270 | ,00 | 5,00 | 2,3074 | 1,00090 | 1,002 | ,719 | ,148 | ,280 | ,295 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PEU11 | 270 | 1,00 | 5,00 | 2,0037 | 1,03650 | 1,074 | 1,163 | ,148 | ,984 | ,295 |
| BI1 | 270 | ,00 | 5,00 | 1,8963 | ,91069 | ,829 | 1,159 | ,148 | 1,589 | ,295 |
| BI2 | 270 | 1,00 | 5,00 | 1,8889 | ,96146 | ,924 | 1,413 | ,148 | 2,138 | ,295 |
| BI3 | 269 | ,00 | 5,00 | 1,8476 | 1,02351 | 1,048 | 1,319 | ,149 | 1,379 | ,296 |
| BI4 | 270 | ,00 | 5,00 | 1,6704 | ,85721 | ,735 | 1,654 | ,148 | 3,680 | ,295 |
| BI5 | 270 | ,00 | 5,00 | 1,8667 | ,89443 | ,800 | 1,365 | ,148 | 2,597 | ,295 |
| EUS1 | 270 | 1,00 | 5,00 | 2,1000 | ,98747 | ,975 | ,918 | ,148 | ,464 | ,295 |
| EUS2 | 270 | 1,00 | 5,00 | 2,1111 | ,99938 | ,999 | 1,036 | ,148 | ,843 | ,295 |
| EUS3 | 270 | 1,00 | 5,00 | 2,2704 | 1,10971 | 1,231 | 1,093 | ,148 | ,608 | ,295 |
| FC1 | 270 | ,00 | 5,00 | 2,2000 | ,98162 | ,964 | ,825 | ,148 | ,474 | ,295 |
| FC2 | 270 | ,00 | 5,00 | 2,3370 | 1,09465 | 1,198 | ,756 | ,148 | ,209 | ,295 |
| FC3 | 270 | ,00 | 5,00 | 2,1481 | 1,01673 | 1,034 | 1,089 | ,148 | 1,342 | ,295 |
| FC4 | 270 | 1,00 | 5,00 | 1,9444 | ,88391 | ,781 | 1,085 | ,148 | 1,672 | ,295 |
| V1 | 268 | ,00 | 5,00 | 3,3097 | 1,51063 | 2,282 | -,209 | ,149 | -1,470 | ,297 |
| V2 | 269 | ,00 | 5,00 | 4,1152 | 1,08488 | 1,177 | -1,521 | ,149 | 1,968 | ,296 |
| V3 | 270 | 1,00 | 5,00 | 3,7481 | 1,23889 | 1,535 | -,835 | ,148 | -,302 | ,295 |
| JR1 | 270 | 1,00 | 5,00 | 2,0926 | ,97303 | ,947 | 1,033 | ,148 | ,960 | ,295 |
| JR2 | 270 | 1,00 | 5,00 | 1,9704 | ,89560 | ,802 | 1,028 | ,148 | 1,139 | ,295 |
| RD1 | 270 | 1,00 | 5,00 | 2,1148 | ,91546 | ,838 | 1,147 | ,148 | 1,746 | ,295 |
| RD2 | 270 | 1,00 | 5,00 | 3,9074 | ,93801 | ,880 | -1,039 | ,148 | 1,258 | ,295 |
| RD3 | 270 | 1,00 | 5,00 | 2,1333 | ,93507 | ,874 | 1,215 | ,148 | 1,866 | ,295 |
| RD4 | 270 | 1,00 | 5,00 | 2,4111 | ,92742 | ,860 | ,671 | ,148 | ,623 | ,295 |
| T1 | 270 | 1,00 | 5,00 | 2,0630 | ,86211 | ,743 | ,965 | ,148 | 1,251 | ,295 |
| T2 | 270 | 1,00 | 5,00 | 2,0111 | ,80649 | ,650 | 1,094 | ,148 | 2,358 | ,295 |
| T3 | 270 | 1,00 | 5,00 | 2,0519 | 1,01892 | 1,038 | 1,340 | ,148 | 1,724 | ,295 |
