ANALYZING THE ACCEPTANCE OF TECHNOLOGY FOR ELECTRONIC BOOK USERS

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ABSTRACT

ANALYZING THE ACCEPTANCE OF TECHNOLOGY FOR ELECTRONIC BOOK USERS

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An electronic book or an e-book is a digital form of a traditional book. Although the use of e-books has been increasing with the development of technology, the acceptance of this technology may vary. The Technology Acceptance Model (TAM) is used to explain and estimate users' behaviour of technology acceptance. This study is performed to investigate the factors that affect the acceptance of technology for e-books.

A survey study has been designed based on the enhanced TAM factors. Data is obtained from graduate and doctorate students of Business Administration, Electrical and Electronics Engineering and Computer Engineering departments. Data is analyzed with the Analytic Hierarchy Process (AHP) Method to determine the weighted importance of each factor that influence technology acceptance for e-books. Multiple Regression Analysis is applied to determine the overall effect of all the factors. A comparison of the two methods is carried out between these two different groups. The findings of the two methods indicate that, perceived

usefulness and perceived ease of use are the most significant factors that influence attitudes toward using e-books.

Keywords: Decision Analysis, Technology Acceptance Model (TAM), Analytic Hierarchy Process (AHP), Multiple Regression Analysis, Electronic Books (e-books).

ÖZ

TEKNOLOJİ KABULÜNÜN ELEKTRONİK KİTAP KULLANICILARI İÇİN İNCELENMESİ

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Elektronik kitap veya e-kitap geleneksel kitabın dijital bir türüdür. E-kitapların kullanımı teknolojinin gelişmesi ile birlikte artmasına rağmen, bu teknolojinin kabulü değişiklik gösterebilir. Teknoloji Kabul Modeli (TKM) kullanıcıların teknoloji kabul davranışlarını açıklamak ve tahmin etmek için kullanılır. Bu çalışma, e-kitap teknolojisinin kabulünü etkileyen faktörleri araştırmak için yapılmıştır.

Anket çalışması geliştirilmiş TKM faktörlerine göre tasarlanmıştır. Veri; İşletme, Elektrik ve Elektronik Mühendisliği ve Bilgisayar Mühendisliği bölümlerinin yüksek lisans ve doktora öğrencilerinden toplanmıştır. Veri, her bir faktörün e-kitaplar için teknoloji kabul etkisinin ağırlıklı önemini belirlemek için Analitik Hiyerarşi Proses (AHP) Metodu ile analiz edilmiştir. Çoklu Regresyon Analizi Yöntemi tüm faktörlerin genel etkisini belirlemek amacıyla uygulanmıştır. İki yöntemin karşılaştırılması bu farklı iki grup arasında gerçekleştirilmiştir. İki metottan elde edilen bulgular algılanan kullanışlılık ve algılanan kullanım

kolaylığının e-kitap kullanım davranışını etkileyen en önemli faktörler olduğunu belirtmiştir.

Anahtar Kelimeler: Karar Analizi, Teknoloji Kabul Modeli (TKM), Analitik Hiyerarşi Proses (AHP), Çoklu Regresyon Analizi, Elektronik Kitaplar (E-Kitaplar).

To My Family and Friends

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AHP	Analitik Hiyerarşi Proses
AHP	Analytic Hierarchy Process
AK	Algılanan kullanışlılık
AKK	Algılanan kullanım kolaylığı
App	Application
ASU	Actual System Use
ATU	Attitude Towards Using
BA	Business Adminstration
BIU	Behavioural Intention to Use
CE	Computer Engineering
CFA	Confirmatory Factor Analysis
CO	Cost
CI	Consistency Index
CR	Consistency Ratio
C-TAM-TPB	The Combined Model of TAM and TPB
ÇRA	Çoklu Regresyon Analizi
DIT	Diffusion of Innovation Theory
DT	Diffusion Theory
DTPB	The Decomposed TPB Model
EC	Environmental Concerns
ECT	Expectation Confirmation Theory
EEE	Electrical & Electronics Engineering
EV	External Variables
E-book	Electronic Book
E-Kitap	Elektronik Kitap
IDT	Integrated Diffusion Theory
LIS	Library and Information Science Students
METU	Middle East Technical University
MIR	Model of Innovation Resistance

MRA	Multiple Regression Analysis
ODTÜ	Orta Doğu Teknik Üniversitesi
OLS	Ordinary Least Squares
PEU	Perceived Ease of Use
PLS	Partial Least Squares
PR	Perceived Risk
PU	Perceived Usefulness
RI	Random Index
SCT	Self Congruity Theory
SEM	Structural Equational Modeling
SI	Social Influence
TAM	Technology Acceptance Model
TKM	Teknoloji Kabul Modeli
TPB	The Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TTF	Task Technology Fit
UGT	Uses and Gratifications Theory
UTAUT	The Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor

CHAPTER 1

INTRODUCTION

Electronic books (e-books) are defined as digital versions of printed materials that are transferred through mediums (Poon, 2014). Some of those mediums include smart phones, iPads, mobile phones, kindles and tablets. E-books have many functions, including: note taking, highlighting, exploring and searching. Improvements in technology have led to an increase in the use of e-books. The increase is due to easy and instant access of e-books, improved reading experiences and learning efficiencies (Poon, 2014).

Despite these advantages, the adoption of e-books is not universal. The purpose of this study is to determine the factors that influence users' acceptance of technology for e-books. It is important to have a unique product accepted by users and that they continue using those products for a long time. The acceptance of technology is explained by the Technology Acceptance Model (TAM) which describes and forecasts why users accept or reject information systems (Szajna, 1996). It is a well-known model that is good for explaining and determining behaviours towards information technology (Park, 2009).

TAM has been used since the 1980s for the purpose of understanding users' information technology adoption and usage. According to the TAM model, perceived usefulness and perceived ease of use are the main factors influencing information technology adoption. Perceived usefulness is the belief that application use will have a positive effect on performing the task (Davis, 1989; Khosrow-Pour, 2004; Hiraoka, 2009). Perceived ease of use is the belief of how easy the application use is (Davis, 1989; Khosrow-Pour, 2004; Hiraoka, 2009). In addition to these factors, several external variables which may vary based on the users' tendencies also have an impact on information technology acceptance.

In this thesis, perceived usefulness and perceived ease of use are used as main factors that TAM involves. The effects of perceived risk, environmental concerns, social influences and cost factors on information technology adoption are also recognized in the existing literature (Poon, 2014; Lin, Tzeng, Chin & Chang, 2010; Pavlou, 2003; Wu & Wang, 2005; Bansal, 2011; Hwang, 2014; Hsiao, 2013; Chiang & Chia-Chen, 2014). There are some reasons why these factors are selected but not others. Each factor plays an important role and has an influence on consumer's decision making process for purchasing. Perceived risk, which is related to psychological factors, is the level of uncertainty and anxiety consumers feel about purchase decisions. Environmental concerns and social influences are included in personal and environmental uncontrollable factors that are forces effecting consumer's buying behaviours. Content factors, which consist of cost, are also a part of consumer's purchasing process. They have a direct and crucial effect on motivations to buy the product (Constantindes, 2004). Hence, these factors are employed along with the main factors in TAM to make comprehensive analysis in this thesis.

Perceived risk is defined as someone's perception of uncertain and negative results of performing a behaviour. Attitudes are decisions towards risk that are performed in uncertain situations. When a person likes to take risks, he is a risk seeker. However, when a person avoids to take risks, he is a risk averse **(**Rohrmann, 2005; Wu & Wang, 2005; Lin, Tzeng, Chin & Chang, 2010). When performing a behaviour, perceived risk is concerned with the perception of uncertain consequences that are related to operating, privacy and health issues. Perceived risk has a negative impact on information technology usage behaviours (Pavlou, 2003; Lin, Tzeng, Chin & Chang, 2010).

Environmental concerns are the general attitudes toward saving the environment (Hwang, 2014). The concerns influence consumption behaviours in such a manner that positive environmental behaviours lead to positive and attentive behaviours (Hwang, 2014).

Social influence is how important others have an effect on using the information system. It has a positive relationship with users' intentions and behaviours (Chiang & Chia-Chen, 2014).

Cost, which refers to price that consumers pay for obtaining a kind of service or product, is related with price issues. Although consumers assert that price has a positive relationship with quality, price generally decreases acceptance of technologies (Wu & Wang, 2005; Chiang & Chia-Chen, 2014; Au & Kauffman, 2003; Ittersum et al., 2006). These factors are taken into consideration when determining the regression model and they are analyzed utilizing MRA.

Perceived usefulness, perceived ease of use, perceived risk, environmental concerns, social influences and cost are the main factors of this study that influence acceptance of technology for e-books. There are also sublevel factors which are identified from the literature and explained in detail in the following chapters. Perceived usefulness is comprised of sublevel factors that are: conciseness, clarity, visual design, musicality, business content and personal content. Perceived ease of use consists of interface, ergonomics, portability, installation ability, navigation and capability to read online or offline. Both sublevel and main factors are analyzed with the Analytic Hierarchy Process (AHP) Method.

After determining the factors of the enhanced TAM, data is collected from graduate and doctorate students of Business Administration, Electrical & Electronics Engineering and Computer Engineering departments. Questionnaires are prepared to obtain the data from 150 students of Middle East Technical University (METU).

Analytic Hierarchy Process (AHP) Method (Saaty, 1980; Saaty, 1983) is a multiple criteria decision-making tool used in various decision applications to acquire the weighted importance of the factors and to observe the overall influence of the factors on TAM. It is easy, straightforward, stable, flexible and convenient method for decision makers to understand due to its hierarchical structure. AHP, which is used in common sense decision making, consists of sensitivity analysis that makes problems more realistic (Vaidya & Kumar, 2006). Multiple Regression Analysis (MRA) is also applied to understand the effects of main factors of the model. The comparison of the two methods are made in order to understand if both of the results are consistent.

The comparison of the two groups is also performed to observe the impact of each factor on attitudes toward using e-books. The first group consists of graduates of the Business Administration department. The second group includes Electrical & Electronics Engineering and Computer Engineering department graduates.

This study is significant because an understanding of the factors that positively influence consumers use of e-books improves how technology is developed. This information may help or guide technology development strategy to improve consumer satisfaction and purchase of e-books. There is continuous improvement of technology that leads to changes in e-books. For a product not to vanish, it has to keep up with the new improvements by updating continuously. Only updating will not be enough, this technology also has to be accepted by the consumers for a long time. This can be achieved by understanding what the consumer wants from the product and investigating the factors that affect product adoption process.

Some parts of this study are based on a previous study of Phan and Daim (2011) the aim of which was to identify the factors that effect acceptance of mobile services. In this study, the adoption of e-books is analyzed rather than mobile services. In both of the studies, TAM and the relevant literature are used to identify the factors. Factors of perceived usefulness, perceived ease of use, technology, social factors and habits were used in Phan and Daim's study. Perceived usefulness, perceived ease of use, perceived risk, environmental concerns, social influences and cost are included in this thesis. AHP and Cluster Analysis were applied by Phan and Daim (2011) to identify the factors that influence the acceptance of mobile services. As a novelty, AHP and MRA are used for testing the data in this study.

The main contributions of this study are as follows. Several new factors, which are perceived risk, environmental concerns, social influence and cost, are employed along with the main factors of TAM. Thus, TAM is enhanced with the described factors. AHP and MRA are used to test the impacts of the factors on e-book adoption, to compare the results of different methodologies and to see if the results of both techniques are coherent.

The limitations of the study are as follows. The study is conducted with 150 graduate students from Middle East Technical University (METU) that are from the Business Administration, Electrical & Electronics Engineering and Computer Engineering departments. It is restricted to graduate and doctorate students of different departments. The analysis is performed to investigate several factors affecting e-book adoption. AHP and MRA Methods are used for the purpose of this study.

The organization of the paper is as follows: Chapter 2 involves the literature review. Chapter 3 discusses hypotheses development and conceptual model. Chapter 4 includes data and methodology. Chapter 5 provides details about data analyses and results. Chapter 6 includes analyses of group differences. Finally, discussion and conclusion are presented in Chapter 7.

CHAPTER 2

LITERATURE REVIEW

The important studies that are relevant to the TAM and e-books are searched within the existing literature and substantial points are emphasized in the following sections. It is observed that contribution of the studies in the literature are either about factors that affect TAM or improvements to basic TAM with models, methods or theories. This section consists of TAM, factors affecting TAM, improvements to basic TAM and e-books.

2.1. Technology Acceptance Model

First of all, the main factors, namely perceived usefulness and perceived ease of use, are determined based on Technology Acceptance Model (TAM). TAM is a well-known model that is perfect for explaining and determining behaviours of information technology (Park, 2009). There are various studies benefiting from TAM. It is widely accepted model and advanced to carry out two objectives. Those objectives are as follows: it is designed to find out the technology acceptance of the users among different courses of actions by preparing new ways for the design and application of information systems; and, it enables testing of the user acceptance method before putting the new systems into use (Davis, 1985). Before constructing TAM that is proposed by Davis (1985), a conceptual model is formed to suggest that motivation is a tool for explaining system use and stimulus has an impact on this usage. This model is shown in Figure 1.

According to Davis (1989), the Technology Acceptance Model (TAM) is "an adaptation of Theory of Reasoned Action (TRA) specifically tailored for modelling user acceptance of information systems". The Conceptual Model is redefined by relying on previous research of Fishbein and Ajzen (1975) that is related to the TRA. According to TRA, a person's actual behaviour can be determined from previous behavioural intention and belief for that behaviour. Behavioural intention can be

explained by two factors: attitudes toward behaviour and subjective norm. Attitudes toward behaviour, which are the feelings about carrying out a behaviour, can be determined from the sum of the product of all salient beliefs about outcomes of an action and evaluation of the outcomes. Subjective norm is measured by summing the product of a person's normative beliefs and his motivation to comply (Chuttur, 2009; Fishbein & Ajzen, 1975).

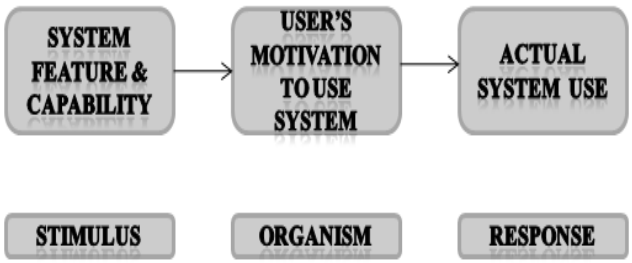

Figure 1: Conceptual Model for Technology Acceptance (Davis, 1985).

The redefined model, which is proposed by Davis, states that actual system use can be explained by several factors that are perceived ease of use, perceived usefulness and attitude towards using. Attitude of a user toward a system helps to understand whether user accepts or rejects the system. It is claimed that perceived ease of use and perceived usefulness have a direct effect on attitude towards using.

Combination of the redesigned conceptual model with some other previous related works, which includes other variables, proposed the original Technology Acceptance Model. TAM focuses on mainly two factors which are perceived ease of use and perceived usefulness. Those factors help to understand the attitude towards using a new technology (Davis, 1985; Davis, 1989; King & He, 2006; Chuttur, 2009).

TAM is not only used to explain the acceptance of technology but also it has been widely accepted as a universal model. Because it is a universal model, its concepts can be generalized (Davis et al., 1989; Phan & Daim, 2011). The TAM consists of 6 concepts that are shown in Figure 2.

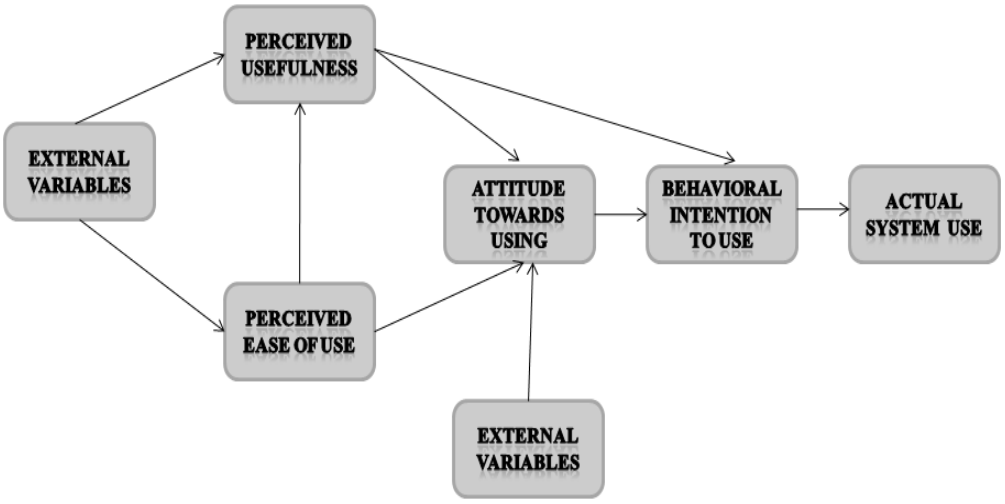

Figure 2: Technology Acceptance Model (Davis et al., 1989).

These concepts can be explained as follows. External Variables (EV) are the factors that influence perceived usefulness (PU), perceived ease of use (PEU) and attitude towards using (ATU) (Phan & Daim, 2011). PU means that a person believes the usage of the application will have a positive impact on doing the job and increase the work performance. It helps to understand and determine directly the attitude towards using a new technology (Davis, 1985; King & He, 2006; Porter & Donthu, 2006; Chuttur, 2009). High level of PU brings about more positive attitudes toward using a technology (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013).

PEU means that a person believes the use of a particular system will be free of effort (Davis, 1989). It is a significant determinant that helps to understand acceptance of information technology and it has a direct effect on attitudes toward adopting a technology (Kim & Hahn, 2012; Porter & Donthu, 2006; Davis, 1985; King & He, 2006; Chuttur, 2009). High level of PEU brings about more positive attitudes toward using a technology (Davis, 1989, Al-Adwan, Al-Adwan & Smedley, 2013).

ATU is explained as eagerness of the usage of the application. This can be either positive or negative. Behavioural intention to use (BIU) is predicted by ATU and PU. It is defined as whether a person has attentive plans to act or not. Actual system use (ASU) is the result of BIU and there is always relationship among PU, PEU and ASU (Venkatesh, 2002; Venkatesh, Morris, Davis & Davis, 2003; Legris, Ingham & Collerette, 2003; Lala, 2014).

TAM is applied in various studies due to its several advantages. It is a specific model for information systems that tries to implement factors of PU and PEU. Furthermore, it is parsimonious and robust because it has a limited number of factors that can be integrated with several other models (Li, Li & Chen, 2011).

2.2. Factors Affecting Technology Acceptance Model

Various studies focus mainly on several factors that influence TAM. The research related to TAM started with investigating PEU and PU factors in order to predict behaviours of people. Shultz and Slevin (1975) found that PU is an important predictor for decision making. Robey (1979) performed the same analyses and confirmed that there is a strong relationship between PU and ATU.

Bandura (1982) showed interest on similar factors and observed that both PEU and PU are influential for understanding behaviours. Davis et al. (1989) performed a longitudinal study the results of which indicated a strong correlation between PU and ATU. However, there is a weak correlation between PEU and PU. The findings supported Bandura's study that both of the factors are found to have a direct influence on ATU.

Lin, Tzeng, Chin and Chang (2010) studied the effects of several new factors besides PU and PEU. They examined how users perceive the influence of recommendations, perceived trust and perceived risk on intention to use e-books. Recommendations were taken from experts, advertising or word of mouth. A survey was conducted on 382 undergraduate and graduate students, who were aged between 18 to 25, from a university of Taiwan. Data was collected through questionnaires and measurement was performed using five point Likert-type scales. Multiple regression analysis were applied and it was understood from the results of the study that word of mouth is the most important factor that affect intention to use e-books. Increased trust and decreased risk also lead to positive relationship between intention and recommendation (Lin, Tzeng, Chin & Chang, 2010).

Letchumanan and Tarmizi (2011) tested different factors by adding gender as an external factor to TAM. This time survey was applied to 169 undergraduate students of Putra Malaysia. Factor Analysis and Structural Equational Modeling (SEM) were used for testing the hypotheses. The results indicated that although perceived

usefulness has a positive impact on intention to use e-books, perceived ease of use and gender do not have a significant effect (Letchumanan & Tarmizi, 2011).

Like Letchumanan and Tarmizi, Jian (2011) tested various additional factors of self-efficacy and product feature to TAM. The results of regression analysis showed that there is a relationship between self-efficacy and usefulness, product feature and intention to use, usefulness and ease of use. However, there is no significant correlation among ease of use, usefulness, product feature and self-efficacy (Jian, 2011).

Not only did Jian analyzed additional factors but also Bansal (2011) tested supplementary factors of environmental conciousness, past usage and personality. Data was collected from Midwestern University students and regression analysis was applied using correlation and square root of AVE. The results of the study implied the explanatory power of the model is 51.7 % . Environmental consciousness has a negative relationship with attitudes toward using e-books, past usage and personality factors have a positive influence on e-book preferences (Bansal, 2011).

On the other hand Phan & Daim (2011) aimed at analyzing different factors that influence acceptance of mobile services. Factors, which are considered in the previous literature, are as follows. Main factor is attitude towards using mobile services. Sublevel factors are ease of use, technology, social factors, usefulness and habits. Ease of use is comprised of sublevel factors that are service quality, simplicity, visual factors, speed and innovativeness. Usefulness consists of sublevel factors that are cost, enjoyment, mobility, content and time efficiency. Factors were harmonized with TAM Model. Quantitative method was used and data was also obtained from questionnaires to find the factor weights. AHP and Cluster Analysis were used to identify factors. The findings of the study indicated that factors of usefulness and ease of use significantly influence mobile service acceptance (Phan & Daim, 2011).

Furthermore, Seet and Goh (2012) examined both perceived affordance and acceptance. Several users were participated in a problem-solving task to learn about the affordances and there were 54 participants in the survey to understand acceptance of affordances that was based on TAM. Data was analyzed using PLS and the results

showed that only collaborative, immediacy, connectivity, support and mobility affordances have a salient impact on user's acceptance (Seet & Goh, 2012).

As researchers concentrate on more to e-books, they try to identify different factors that have not been studied. Different factors such as interest, consumer awareness and intention to use were investigated by Jung, Chan-Olmsted and Kim (2012) in order to understand which ones have more influence on e-book reader diffusion. Those factors were compared with different variables. A survey was performed with personal interviews in a Korean Company. Hierarchical multiple regression analyses were applied for the analyses. Bivariate zero-order correlations were used in testing. It was found that interest, consumer awareness and intention to use have a positive relationship with variables such as age, income, innovativeness, etc. Among those variables, demographics and innovativeness are the most effective factors that help to predict e-book reader diffusion (Jung, Chan-Olmsted & Kim, 2012). Huang and Hsieh (2012) also thought innovativeness as an important factor and they combined innovation attributes and switching costs based on consumer electronics acceptance. The hypotheses in the study suggested that perceived innovative attributes (complexity, compatibility and relative advantage) have a direct effect on behaviour of adoption. Those attributes also affect adoption behaviour with cost of perception that are relational, financial and procedural. Data was obtained from consumers of some retailers in Taiwan using seven-point Likert-type scales. Confirmatory Factor Analysis (CFA) were used in this model. The results of the study showed that complexity is related to switching costs. Although procedural and relational switching costs play an important role in usage of e-book readers, financial switching costs do not have an effect (Huang & Hsieh, 2012).