| T4 | 270 | 1,00 | 5,00 | 2,0815 | 1,00594 | 1,012 | 1,138 | ,148 | 1,177 | ,295 |
| SE1 | 270 | 1,00 | 5,00 | 2,1222 | ,98872 | ,978 | 1,078 | ,148 | 1,069 | ,295 |
| SE2 | 270 | 1,00 | 5,00 | 2,2778 | 1,04573 | 1,094 | ,878 | ,148 | ,397 | ,295 |
| SE3 | 270 | ,00 | 5,00 | 2,0296 | ,99770 | ,995 | ,732 | ,148 | ,065 | ,295 |
| SE4 | 270 | ,00 | 5,00 | 1,5815 | ,83088 | ,690 | 1,893 | ,148 | 4,998 | ,295 |
| SE5 | 270 | ,00 | 5,00 | 2,0074 | ,93265 | ,870 | 1,176 | ,148 | 1,902 | ,295 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| FNC1 | 270 | ,00 | 5,00 | 2,8296 | 1,30507 | 1,703 | ,218 | ,148 | -,966 | ,295 |
| FNC2 | 268 | 1,00 | 5,00 | 3,0485 | 1,10899 | 1,230 | -,030 | ,149 | -,870 | ,297 |
| FNC3 | 270 | 1,00 | 5,00 | 3,3222 | 1,04360 | 1,089 | -,399 | ,148 | -,637 | ,295 |
| FNC4 | 269 | 1,00 | 5,00 | 2,3383 | 1,01521 | 1,031 | ,727 | ,149 | ,228 | ,296 |
| A1 I | 270 | 1,00 | 5,00 | 4,0704 | 1,11038 | 1,233 | -1,223 | ,148 | ,670 | ,295 |
| A2 | 269 | 1,00 | 5,00 | 3,7286 | 1,33996 | 1,795 | -,684 | ,149 | -,885 | ,296 |
| A3 | 270 | 1,00 | 5,00 | 3,7963 | 1,25220 | 1,568 | -,833 | ,148 | -,425 | ,295 |
| A4 | 270 | ,00 | 5,00 | 4,1296 | 1,07431 | 1,154 | -1,348 | ,148 | 1,518 | ,295 |
| C1 | 270 | ,00 | 5,00 | 3,7630 | 1,43875 | 2,070 | -,815 | ,148 | -,684 | ,295 |
| C2 | 270 | 1,00 | 5,00 | 3,6333 | 1,48186 | 2,196 | -,608 | ,148 | -1,145 | ,295 |
| C3 | 270 | ,00 | 5,00 | 3,1741 | 1,30315 | 1,698 | -,022 | ,148 | -1,095 | ,295 |
| C4 | 270 | 1,00 | 5,00 | 3,7074 | 1,27586 | 1,628 | -,692 | ,148 | -,657 | ,295 |
| C5 | 270 | 1,00 | 5,00 | 2,0037 | ,95434 | ,911 | 1,337 | ,148 | 1,917 | ,295 |
| SN1 | 270 | 1,00 | 5,00 | 2,8741 | 1,24912 | 1,560 | ,287 | ,148 | -1,005 | ,295 |
| SN2 | 270 | ,00 | 5,00 | 2,4148 | 1,12349 | 1,262 | ,761 | ,148 | -,072 | ,295 |
| SN3 | 270 | 1,00 | 5,00 | 2,4444 | 1,10871 | 1,229 | ,636 | ,148 | -,432 | ,295 |
| SN4 | 270 | ,00 | 5,00 | 2,8222 | 1,39231 | 1,939 | ,105 | ,148 | -1,305 | ,295 |
| TRU1 | 270 | 1,00 | 5,00 | 3,3593 | 1,33044 | 1,770 | -,291 | ,148 | -1,136 | ,295 |
| TRU2 | 270 | 1,00 | 5,00 | 1,9741 | ,99220 | ,984 | 1,294 | ,148 | 1,810 | ,295 |
| Valid N (listwise) | 260 | | | | | | | | | |