On the other hand, Yu, Yu and Cheng (2012) concentrated on particular factors and performed an investigation focusing on the question whether digital content and technological convenience have influence on user's motivation of adaptation. TAM was used to explain adaptation and factors faced. The research used single group post-test experimental design and Likert-type questionnaires. As a result of the regression analysis it was observed that the variables satisfaction and convenience have positive impact and related hypothesis can be accepted (Yu, Yu & Cheng, 2012). Different investigators such as Calli, Balcikanli, Calli, Cebeci and Seymen (2013) aimed to observe the effects of some other variables on learning processes of

distance learning programme. 930 students carried out e-learning programmes for the aim to offer a new model and to observe the intention to use by adding some variables. Structural Equational Model (SEM) was used to test the hypotheses. The results showed that some factors have a significant effect on perceived usefulness and satisfaction is also influenced by the same factors which are multimedia content effectiveness, perceived playfulness and usefulness (Calli, Balcikanli, Calli, Cebeci & Seymen, 2013).

Like Calli, Balcikanli, Calli, Cebeci & Seymen, Ho, Lu and Lin (2013) examined various factors to observe the effect of perceived sacrifice, appearance quality and functional quality on perceived value of Application (App) E-book and E-Magazine with SEM. A survey was performed to 294 experienced users. The findings of the study are as follows. Perceived sacrifice and functional quality have a positive influence on perceived value of App e-books and sacrifice, functional quality and appearance quality have a direct effect on perceived value of App e-magazines (Ho, Lu & Lin, 2013).

Researchers' interest on electronic books acceptance has expanded with the increase of the usage of e-book devices due to change in technology. Mustafa, Harun and Endin (2014) investigated the adoption of e-books using TAM and intended to identify the factors of the adoption considering selected e-book items and variation in attitudes. The study was built upon to find the reaction to e-books and the results of those reactions. In order to find the reactions, interaction effect between dependent and independent variables is examined. Various surveys were analyzed to determine the reasons why people use e-books. As a result, findings suggested that user interfaces, query capabilities and functions on comments are the main factors behind adoption, accesibility, enhanced function and convenience. These are mostly selected e-book items and variation in attitudes depends on experiences in usage (Mustafa, Harun & Endin, 2014).

Poon (2014) also investigated e-books and he aimed at inspecting the purpose of college students' usage of e-books in a model consisting of different factors. A novel research model was suggested and hypotheses were formed based on the cross-sectional study that was performed by using TAM including four variables that are environmental consciousness, perceived costs, social influences and personal

innovativeness. Survey was carried out to 200 students of a college who were asked to participate in questionnaires voluntarily. The findings showed that quantitative approach approves the validity of the model and provides ways to figure out behaviours in acceptance of e-books. Partial Least Squares (PLS) method, which is a statistical method related to regression, shows that test results are valid for model (Poon, 2014). Besides, Tsai and Yen (2014) combined original TAM constructs with computer self-efficacy, reading self-efficacy and perceived enjoyment. Questionnaires were distributed to obtain the data and as a result of PLS analysis it was observed that reading self-efficacy has a positive influence and computer self-efficacy has a negative influence on e-book usage (Tsai & Yen, 2014).

Al-Suqri (2014), whose purpose was to extend usage of TAM on e-books in a university, focused on different factor influences. A survey was performed to 332 university members to analyze the influence of language and personal characteristics on perceived usefulness, perceived ease-of-use and acceptance. Descriptive and inferential statistical techniques were used to perfom the data analysis. The results of the study showed that people who have perceived ease of use and male gender use e-books more. The occupations such as engineers, arts and humanities and business are more capable of using e-books than social, life and health sciences (Al-Suqri, 2014).

Furthermore, Williams, Slade and Dwivedi (2014) studied consumers' intentions using e-readers with factors of perceived usefulness, ease of use, subjective norm, cost and image. Data was obtained from 234 consumers and it was analyzed utilizing PLS. Although the results of the study showed that perceived usefulness and subjective norm have a positive impact on use of intention, the effect of ease of use, cost and image could not be confirmed in this study. In line with this, the researchers suggested this study to be further developed to examine the effects of more factors (Williams, Slade & Dwivedi, 2014). Nevertheless, switch intention of users' reading behaviour of e-books was tested by Chiang and Chia-Chen (2014). Testing was performed through product attributes, price, social influence and switch costs. Questionnaires were used to gather data and SEM was used to determine the effects of the factors. The results supported the hypotheses that all the factors have a significant impact on switch intention of users' reading behaviour (Chiang & Chia-Chen, 2014). The methodology and model applied in this study is basically the same as a study that is performed by Carmen, Carmen and Javier (2014). However, the

paper analyzes the effects of different factors of e-books' illegal downloading and acceptance of price that consists of technological and ethical aspects (Carmen, Carmen & Javier, 2014).

All the same, Bergstrom and Hoglund (2014) performed a survey of early adopters of e-book reading in Sweden in order to observe the impact of demographics, frequency of reading and book reading habits. Data was collected with mail survey and tested employing bivariate and multivariate analyses. Results noted that all the factors are used to explain the main changes in e-book reading (Bergstrom & Hoglund, 2014).

Like Bergstrom and Hoglund, Aharony (2015) added several new factors to TAM. The factors are perceived ease of use, perceived usefulness, personal innovativeness and personal characteristics of motivation and cognitive appraisal. Data was collected from 169 librarians and information specialists who live in Israel. The results of SEM indicated that all the factors are main determinants of behavioural intention to use e-books (Aharony, 2015).

2.3. Improvements to Basic Technology Acceptance Model

Some studies concentrate mainly on integration of several models, methods or theories to TAM. Rather than just dealing with TAM, Lai and Chang (2011) extended and combined several theories for the purpose of identifying the factors that lead consumers to use e-book readers. Those models are as follows: TAM, Innovation Diffusion Theory and Media Richness Theory. Quantitative method was used and data was obtained from 288 senior secondary school, university and graduate students using questionnaires. This time Partial Least Squares (PLS) Technique was used to perform the analysis. The results of the study demonstrated that convenience, media richness and compatibility significantly conduce to e-book readers adoption (Lai & Chang, 2011). Apart from Lai and Chang, Dong-Hee (2011) also examined integration of Uses and Gratifications Theory (UGT), Expectation Confirmation Theory (ECT) and Diffusion Theory (DT) among each other. A web-based survey questionnaire was performed and measurements were made using regression analysis. The findings of the proposed model showed that gratification and demographics are significant (Dong-Hee, 2011). Moreover, Brown (2011) also aimed to merge some of the models of TAM, Task Technology Fit (TTF) Model and the Theory of Planned Behaviour (TPB). He looked forward to use real e-book

devices and made a survey based on the experiences of users. Even though his research was not completed in 2011, he planned that his study would enable us to understand how students adopt e-readers and the importance given to each of the factor that is related to e-books (Brown, 2011).

Brown (2012) continued his studies based on the study that he performed in 2011. He merged TAM, TTF and TPB and utilized the factors based on literature review. Data analysis was made examining descriptive statistics. The findings of the study showed that students are not satisfied with e-textbooks in current format. Brown planned another study to investigate the priority given to each construct (Brown, 2012).

As researchers concentrate on more to e-books, they try to identify different theories that have not been studied. Combination of TAM and Integrated Diffusion Theory (IDT) was also carried out by Lai and Ulhas (2012) in order to observe intrinsic and extrinsic factors on e-textbook adoption. Quantitative method was used and data was obtained from 113 undergraduate and graduate students from different universities in Taiwan using questionnaires. As a result of the PLS techique analysis it was seen that perceived usefulness, convenience, perceived enjoyment and compatibility have an apparent influence on e-textbook acceptance (Lai & Ulhas, 2012).

Not only did Lai and Ulhas analyzed additional theories but also Hsiao (2013) proposed a model based on Theory of Reasoned Action (TRA) using the factors that are related to hardware, software, design and perceived value. The factors related to hardware include perceived infrastructure and the ones that are associated with software are perceived content and convenience of interface. Design is related with aesthetics and perceived value is comprised of social value, performance value, price and emotional value. A survey was applied to 881 android smartphone users in Taiwan. PLS method was used to test the hypotheses. The results of the study showed that perceived content has the strongest influence on acceptance of android smartphones and intention to make payment for mobile internet services. Convenience of interface, perceived content and perceived infrastructure have an indirect effect on user attitudes (Hsiao, 2013).

The study, which is performed by Anton, Camarero and Rodriguez (2013), also merges different models and theories that are: TAM and Self Congruity Theory (SCT) frameworks. Utilitarian and hedonic values of e-book devices and their

congruence was investigated. In order to obtain the data, an online survey that is comprised of 5-point Likert scales was presented through different social networks. SEM was used to investigate the purpose of the study. The results of the study showed that perceived usefulness, enjoyment and self-image congruence have a positive impact on e-book purchase. It was also determined that perceived usefulness is the most effective factor and self-image is the most direct factor on attitudes of purchasing e-books (Anton, Camarero & Rodriguez, 2013).

Like Anton, Camarero and Rodriguez, Lee (2013) combined various theories and models. An integrated adoption model for e-books in a mobile environment was completed by Lee (2013). The study combined Diffusion of Innovation Theory (DIT), TAM and Model of Innovation Resistance (MIR). DIT tries to understand how and why new ideas are adopted. According to MIR, factors that influence people's resistances can be determined from software and hardware components. The research tried to understand the relationship among innovativeness, perceived usefulness, perceived ease of use, innovation resistance and behavioural intention. Online survey was carried out and data was analyzed employing SEM. As a result of the study, it was observed that innovativeness has an influence on perceived ease of use and perceived usefulness and perceived ease of use have a positive relationship with usage of e-books. Resistance and risk have a significant influence on user's resistance (Lee, 2013).

Lee (2013) preferred to study an integrated adoption model for e-books in a mobile environment and the investigation of the effect of content on the adoption of mobile e-book readers was studied by Torres, Johnson and Imhonde (2014). A model, which was based on TAM and motivation theory, was improved. 287 undergraduate students of Southwestern University carried out a survey and the survey was analyzed using Partial Least Squares (PLS) technique. The results of the survey confirmed the validity of the hypotheses that perceived playfulness and content availability are important determinants of mobile e-book reader acceptance (Torres, Johnson & Imhonde, 2014).

Even though most studies combined few theories, Jin (2014) merged 4 diversed theories and worked on the adoption of e-books among undergraduate students of economics and business administration of two universities in Korea. The study

integrated the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Diffusion of Innovation Theory (DIT) into TAM. Study differentiates external (compatibility, relative advantage, self-efficacy and subjective norms) and internal (perceived ease of use, perceived usefulness, satisfaction and intention) factors. The hypotheses were tested benefiting from EQS (Structural Equation Manual Program) and it is found that all of the factors are significant determinants of adoption of e-books (Jin, 2014).

Besides, Hsiao and Tang (2014) combined 5 variant models that are different than Jin's (2014). They tried to explain undergraduate students' behavioural intention of e-textbook adoption based on five theoretical models: the Theory of Planned Behaviour (TPB), TAM, the Decomposed TPB Model (DTPB), the Combined Model of TAM and TPB (C-TAM-TPB) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Survey was used to obtain data and SEM was used to analyze the effects of the factors. As a result of the study, UTAUT was suggested to be the best model and factors such as the effects of attitude, subjective norm, perceived behavioural control, perceived ease of use and performance expectancy have a significant influence on acceptance of e-textbook services (Hsiao & Tang, 2014).