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 14,450 | 28,899 | 28,899 | 10,821 | 21,642 | 21,642 | 6,082 | 12,164 | 12,164 |
| 2 | 2,971 | 5,941 | 34,840 | 4,658 | 9,317 | 30,958 | 3,358 | 6,716 | 18,880 |
| 3 | 2,569 | 5,138 | 39,978 | 1,778 | 3,556 | 34,514 | 2,586 | 5,173 | 24,053 |
| 4 | 2,110 | 4,219 | 44,198 | 2,206 | 4,413 | 38,927 | 2,525 | 5,050 | 29,104 |
| 5 | 1,887 | 3,775 | 47,972 | 1,922 | 3,845 | 42,772 | 2,322 | 4,645 | 33,748 |
| 6 | 1,796 | 3,591 | 51,564 | 1,647 | 3,295 | 46,067 | 2,242 | 4,485 | 38,233 |
| 7 | 1,739 | 3,478 | 55,042 | 1,130 | 2,260 | 48,326 | 1,908 | 3,816 | 42,049 |
| 8 | 1,497 | 2,994 | 58,035 | 1,253 | 2,506 | 50,832 | 1,813 | 3,625 | 45,674 |
| 9 | 1,478 | 2,957 | 60,992 | 1,081 | 2,163 | 52,995 | 1,772 | 3,545 | 49,219 |
| 10 | 1,158 | 2,316 | 63,308 | ,844 | 1,687 | 54,682 | 1,761 | 3,522 | 52,741 |
| 11 | 1,093 | 2,187 | 65,495 | ,748 | 1,496 | 56,178 | 1,573 | 3,145 | 55,886 |
| 12 | 1,001 | 2,002 | 67,497 | ,629 | 1,258 | 57,436 | ,775 | 1,550 | 57,436 |
| 13 | ,955 | 1,910 | 69,407 | | | | | | |
| 14 | ,831 | 1,662 | 71,069 | | | | | | |
| 15 | ,813 | 1,626 | 72,694 | | | | | | |
| 16 | ,772 | 1,544 | 74,238 | | | | | | |
| 17 | ,716 | 1,432 | 75,670 | | | | | | |
| 18 | ,702 | 1,405 | 77,075 | | | | | | |
| 19 | ,671 | 1,341 | 78,416 | | | | | | |
| 20 | ,646 | 1,293 | 79,709 | | | | | | |
| 21 | ,630 | 1,260 | 80,969 | | | | | | |
| 22 | ,587 | 1,174 | 82,143 | | | | | | |
| 23 | ,571 | 1,142 | 83,286 | | | | | | |
| 24 | ,522 | 1,044 | 84,330 | | | | | | |
| 25 | ,516 | 1,032 | 85,362 | | | | | | |
| 26 | ,495 | ,991 | 86,353 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 27 | ,478 | ,957 | 87,310 | | | | | | |
| 28 | ,465 | ,931 | 88,240 | | | | | | |
| 29 | ,444 | ,887 | 89,127 | | | | | | |
| 30 | ,431 | ,862 | 89,990 | | | | | | |
| 31 | ,417 | ,834 | 90,823 | | | | | | |
| 32 | ,392 | ,784 | 91,607 | | | | | | |
| 33 | ,374 | ,749 | 92,356 | | | | | | |
| 34 | ,357 | ,715 | 93,070 | | | | | | |
| 35 | ,339 | ,678 | 93,749 | | | | | | |
| 36 | ,314 | ,627 | 94,376 | | | | | | |
| 37 | ,291 | ,583 | 94,959 | | | | | | |
| 38 | ,268 | ,536 | 95,495 | | | | | | |
| 39 | ,258 | ,517 | 96,011 | | | | | | |
| 40 | ,238 | ,476 | 96,487 | | | | | | |
| 41 | ,227 | ,454 | 96,942 | | | | | | |
| 42 | ,218 | ,436 | 97,378 | | | | | | |
| 43 | ,211 | ,422 | 97,799 | | | | | | |
| 44 | ,203 | ,406 | 98,205 | | | | | | |
| 45 | ,187 | ,373 | 98,578 | | | | | | |
| 46 | ,169 | ,337 | 98,916 | | | | | | |
| 47 | ,164 | ,329 | 99,244 | | | | | | |
| 48 | ,141 | ,283 | 99,527 | | | | | | |
| 49 | ,140 | ,279 | 99,806 | | | | | | |
| 50 | ,097 | ,194 | 100,000 | | | | | | |