Aharony (2014) integrated TAM and Cognitive Appraisal Theory to determine the factors affecting acceptance of e-books for library and information science students (LIS) and information professionals. The intention of e-book usages for two groups was compared. The effects of the factors in TAM and the other factors that are challange, threat and motivation were investigated. Questionnaires were used to obtain data, 7 Point Likert Scales were used for measurement and regression analysis was performed. The findings of the study indicated that in terms of each factor there are significant differences between two groups. Apart from the TAM factors, personal characteristics also influence and determine e-book acceptance (Aharony, 2014).

On the other hand, a novel model comprised of Augmented Reality Technology and TAM was proposed by Huang and Liaw (2014). Experiment was conducted on 75 learners to examine the effect of motivation. Results of the experiments supported the hypotheses that perceived usefulness and perceived ease of use help to understand the learners' motivations (Huang & Liaw, 2014). Nevertheless, Park,

Sung and Cho (2015) aimed to explore the reasons behind intention of using e-books based on integrated TAM. 219 undergraduate and graduate students carried out an online survey. As a result of the regression analysis it was observed that experience, perceived mobility, perceived behavioural control, skill, readability, text satisfaction and perceived usefulness have an important effect on adoption of e-books (Park, Sung & Cho, 2015).

When the research of this thesis is compared to the studies that are mentioned above, there exists some differences. Although some parts of this study depends on a previous research of Phan and Daim (2011), there are some contributions. E-book devices, which may include kindles, tablets or smartphones, are used rather than other devices. AHP and MRA are used to explain the effects of the factors on e-book acceptance or use process and compare the results of different methodologies that are used in this thesis. They are also employed to see if the results of both techniques are consistent. Even if the prior works performed include factors of TAM, this study additionally includes perceived risk, environmental concerns, social influence and cost factors. TAM is improved with the described factors. These factors are chosen because they are significant determinants of consumer's decision making process of purchasing (Constantinides, 2004). This thesis is carried out with graduate students of Business Administration, Electrical & Electronics Engineering and Computer Engineering departments.

2.4. Electronic Books

E-books are defined as electronic versions of traditional printable books or materials that can be transmitted through mediums (Poon, 2014). Currently, e-book markets have enlarged with various types of e-books available (textbook, newspaper, article, reference book, magazine, etc) and with different forms of software and devices (kindles, tablets, smart phones, iPads, etc) (Ashcroft, 2011).

Improvements in technology have given rise to an increase in the availability of different e-book types and featured devices. The diversity of these features have lead to an increase in the use of e-books. Importance and advantages of e-books increase with those improvements. They are as follows. Documents are easy to access and can be downloaded whenever needed. E-books can be read when the user is online or offline and they can be carried everywhere. There is no delivery or shipment costs.

There will also be no use of paper, which is a benefit to the environment. Reading experiences and learning efficiencies will be improved because of easy and fast access of e-books, content relevance and appropriate educational model. The usage of e-books will teach everyone to share because the increase in the use of e-books will improve information sharing habits (Poon, 2014; Sasson, 2016).

CHAPTER 3

CONCEPTUAL MODEL AND HYPOTHESES DEVELOPMENT

3.1. Conceptual Model

Different people prefer different features of e-books and the priority they give to each feature varies. As it is mentioned before, in order to understand the behaviour of e-book acceptance, TAM is applied. TAM is explained in detail in Section 2.1 of Chapter 2.

The conceptual model is proposed and set up by investigating the existing studies in the literature. It satisfies the purpose of the study and its aim is to examine the effect of each factor on technology acception. The conceptual model is shown in Figure 3 below. Acceptance of e-books is determined from attitude towards using (ATU) which is the dependent variable for MRA and goal for AHP. Perceived usefulness (PU), perceived ease of use (PEU), perceived risk (PR), environmental concerns (EC), social influences (SI) and cost (CO) are explanatory factors (main factors) influencing e-books acception through ATU. PU is comprised of sublevel factors that are conciseness, clarity, visual design, musicality, business content and personal content. PEU includes sublevel factors that are interface, ergonomics, portability, installation ability, navigation and capability to read online or offline.

Each construct is defined and presented in the related hypotheses in the following section.

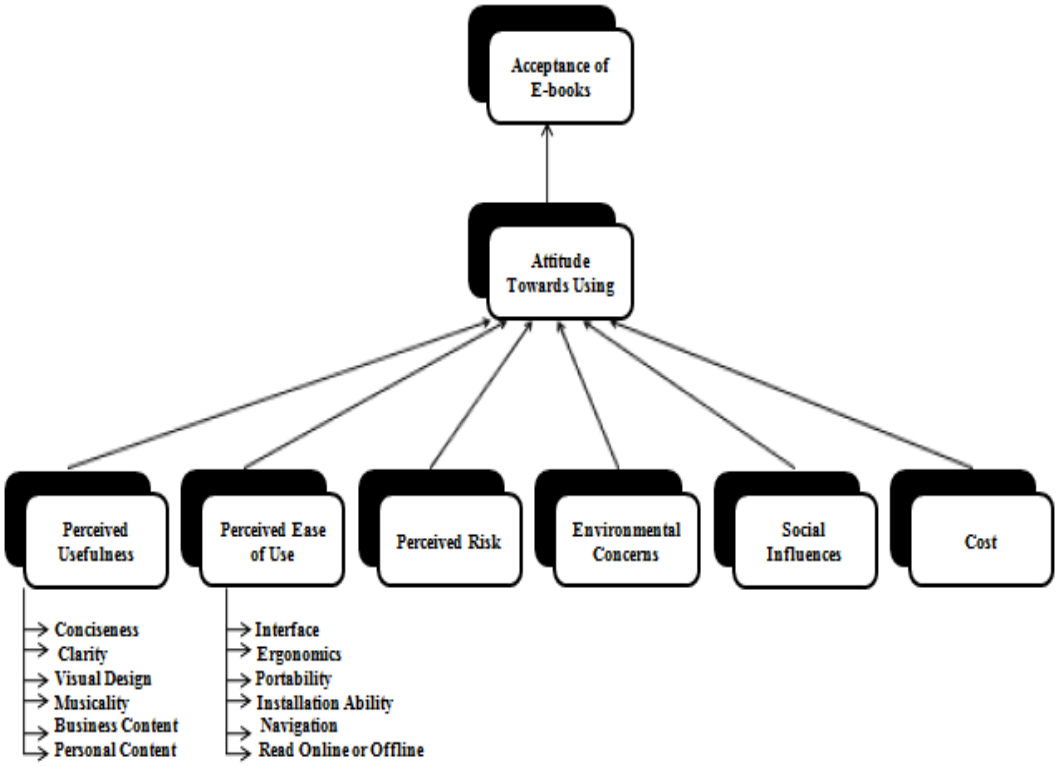

Figure 3: Conceptual Model

3.2. Hypotheses Development

In this thesis, ATU depends on both of the main factors of TAM and EV. Factors of perceived usefulness and perceived ease of use are considered based on TAM. Other factors (perceived risk, environmental concerns, social influences and cost) and sublevel factors are determined taking into account the relevant literature. It can also be viewed from Figure 3 that ATU depends on PU, PEU, PR, EC, SI and CO. Although main factors are analyzed utilizing both of the methods, the impact of sublevel factors are investigated using AHP and the interaction effect between perceived risk and cost is tested employing MRA.

7 different hypotheses, which present the expected relationship of each construct with ATU, are developed to test the conceptual model.

3.2.1. Perceived Usefulness

Perceived usefulness is defined as "the degree to which an individual believes that using a particular system would enhance his or her job performance" (Davis, 1989). PU helps to understand and determine directly the attitude towards using a new technology (Davis, 1985; King & He, 2006; Porter & Donthu, 2006; Chuttur, 2009). High level of perceived usefulness brings about more positive attitudes toward using a technology (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013). Hence, it is hypothesized:

H_1: Perceived usefulness is an effective dimension for (per AHP) and/or has a significant positive effect on (per MRA) attitude towards using e-books.

Even though sublevel factors are not included in the hypotheses, they are analyzed making use of AHP and not with MRA. PU consists of sublevel factors which are identified from literature search (Tsai & Li, 2011). They are as follows: conciseness, clarity, visual design, musicality, business content and personal content. Conciseness and clarity are about structure (sound, pictures and graphics) of the digital content of e-book. Conciseness is defined as how easily the contents are designed and arranged to give the meaning. The increase in the comprehension and conciseness of the content leads to higher value of the product. Clarity is related to how precisely the pictures, graphics and sound are brought together into a harmony as a whole. Appropriate design of those features gives rise to higher value of the content (Kim, Oh & Shin, 2010; Tsai & Li, 2011).

Design can be explained as visual attraction of pictures, graphics and musicality of sound. To that respect, visual design and musicality features are related to the design of the e-book. Visual attraction of pictures and graphics are extracted from both visual and artistic effects. Visual design is detectable by sense of sight and it is related to graphics and pictures in which the presence of the content is realistic and natural. Better visual design leads to higher digital content value and flow. Musicality is the harmony of the quality of sound effects with background story. The sound effects are related to sound, music and audio e-books that can be integrated to each e-book. These sound effects have an influence on users' responses in a way that they lead to higher digital content value and flow (Kim, Oh & Shin, 2010; Tsai & Li, 2011).

People prefer different types of e-books according to the needs and priority given to them. Because of this users focus on e-books with different contents that are business and personal. Business content is comprised of business related e-books and personal content consists of entertainment and self interests (Kim, Oh & Shin, 2010; Tsai & Li, 2011).

3.2.2. Perceived Ease of Use

Perceived ease of use is defined as "the degree to which an individual believes that using a particular system would be free of effort or diffuculty" (Davis, 1989). It is a significant determinant that helps to understand adoption of information technology and it has a direct effect on attitudes toward adopting a technology (Kim & Hahn, 2012; Porter & Donthu, 2006; Davis, 1985; King & He, 2006; Chuttur, 2009). Increased level of perceived ease of use brings about more positive attitudes toward using a technology (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013). Hence, it is hypothesized:

H_2: Perceived ease of use is an effective dimension for (per AHP) and/or has a significant positive effect on (per MRA) attitude towards using e-books.

Sublevel factors of perceived ease of use are not involved in the hypotheses but they are analyzed making use of AHP. PEU is comprised of sublevel factors that are acquired from relevant literature (Poon, 2014; Phan & Daim, 2011). They are as follows: interface, ergonomics, portability, installation ability, navigation and capability to read online or offline. Interface can be thought as a border that provides connection between human and computer. It enables the user to communicate with the system. Ergonomics is defined as designing the job to fit the worker, not forcing the worker to fit the job. It is a method of designing products and systems in a way that it is appropriate for the users (Dohrmann Consulting, 2014). Portability is how easily a device can be carried or relocated from one environment to other. The smaller a device is, the easier it is to transport. Installation ability is the process of putting new system or programme into its position and prepare it ready for usage. Navigation means moving or changing from one part to other part of the website or document. Faster installation ability and navigation lead users to be more satisfied. The feature of reading online or offline gives the advantage of availability whenever needed even online or offline (Poon, 2014; Phan & Daim, 2011).

3.2.3. Perceived Risk

Perceived risk is defined as someone's perception of uncertain and negative results of carrying out a behaviour. Attitudes are decisions towards risk that are taken in indefinite situations. When a person likes to take risks, he is called a risk seeker. However, when a person does not like to take risks, he is accepted as a risk averse. Risk has an influence on consumer behaviours and decisions **(**Rohrmann, 2005; Wu & Wang, 2005; Lin, Tzeng, Chin & Chang, 2010).

Perceived risk is the perception of uncertain consequences when performing a behaviour. The possible consequences are related to different types of risks that are operating, privacy and health issues in this thesis. Operating risk is about performance of the e-book device. It is a concern that the product will not operate as it is expected and described. Privacy risk is about hesitation of trust to online financial activities. It is very hard to create a 100 % trustable online system on those days. Health issue risk deals with the negative effects of the product on our body (Lee, 2013; Wu & Wang, 2005; Lin, Tzeng, Chin & Chang, 2010).

People are more anxious about various risks in online activities rather than the physical environment because of its intangible characteristics. It is a key element that influence people's behaviours in online environments. The anxiety or uncertainty has been shown to reduce consumers online shopping behaviours. Perceived risk has a negative effect on information technology usage behaviours (Ahn, Lee & Park, 2001; Pavlou, 2003; Lin, Tzeng, Chin & Chang, 2010). Yet, it is hypothesized:

H_3: Perceived risk is an effective dimension for (per AHP) and/or has a significant negative effect on (per MRA) attitude towards using e-books.

3.2.4. Environmental Concerns

Environmental concerns are defined as "the general attitude or value orientation towards protecting the environment" (Hwang, 2014). They are towards saving the environment and the concerns for the environment reflect person's attitudes, behaviours and decisions about consumption. Positive environmental attitudes result in positive, attentive and responsible consumption behaviours (Hwang, 2014; Poon, 2014; Bansal, 2011). Regarding this view, it is hypothesized:

H_4: Environmental concerns are effective dimensions for (per AHP) and/or have a significant positive effect on (per MRA) attitude towards using e-books.

3.2.5. Social Influences

Social influence is how important others have an influence on decisions toward using the information system. It influences social interaction of using e-books either through social pressure or the frequency of the peers' product use (Hsiao, 2013; Chiang & Chia-Chen, 2014).

Social influence in this thesis is related to the effect of peers and immediate environment on users' desire to change his reading habit from traditional books to e-books. It has a positive effect on users' intentions and behaviours of using e-books (Poon, 2014; Phan & Daim, 2011; Hsiao, 2013; Chiang & Chia-Chen, 2014). Hence, it is hypothesized:

H_5: Social influences are effective dimensions for (per AHP) and/or have a significant positive effect on (per MRA) attitude towards using e-books.

3.2.6. Cost

Cost refers to price that consumers pay for obtaining a kind of service or product (Ho, Lu & Lin, 2013). Consumers take into account non-negligible costs when deciding among different products. Consumers think that price has a direct relationship with quality (Wu & Wang, 2005; Chiang & Chia-Chen, 2014).

Higher cost is a barrier to purchasing the device (Williams, Slade & Dwivedi, 2014) and price decreases adoption of technologies in most cases (Au & Kauffman, 2003; Ittersum, et al., 2006; Phan & Daim, 2011; Poon, 2014). In this regard, it is hypothesized:

H_6: Cost is an effective dimension for (per AHP) and/or has a significant negative effect on (per MRA) attitude towards using e-books.

3.2.7. Interaction Effect of Perceived Risk and Cost

Interaction terms are used to understand the interaction effect of two independent variables on dependent variable. In this thesis the interaction effect of perceived risk and cost is tested using MRA. It is believed that cost moderates the effect of

perceived risk. It influences the strength of the relationship between perceived risk and cost. It is the weighting factor that influence other variables' effects on purchasing behaviours. Cost reduces the effect of perceived risk in a way that perceived risk becomes less important. This means when the value of cost decreases, people may ignore perceived risk because they give more importance to cost. This relationship is hypothesized:

H_7: Cost increases the negative effect of perceived risk on attitude towards using e-books.

Internet users engage in economic transactions. Perceived risk is related with cost in a way that its impact may reduce through economic incentives that includes products with lower price or reduced costs. People are more prone to using technology with lower risks that decrease with lower costs (Ahn, Lee & Park, 2001; Salam, Rao & Pegels, 2003; Miller & Engemann, 2015). Higher levels of cost and perceived risk lead to lower levels of usage attitudes and lower levels of cost and perceived risk result in higher levels of usage attitudes of e-books. So the effect of perceived risk on attitude towards using e-books varies depending on different values of cost (Ahn, Lee & Park, 2001; Salam, Rao & Pegels, 2003; Miller & Engemann, 2015).

CHAPTER 4

DATA AND METHODOLOGY

This thesis aims to investigate the factors that have effect on acceptance of technology for e-books. In order to understand which factors are more influential for adopting e-books, a survey is developed and applied to obtain data. This chapter is comprised of data (survey design, variable measurement, sampling and data collection) and used methodology.

4.1. Data

4.1.1. Survey Design And Variable Measurement

The hypotheses are developed based on the conceptual model in Figure 3. The proposed hypotheses are tested utilizing different methods and data is collected using survey methodology. Although there are various types of survey techniques, the questionnaires are applied in this study. After investigating different studies in the literature, it is understood that questionnaires are the most appropriate survey type for this thesis. The questionnaire included in Appendix A is prepared based on the previous research and it is developed for the purpose of observing consumers' attitudes toward using e-book devices. The questionnaire, which starts with the aim of the study and the instructions of the survey, has two sections. Section 1 is prepared for Multiple Regression Analysis (MRA) to understand the explanatory power main factors in the model. Section 2 is related to the Analytic Hierarchy Process (AHP) Method to observe the effectiveness or the priority of sublevel and main factors on attitudes toward using e-books.

Section 1 consists of 16 questions. The first 3 questions obtain demographic information of the users such as age, gender and occupation. Questions 4 to 9 are aimed to obtain short information about past and current use of electronic books.

In Multiple Regression Model, attitude towards using (ATU) e-books is the dependent variable. The impact of 6 independent variables on ATU are examined. The independent variables of the model are as follows: perceived usefulness, perceived ease of use, perceived risk, environmental concerns, social influences and cost. All of the questions are prepared according to the studies of Lee (2013), Mulholland & Bates (2014), Jin (2014), Venkatesh et al. (2003) and Porter & Donthu (2006). Five point Likert-type scales are used to measure attitudes toward using e-books for each construct.

Construct ATU is comprised of 4 items that measure attitude towards using (ATU) e-books using five point Likert-type scales. The questions are with respect to intention and suggestion of e-book devices. This question gives an idea about intention of the respondents' attitudes toward using e-books. Construct PU includes 6 items that is used for obtaining opinions about perceived usefulness of electronic books. PU is the belief that the use of the application has a positive effect on performing the job. The questions are related to usefulness, performance and time efficiencies of electronic books. Construct PEU is aimed to measure perceived ease of use of e-book devices that is defined as the use of application will need no effort. This construct, which includes 7 items, constitutes interaction of e-book devices and attributes of simpleness and practicalness of interface. Both of the items for these constructs are created based on the articles of Gefen & Straub (2000), Venkatesh et al. (2003) and Shen, Luo & Sun (2015).

Perceived risk, which is the uncertainty consumers face when they cannot foresee the consequences of their purchase decisions, is measured by the items of PR. The items are related to the issues of risk such as financial, product performance, personal and health. They are constructed by considering the methodology of several articles that are: Hwang (2014) and Lee (2013).

Construct EC is used to understand the effect of environmental concerns on attitudes toward using e-books. It is comprised of 5 items and the studies of Hwang (2014) and Rohrmann (2005) are taken into consideration as a reference for those items. Since environmental concerns are general attitudes toward saving the environment, the items are related to the importance of environmental problems and protection. Apart from environmental concerns, social influences are evaluated with Construct

SI that consists of 4 items. The items are chosen considering social image, advices and social effect. The items are developed according to the studies of Venkatesh et al. (2003).

Cost, which is related to the financial situations, is the last independent variable to be tested for its main effect and interaction effect with perceived risk on dependent variable ATU. Construct CO has 3 items that are prepared regarding the study of Wu & Wang (2005) and they constitute price related issues.

After preparing the questionnaire for Multiple Regression Analysis (MRA) in Section 1, the questionnaire for Analytic Hierarchy Process (AHP) Method is prepared in Section 2 of Appendix A to observe the effectiveness or the weights (priorities) of sublevel and main factors on attitudes toward using e-books.

AHP method is explained in detail in Section 4.2.1. The questionnaire design is developed based on the previous research of Phan & Daim (2014) and Oz (2011). The respondents are asked to assign scores to each factor of the model depending on their preferences. Pairwise Comparison Method is applied to satisfy the aim of making comparison of the two items at a time. The prepared questionnaire for AHP is included in Section 2 of Appendix A.

AHP model in Figure 3 is used for preparing the questionnaire. Section 2 is comprised of 3 questions that are related to opinions about preference of some factors using electronic books. Measurements are performed with a 1-9 frequency scale by comparing two items at a time in each question. First of all, pairwise comparisons among main criteria of ATU are performed in Question 1. Main factors are as follows: perceived usefulness, perceived ease of use, perceived risk, environmental concerns, social influences and cost. The aim is to observe which factor is more significant for using e-book devices. Second, sublevel factors of perceived usefulness are compared in Question 2. Two items are compared at a time for each question in order to understand which criteria makes an e-book device more useful. Sublevel factors are as follows: conciseness, clarity, visual design, musicality, business content and personal content. Last, pairwise comparisons among sublevel criteria of perceived ease of use are arranged. The purpose is to observe which factors make an e-book device easy to use. Comparisons of two items at a time for

interface, ergonomics, portability, installation ability, navigation and capability to read online or offline are performed.

The last page of the questionnaire consists of an appendix that includes the definitions of the used terms.

4.1.2. Sampling And Data Collection

Data is collected from primary sources using the questionnaires which are explained in Section 4.1.1 and included in Appendix A. The unit of analysis for this thesis is graduate and doctorate students of Business Administration and Electrical & Electronics Engineering and Computer Engineering departments of METU. Questionnaires are applied to a total of 150 students who use e-books. In this survey, nonprobability sampling is performed because personal judgement is involved when selecting the sample. Convenience sampling is also used since the subjects are graduate and doctorate students of different departments from METU. This sampling method is selected because it is difficult to identify the participants who use e-books due to high number of graduate students in various universities. Since there are many graduate students, the cost of reaching to those students is high and there is time restriction, non-random sampling is applied.

4.2. Methodology

This thesis is an exploratory research that aims to investigate the factors that have effect on acceptance of technology for e-books. After obtaining the data using the questionnaires in Appendix A, two different methods are used to test the hypotheses in the proposed model. Those techniques are as follows: Analytic Hierarchy Process Method and Multiple Regression Analyses.

4.2.1. Analytic Hierarchy Process Method

The Analytic Hierarchy Process (AHP) Method is used in this study to investigate the factors that influence acceptance of e-books. AHP is one of the most important tools of decision makers and is widely used in multiple criteria decision making processes. It is a method for coping with complex decisions that uses weights to assign priorities and determines the best decision. AHP helps to reduce errors and check consistencies for attributes and alternatives (Saaty, 1980).

AHP can be used in different applications some of which are as follows: selecting the best alternative, planning, optimization, manufacturing, layout design and engineering problems (Alexander, 2012). It can be combined with several different techniques such as fuzzy logic and linear programming (Triantaphyllou & Mann, 1995; Vaidya & Kumar, 2006).

AHP has several advantages. It is an easy, straightforward, stable, flexible and convenient method for decision makers to understand because it looks like the method that is used in common sense decision making and it is hierarchical. It consists of a sensitivity analysis that makes scenarios more realistic. It also assigns weights and uses pairwise comparisons which makes it a simple method. The hierarchy of the method provides the opportunity to observe the impact of upper levels on lower levels. The ranking criteria offers more precise decisions, consistency in evaluation and versatility in choosing various alternatives. Overall, the ability to design complex, multi-attribute, multi-period and multi-person problems in hierarchy and simple use make AHP a strong model (Shahroodi et al., 2012; Moffett & Sarkar, 2006).

Although AHP provides various advantages, it also has some disadvantages. The performance of alternatives is based on a 1 to 9 ratio scale which may lead to inconsistencies. Different opinions about the weights of each criteria may lead to complexity. The fact that AHP is a subjective evaluation that needs knowledge and experience may lead to conflicts among decision makers. AHP also does not take into account risks and uncertainties (Shahroodi et al., 2012; Moffett & Sarkar, 2006).