**Factor Transformation Matrix**

| Factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ,417 | ,147 | ,135 | ,736 | ,285 | ,179 | ,201 | ,146 | ,156 | ,186 | ,105 | ,013 |
| 2 | ,468 | ,410 | ,240 | -,624 | ,069 | ,196 | ,172 | ,118 | ,154 | ,202 | ,023 | ,120 |
| 3 | ,200 | ,234 | -,293 | ,065 | -,134 | ,111 | -,832 | ,127 | ,263 | -,044 | ,075 | ,031 |
| 4 | -,145 | ,241 | -,757 | -,037 | -,011 | ,007 | ,398 | ,367 | ,062 | -,050 | ,197 | ,089 |
| 5 | ,220 | -,704 | -,130 | -,164 | ,142 | ,468 | -,077 | ,351 | -,189 | ,066 | ,065 | -,011 |
| 6 | ,623 | -,227 | -,394 | -,031 | -,095 | -,391 | ,085 | -,475 | -,069 | ,064 | -,019 | -,003 |
| 7 | ,130 | -,073 | ,112 | -,080 | ,154 | ,034 | ,095 | -,087 | ,303 | -,767 | ,409 | -,265 |
| 8 | ,027 | ,119 | -,219 | ,000 | ,320 | ,314 | ,042 | -,171 | ,055 | -,300 | -,778 | -,085 |
| 9 | -,042 | ,301 | -,105 | ,022 | ,128 | ,426 | -,079 | -,431 | -,616 | -,017 | ,354 | -,021 |
| 10 | -,142 | -,053 | -,048 | -,130 | ,822 | -,339 | -,195 | -,032 | ,033 | ,091 | ,132 | ,319 |
| 11 | -,207 | -,061 | -,139 | -,100 | ,153 | ,145 | ,015 | -,263 | ,396 | ,473 | ,119 | -,645 |
| 12 | -,167 | -,185 | -,035 | ,034 | -,160 | ,358 | ,107 | -,415 | ,454 | ,044 | ,099 | ,617 |

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization.

**Communalities**

| | Initial | Extraction |
|---|---|---|
| PU1 | ,658 | ,633 |
| PU2 | ,561 | ,505 |
| PU3 | ,594 | ,590 |
| PU4 | ,656 | ,610 |
| PU5 | ,664 | ,606 |
| PU6 | ,804 | ,794 |
| PU7 | ,669 | ,619 |
| PU8 | ,603 | ,507 |
| PU9 | ,636 | ,603 |
| PU10 | ,579 | ,448 |
| PU11 | ,635 | ,603 |
| PU13 | ,560 | ,482 |
| PU14 | ,556 | ,517 |
| PEU1 | ,592 | ,599 |
| PEU3 | ,623 | ,607 |
| PEU4 | ,637 | ,563 |
| PEU5 | ,416 | ,383 |
| PEU6 | ,643 | ,676 |
| PEU9 | ,530 | ,535 |
| PEU11 | ,387 | ,333 |
| BI1 | ,634 | ,636 |
| BI2 | ,684 | ,765 |
| BI3 | ,619 | ,602 |
| BI4 | ,491 | ,479 |
| BI5 | ,562 | ,545 |
| EUS1 | ,576 | ,548 |
| EUS2 | ,554 | ,676 |
| EUS3 | ,547 | ,540 |
| FC1 | ,640 | ,667 |
| FC2 | ,568 | ,548 |
| FC3 | ,641 | ,594 |

| | | |
|---|---|---|
| FC4 | ,562 | ,469 |
| JR1 | ,704 | ,828 |
| JR2 | ,716 | ,769 |
| RD1 | ,807 | ,983 |
| RD2 | ,439 | ,339 |
| RD3 | ,744 | ,698 |
| RD4 | ,597 | ,495 |
| T1 | ,596 | ,553 |
| T2 | ,514 | ,470 |
| T3 | ,601 | ,524 |
| T4 | ,575 | ,456 |
| SE4 | ,458 | ,380 |
| A1 | ,563 | ,559 |
| A2 | ,648 | ,742 |
| A3 I | ,606 | ,619 |
| A4 | ,522 | ,505 |
| SN1 | ,512 | ,466 |
| SN2 | ,539 | ,530 |
| SN3 | ,467 | ,522 |

Extraction Method: Maximum Likelihood.