AHP is a multiple criteria decision tool that applies an eigenvalue approach. When performing measurements, it includes 1 to 9 scales that can be either quantitative or qualitative. Those scales and their definitions are shown in Table 1 (Saaty, 1987).

AHP is comprised of 3 operations that are hierarchy construction, analysis of priority (pairwise comparisons and weights) and consistency check.

Table 1: The Scale of Analytic Hierarchy Process (Saaty, 1987)

Intensity of Importance	Definition	Explanation
1	Equal Importance	Two activities contribute equally to objective
3	Moderate Importance	Experience and judgment slightly favor one activity over other
5	Strong Importance	Experience and judgment strongly favor one activity over other
7	Very Strong Importance	Experience and judgment very strongly favor one activity over other
9	Extreme Importance	The evidence favoring one activity over another is of the highest possible order of information
2,4,6,8	Intermediate Values	When compromise is needed

4.2.1.1. Decision Hierarchy

First, problem, objectives and criterias are identified. Then, complex decision problems are broken down into hierarchical levels of forming goal, criteria, sub-criteria and decision alternatives.

4.2.1.2. Analysis of Priority

Each attribute at the same level is compared at a time. Those comparisons are performed with respect to the goals or personal judgements of decision makers. Pairwise comparison mechanism is performed with a nine point intensity scale which is shown in Table 1. Comparison matrices for each alternative and attribute are prepared in a way that alternatives or attributes are listed in horizontal and vertical manner. The numbers show how much more important row attribute is against column attribute.

The contribution of each element can be determined with a priority vector (or eigenvector) that can be calculated using geometric mean method by multiplying *n* elements in each row and taking the *n*th root. The comparisons are turned into weights by summing the columns, dividing each number in the table by the sum and

then taking the average of each row. The weights for attributes and sublevel factors are calculated in this way (Oz, 2011).

Calculations are made to obtain maximum eigenvalue, consistency index, consistency ratio and normalized value of each alternative.

4.2.1.3. Consistencies

In order to make sure that judgements are consistent, consistency checks are performed by calculating consistency ratios. AHP gives possibility of some certain degree of consistency but not too much. The larger the upper limit of inconsistency, the more openness for it to change. In contrast, the smaller the lower limit of inconsistency, the more possibility for adapting to new information (Vaidya & Kumar, 2006; Oz, 2011). The consistency ratio is calculated using the eigenvalue approach as follows. The largest eigenvalue is equal to the size of pairwise comparison matrix ($\lambda_{max} = n$) (Oz, 2011). The consistency index (CI), which shows the degree of consistency, can be calculated as

$$\text{CI} = \frac{\lambda_{max} - n}{n-1} \quad (1)$$

where n is the size of comparison matrix. Consistency Ratio (CR) is the ratio of Consistency Index (CI) to Random Index (RI). It compares CI with RI and the related formula for CR can be written as

$$\text{CR} = {CI}/{RI} \quad (2)$$

The value of RI can be determined from Table 2 using the size of comparison matrix. Table 2 (Saaty, 1980) consists of RI values for different matrix sizes.

Table 2: Random Index Values for Different Matrix Sizes (Saaty, 1980)

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

If CR is less than 0.1, there is no concern for inconsistency. Inconsistencies happen if CR is not within that interval. If inconsistencies happen, the pairwise comparisons should be revised until the values are satisfactory. After checking consistencies, the scores for alternatives are obtained using weights. The ones with the highest score are chosen. Finally, a sensitivity analysis is carried out to understand how sensitive the preference is to the changes in decisions (Ho, 2008).

Other than eigenvalue approach, a Rule of Thumb approach can be used to calculate the Consistency Ratio. Everything is the same except calculation of average ratio which is equal to the largest eigenvalue ($\lambda_{max} = n$) of eigenvalue approach. Average ratio can be calculated as follows. Considering the pairwise comparison matrix, the average weights of each column is calculated, multiplied with each number in the column and the sum of each row is taken. Then each sum is divided by the weight of that attribute and the average of them are taken. This gives average ratio (Vaidya & Kumar, 2006; Oz, 2011). The way of performing other calculations is the same as eigenvalue approach. Although there are two approaches mentioned, eigenvalue is more precise, safer and harder to apply.

4.2.2. Multiple Regression Analyses

The influence of all the main factors on ATU are analyzed with multiple regression analysis (MRA). Multiple Regression broadens Simple Regression by adding several independent variables (predictors). MRA is a statistical technique that is used to analyze the relationship between a single dependent variable and multiple independent variables. The aim is to predict an unknown variable from known one(s) (Hair Jr, Black, Babin & Anderson, 2010). There are two types of variables, independent (known) and dependent (to be predicted) (Hwang, 2014; Tabachnick & Fidell, 2001).

MRA is a flexible method that makes a better prediction considering multiple predictors. It helps to examine sophisticated hypotheses, avoid non-optimal mergers of predictors and discover relationships among independent and dependent variables (Tabachnick & Fidell, 2001; “Multiple Regression Models”, 2016).

In MRA, Ordinary Least Squares (OLS) Regression approach is applied. It has several assumptions that are as follows. MRA requires linear relationship between

independent and dependent variables. It uses continuous dependent variable and continuous or categorical independent variables. It needs all variables to be normal and all the observations to be independent. Data needs to present homoscedasticity that occurs when errors are of equal size and demonstrate equal variance across different values of the predictor. Moreover, MRA requires data to have no multicollinearity in a way that the predictors do not correlate highly with one another. Significant outliers, high leverage or influential points are not included in the analysis. It demands errors to be approximately normally distributed, expected values to be zero and the distribution of the variables to be multivariate normal (Doane & Seward, 2011).

CHAPTER 5

DATA ANALYSES AND RESULTS

Analytic Hierarchy Process Method and Multiple Regression Analyses are used to investigate the importance of the factors on e-book adoption and to test the proposed model.

5.1. Analytic Hierarchy Process Method

5.1.1. Descriptive Statistics

The descriptive statistics are interpreted and reported using EViews 8 Software Programme in this section.

5.1.1.1. Descriptive Statistics for Participants

The data is collected from a total of 150 students 22 of which are eliminated due to inconsistencies.

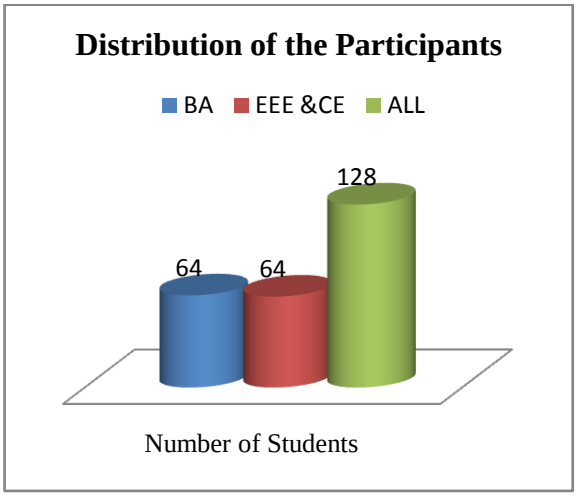

Figure 4: Distribution of the Participants for AHP

Figure 4 shows the distribution of the participants. It can be observed that 64 of the participants are from Business Administration (BA) and 64 of them are from Electrical & Electronics Engineering (EEE) & Computer Engineering (CE) departments. A total of 128 graduate students are included in the study.

5.1.1.2. Descriptive Statistics for Main and Sublevel Factors

Both main and sublevel factors of the conceptual model in Figure 3 are used in AHP Analyses. The tables for descriptive statistics are prepared using Microsoft Office Excel 2013 programme. The normality of those variables are determined from any of the following tests that are: Jarque-Bera Test, mean-median differences and skewness values.

The descriptive statistics for the main factors, sublevel factors of PU and PEU for the participants (a total of 128 students) are shown in Tables 3, 4 and 5 of Appendix B. It is confirmed from Jarque-Bera Test in Table 3 that PU (p-value=0.065) and PEU (p-value=0.125) indicate approximately normal distributions since p-values are greater than α=0.05. The data is normally distributed because mean values are close to median values.

It can be noted from Tables 4 and 5 that all the sublevel factors for PU and PEU display non-normal distributions because p-values are smaller than α=0.05. This result can also be supported with skewness testing that the skewness values are outside the interval showing that the population being sampled is not normal.

5.1.2. Mathematical Analyses

Analytic Hierarchy Process (AHP) Method is benefited to examine the role of the factors on e-book adoption and it is explained in detail in Section 4.2.1 of Chapter 4.

AHP is very useful for solving a wide range of important decision problems and it is used in multiple criteria decision making processes. AHP, which includes weights to assign priorities, helps to deal with complex problems and brings forth the best decision (Saaty, 1980).

The proposed model in this thesis is appropriate for AHP because there are multiple criterias of both the sublevel and main factors. Weighted importances for all factors help to understand their roles on e-book adoption process and to determine which

factor has more effect or which factor is the best decision (preference) on adoption of e-books.

AHP analysis is performed based on the study of Phan and Daim (2011). It is implemented mathematically and the obtained results are checked from a website to achieve precise information ("BPMSG AHP Priority Calculator", 2016).

The stages of the AHP Model is explained for determining the weights of each factor.

5.1.2.1. Decision Hierarchy

A decision hierarchy is set up using the conceptual model in Figure 3. Decision hierarchy for attitude towards using e-books is shown in Figure 5 below. General objective is understanding attitude towards using e-books. Attributes are the main and sublevel factors for perceived usefulness and perceived ease of use.

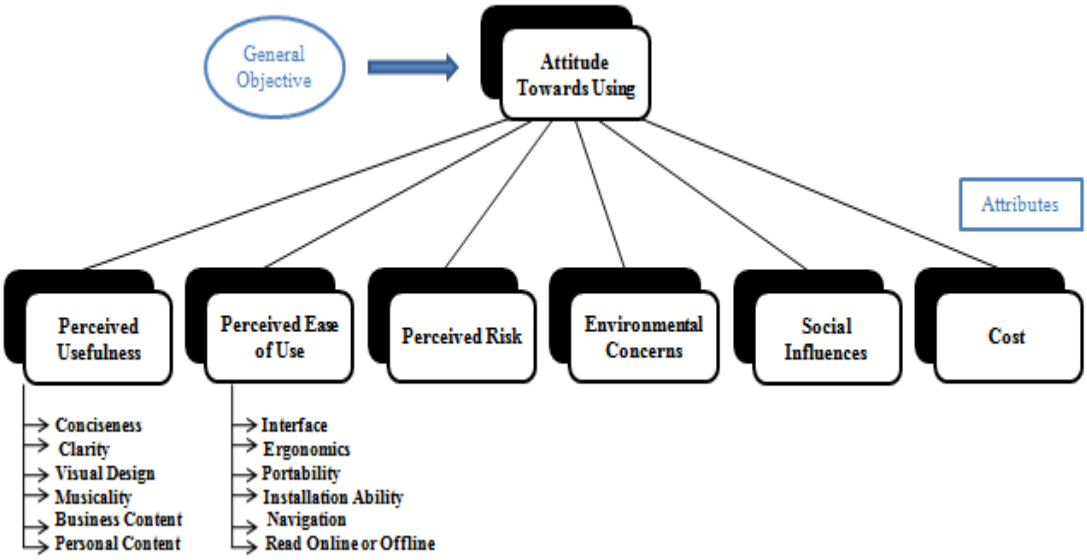

Figure 5: Hierarchy for Attitude Towards Using E-books

5.1.2.2. Pairwise Comparisons

The purpose is to determine the best attribute(s) for main and sublevel factors. After constructing the decision hierarchy, relative priorities of each element in the hierarchy is found by making pairwise comparisons. The participants make pairwise

comparisons between two elements at a time using a nine point scale. The scales and their definitions are shown in Table 1 of Section 2.1. The numbers show how much more important row attribute is against column attribute.

The collected data from each participant using questionnaires are converted into three pairwise comparison matrices that are as follows. One pairwise comparison table (matrix) for main factors, another table for the sublevel factors of perceived usefulness and the other one is for the sublevel factors of perceived ease of use. First of all, a sample of pairwise comparison matrix for main factors is shown in Table 12. The matrix is comprised of main factors and it is constructed according to the participants' answers in Question 1 of Section 2 in Appendix A. For example, according to the answers of the fifth participant, it can be seen that perceived risk is equally important to cost. Environmental concerns are very strongly more important than perceived risk. The numbers in the matrix are converted forms of verbal scales into numbers using a scale that is included in Table 1 of Section 2.1.

Table 12: A sample of Pairwise Comparison Matrix for Main Factors

	Perceived Risk	Environmental Concerns	Perceived Usefulness	Perceived Ease of Use	Cost	Social Influences
Perceived Risk	1	1/7	1/3	1/4	1	2
Environmental Concerns	7	1	1/4	1/3	4	4
Perceived Usefulness	3	4	1	1/2	3	4
Perceived Ease of Use	4	3	2	1	3	5
Cost	1	1/4	1/3	1/3	1	2
Social Influences	1/2	1/4	1/4	1/5	1/2	1

Next, an example of pairwise comparison matrix for sublevel factors of perceived usefulness is shown in Table 13. The matrix consists of attributes for perceived usefulness and it is constructed based on the participants' answers in Question 2 of Section 2 in Appendix A.

Table 13: A sample of Pairwise Comparison Matrix for Sublevel Factors of Perceived Usefulness

	Conciseness	Clarity	Visual Design	Musicality	Business Content	Personal Content
Conciseness	1	4	2	2	2	1
Clarity	1/4	1	1/3	2	1	2
Visual Design	1/2	3	1	2	2	2
Musicality	1/2	1/2	1/2	1	1/2	1/2
Business Content	1/2	1	1/2	2	1	3
Personal Content	1	1/2	1/2	2	1/3	1

Last, a representative of pairwise comparison matrix for sublevel factors of perceived ease of use is shown in Table 14. The matrix is built upon the participants' answers in Question 3 of Section 2 in Appendix A.

Table 14: A sample of Pairwise Comparison Matrix for Sublevel Factors of Perceived Ease of Use

	Interface	Ergonomics	Portability	Installation	Navigation	Read online/offline
Interface	1	4	2	2	3	1/2
Ergonomics	1/4	1	1/2	1/2	2	1/2
Portability	1/2	2	1	3	4	3
Installation	1/2	2	1/3	1	4	2
Navigation	1/3	1/2	1/4	1/4	1	1/3
Read online/offline	2	2	1/3	1/2	3	1

5.1.2.3. Weights and Consistencies

After obtaining pairwise comparison matrices (tables) for each participant, the numerical scores (ratings) are converted into weights mathematically using Microsoft Office Excel 2013 programme. The ratings are turned into weights for main factors, sublevel factors of perceived usefulness and perceived ease of use. Consistency ratios for n=6 are calculated for the weights. How the calculations are performed is explained in detail in Section 4.2.1 of Chapter 4. The weights and consistency ratios

are calculated for each participant. After making mathematical calculations, the obtained results are controlled from a website that uses eigenvalue approach to obtain certain results ("BPMSG AHP Priority Calculator", 2016). It is seen that both the mathematical calculations and the website produce the same results. The resultant values of consistency ratios for the participants, which are greater than 0.1, are not included in the study. The outputs of AHP analyses, which include weights and consistency ratios, are shown and explained in Section 5.1.3.1.

5.1.3. Results

5.1.3.1. Weights and Consistency Ratios

Weights and consistency ratios for each participant is calculated using the data that is acquired from 128 graduate students of BA, EEE and CE departments. The computed average value of weights and consistency ratios are presented in Table 15 and Table 16. The consistency ratios whose values are higher than 0.1 are not included in the analyses. So 22 of the participants are taken out from the analyses.

Table 15: Consistency Ratios of Participants

	Participants
Main Factors	0.060
Sublevel Factors for PU	0.056
Sublevel Factors for PEU	0.052

Table 15 consists of average values of consistency ratios for each factor. A low Consistency Ratio states that the consistency of participant's decision is high. In contrast, a high Consistency Ratio means that the consistency of participant's decision is low. The acceptable range for Consistency Ratio is above 0.1 (equal to 10 % inconsistency rating and 90 % consistency rating) (Oz, 2011). It can be noted from Table 15 that CR's are low and less than 0.1 for all the factors. They have consistency rating around 94 % to 95 %. It can be claimed from the results of CR's that the decisions with respect to each attribute (main factors and sublevel factors) are highly consistent.

The purpose is to investigate the effects of the factors on the acceptance of e-books based on the weighted importance of the factors in order to observe their roles on e-book adoption. The average values of the weights are summarized briefly in the tables and figures to make them simpler and more understandable. The average value of each weight (or priority) is given in Table 16. The higher the value of the alternatives or attributes, the greater the weights are. Higher weights mean that they have more priority or more influence on making the decisions. The priority of each alternative or attribute shows its importance relative to others (Oz, 2011).

In this thesis, the threshold value for the weights is specified as the average value of the number of independent factors out of 100. Since there are 6 independent variables, the average value is calculated as 0.166 (16.6 %). The variables with weights that are higher than the threshold value are considered as an effective dimension.

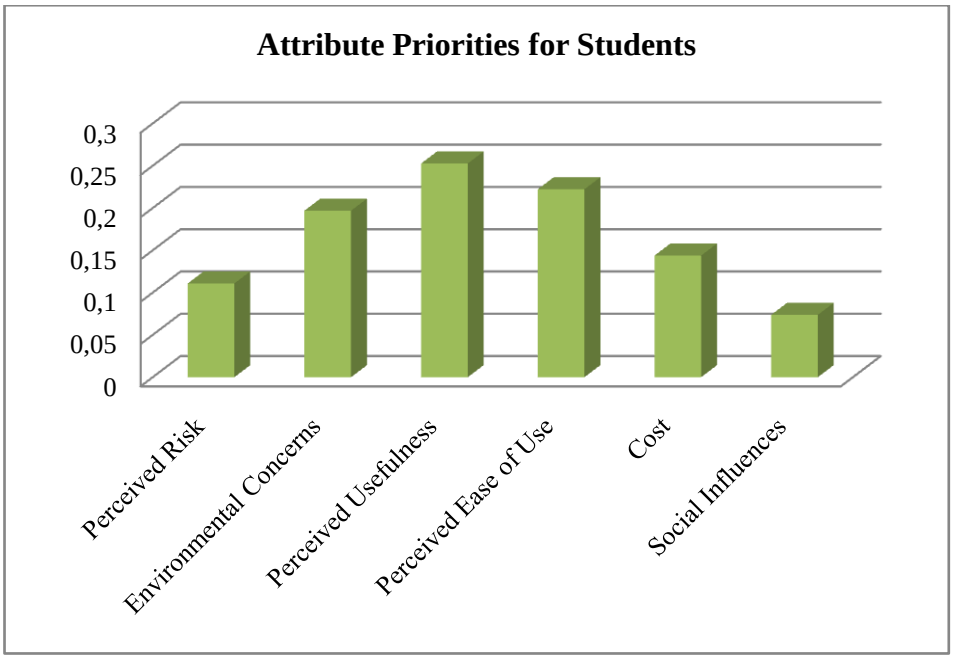

Figure 6: Attribute (Main Factor) Priorities for Students

Table 16 and Figure 6 indicate the weights of the main factors that influence attitudes toward using e-books. When prioritising the six attributes for ATU, perceived usefulness (weight=0.253) is the first priority, perceived ease of use (weight=0.222)

is the second priority, and environmental concerns (weight=0.196) is the third priority. Social influences is the last priority possessing value of 0.073. PU, PEU and EC are effective dimensions for attitudes toward using e-books because the weights for each factor are greater than threshold value 0.166 (16.6 %).

Table 16: Attribute Priorities for Students

MAIN FACTORS	**PARTICIPANTS**
Perceived Risk	0.111
Environmental Concerns	0.196
Perceived Usefulness	0.253
Perceived Ease of Use	0.222
Cost	0.144
Social Influences	0.073
SUBLEVEL FACTORS OF PU	
Conciseness	0.208
Clarity	0.165
Visual Design	0.151
Musicality	0.083
Business Content	0.187
Personal Content	0.204
SUBLEVEL FACTORS OF PEU	
Interface	0.141
Ergonomics	0.142
Portability	0.206
Installation	0.144
Navigation	0.124
Read Online/Offline	0.242

Table 16 and Figure 7 show weights of sublevel factors of PU that effect e-book adoption behaviours. When prioritising the six attributes for PU, conciseness (weight=0.208) is the first rank, personal content is the second rank (weight=0.204) and business content (weight=0.187) is the third rank. Musicality is given the last position possessing value of 0.083. Conciseness, personal content and business content are also effective dimensions for attitudes toward using e-books.

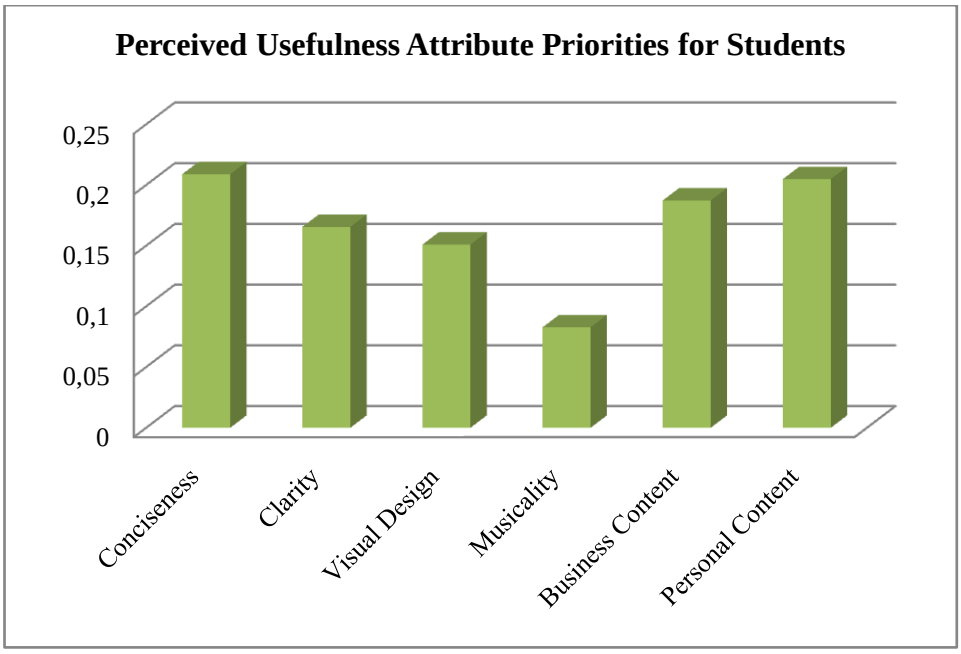

Figure 7: Perceived Usefulness Attribute Priorities for Students

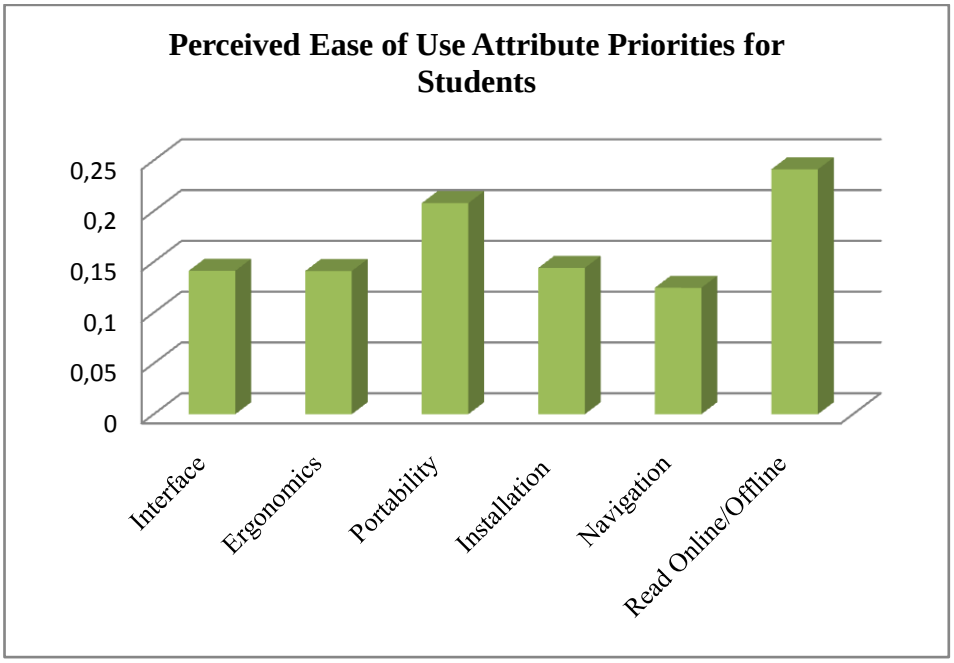

Figure 8: Perceived Ease of Use Attribute Priorities for Students

Weights of sublevel factors of PEU are shown in Table 16 and Figure 8. Among the six attributes for PEU, first position is given to read online/offline with weighting value of 0.242. Portability (weight=0.206) takes the second position and installation

(weight=0.144) is placed on the third position. Navigation is the last choice with weighting value of 0.124. The effective dimensions for e-book adoption are read online/offline and portability because the threshold value is smaller than the weight values.

5.2. Multiple Regression Analyses

Multiple Regression Analyses are also used to examine the impact of the main factors on attitudes toward using e-books and to test the proposed model. Analyses are performed using Minitab 16 Statistical Software Programme and EViews 8 Software Programme. This section consists of descriptive statistics, regression analyses and results.

5.2.1. Descriptive Statistics

The descriptive statistics are summarized using Eviews 8 Software Programme in this section. The dependent and independent variables in the conceptual model of Figure 3 are used in the regression analysis. Since the effects of main factors on ATU are analyzed, ATU is the dependent variable and perceived usefulness, perceived ease of use, perceived risk, environmental concerns, social influence and cost are the independent variables.

5.2.1.1. Descriptive Statistics for Participants

Figure 9 demonstrates the distribution of the participants.

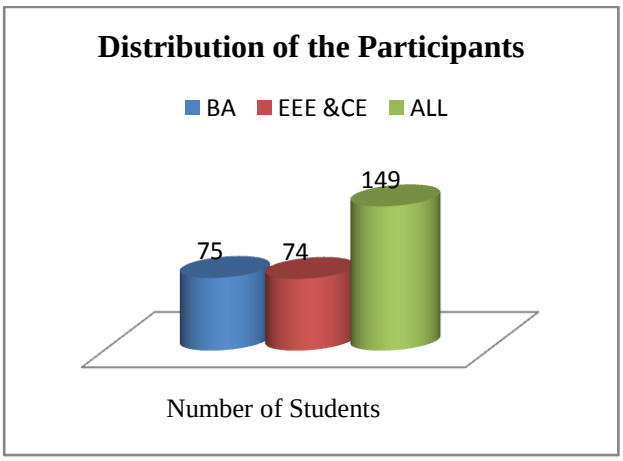

Figure 9: Distribution of the Participants for MRA

The data is collected from a total of 150 graduate and doctorate students and 1 outlier is taken out from the analysis. As a result, 75 BA and 74 EEE & CE graduate students are left for regression analysis.

5.2.1.2. Descriptive Statistics of the Variables

Table 21 consists of descriptive statistics for the variables of the participants. The values of mean is very close to the values of median for each variable so the distributions seem to be symmetric and approximately normal. The normality of the distributions can also be explained using Jarque-Bera Test that the p-values of all the variables except ATU and EC are greater than α=0.05. Detailed descriptive statistics of variables are included in Table 41 of Appendix C.

Table 21: Descriptive Statistics of Variables

	ATU	PU	PEU	PR	EC	SI	CO
Mean	3.825	3.550	3.873	2.696	4.228	2.619	2.937
Median	4	3.5	3.857	2.8	4.2	2.75	3
Skewness	-0.564	-0.062	-0.062	0.064	-0.693	-0.115	-0.044
Kurtosis	2.712	2.733	2.721	2.838	3.667	2.426	3.183
Jarque-Bera	8.414	0.537	0.577	0.262	14.705	2.374	0.256
p-value	0.0148	0.764	0.749	0.877	0.0006	0.305	0.879
Observations	149	149	149	149	149	149	149

5.2.2. Correlations

Correlation coefficient is a statistic that explains the degree of linearity between two different variables. Although it shows both the strength and direction (either positive or negative) of linear relationship, it does not provide causal relationship between variables (Doane & Seward, 2011).

The range of the correlation coefficients are between -1 and 1. -1 indicates strong negative correlation, 0 indicates no correlation and 1 refers to strong positive correlation.

According to Pearson's correlation coefficients, any value of correlation coefficient between ±0.1 and ± 0.3 indicates weak linear relationship, values of ± 0.3 and ± 0.5 represents moderate to strong linear relationship and values of ± 0.5 and ± 1 signals strong relationship (Laerd Statistics, 2013).

Correlation Matrices are acquired using EViews 8 Software Programme. Correlations between variables for participants are shown in Table 24 of Appendix C. Pearson's Correlation Coefficient Intervals are taken into account and the correlation coefficient values for all the participants are examined. It is noted that correlations among variables of ATU and PU (0.546) and ATU and PEU (0.526) show strong relationship. The correlation between variables of PU and PEU (0.434), EC and PU (0.389), SI and PU (0.368), PR and PEU (-0.386) and PR and CO (0.307) are moderate to strong. Weak relationship is determined between the other correlations that are not indicated.

5.2.3. Regression Analyses and Results

This subsection provides MRA results. MRA is benefited to examine the influence of the factors on ATU in the model and it is explained in detail in Section 4.2.2 of Chapter 4. After the data is collected from participants of BA and EEE & CE department students using surveys, MRA is conducted to examine whether the explanatory factors affect acceptance of e-books or not.

The proposed model in this thesis is appropriate for MRA because there is one dependent variable and a set of independent variables. The assumptions of the method are satisfied. It is a recommended study for testing interaction terms. OLS Regression approach is applied to the data in Minitab 16 Statistical Software Programme and EViews 8 Software Programme in order to test the hypotheses and analyze the data.

The dependent variable for the regression model is attitudes toward using e-books. Independent variables are PU, PEU, PR, EC, SI and CO. The interaction between PR and CO is also tested utilizing MRA.

The outputs of the regression model are attached in Appendix C. It includes various tables of diagnostic tests results such as serial correlation, homoscedasticity, multicollinearity, stability and normality tests.

5.2.3.1. Regression Results of the Participants

The results of regression analyses for students of BA and EEE & CE departments are presented in Table 31. 1 outlier is eliminated from analyses. The model is statistically significant since F-statistic=15.531 and p-value<0.0001 (p-value<α). It is a good model and it has a good fit (R^2=43.536 %). 40.733 % (Adjusted R^2) of the variation in attitudes toward using e-books is explained by change in independent variables.

Perceived Ease of Use (PEU) (β=0.455, p-value=0.0001) is one of the most significant factor or the strongest predictor in the model. It differs significantly from zero and the likelihood of being wrong is 0 %. There exists a positive relationship between PEU and ATU. One unit increase in the value of PEU results in an increase in the average value of ATU by 0.455 units. PEU has a positive impact on attitudes toward using e-books so ATU increases when there is an increase in the level of perceived ease of use (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013).

Perceived Usefulness (PU) (β=0.518, p-value=0.0001) is the other most significant factor in the model. It differs significantly from zero and the likelihood of being wrong is 0 %. It has a positive impact on attitude towards using e-books. One unit increase in the value of PU leads to an increase in the average value of ATU by 0.518 units. PU has a positive relationship with ATU because performance improves with usage. The increase in PU leads more acceptance behaviour of e-books (Davis, 1989).

According to the results of the analysis, PU and PEU are significant predictors of attitude towards using e-books. Nevertheless, PR, EC, SI and CO and interaction term of PR*CO are not significant factors for determining acceptance of e-books. The regression equation is as follows:

$$ATU = 1.20 + 0.518\ PU + 0.455\ PEU - 0.814\ PR + 0.155\ EC + 0.165\ SI - 0.605\ CO + 0.235\ PR*CO \quad (4)$$

The diagnostic tests are included in Appendix C. It is observed from the outputs that the assumptions of serial correlation, homoscedasticity, normality, stability and multicollinearity are not violated.

Table 31: The Outputs for Regression Analyses

Variable	Coefficient	Std. Error	t-Statistic	p-value	Standardized Coefficient
C	1.205	1.302	0.926	0.355	
PU	0.518	0.124	4.164	**0.0001**	0.336
PEU	0.455	0.115	3.971	**0.0001**	0.305
PR	-0.814	0.440	-1.847	0.066	-0.563
EC	0.155	0.125	1.2495	0.214	0.086
SI	0.165	0.091	1.817	0.071	0.125
CO	-0.605	0.398	-1.521	0.130	-0.426
PR*CO	0.235	0.149	1.575	0.117	0.727
R-squared	0.435		**Mean dependent var**		3.825
Adjusted R-squared	0.407		**S.D. dependent var**		0.941
S.E. of regression	0.724		**Akaike info criterion**		2.244
Sum squared resid	73.946		**Schwarz criterion**		2.405
Log likelihood	-159.226		**Hannan-Quinn criter.**		2.310
F-statistic	15.531		**Durbin-Watson stat**		2.024
p-value	p<0.0001				

Table 32 reports serial correlation and heteroscedasticity tests. According to Breusch-Godfrey Serial Correlation LM Test, there is no serial correlation since the probability is not significant (0.726), null hypothesis is accepted that serial correlation does not exist.

Heteroscedasticity tests of Harvey, White and ARCH show that heteroscedasticity does not exist in the model. The p-values for the F-statistic are considered. The null hypothesis is as follows: there is no heteroscedasticity. Since p-values are greater then α, null hypothesis is accepted that there is homoscedasticity.

Figures 14 and 15 illustrate normality (Jarque Berra Test) and stability (CUSUM and CUSUM of Squares) test results. According to Jarque Berra Test, the null hypothesis is as follows: there is normality. Since p-value is greater then α, null hypothesis is accepted that the distribution of residuals is approximately normal.

CUSUM and CUSUM of squares tests provide plots of data versus cumulative sum of recursive residuals. If the obtained cumulative sums are within 5 % of significant

range, there is no structural break. In Figure 15, the cumulative sums are within the range so there is no structural break showing that the model is stable.

The presence of Multicollinearity is determined using Variance Inflation Factors (VIF). The values should be below 10. VIF values are high only for PR, CO and interaction term. It is not surprising to have high VIF values in the model because there is an interaction term that is the product of two variables. It is not a problem to have high VIF values if there is an interaction term included in the model (Allison, 2010). VIF values are included in Table 33 of Appendix C.

5.3. Hypotheses Testing

Hypotheses developed in Section 3.2 are tested in this section by using AHP and MRA results. A summary of regression results for participants are provided in Table 34.

H_1: Perceived usefulness is an effective dimension for (per AHP) and/or has a significant positive effect on (per MRA) attitude towards using e-books.

The findings of the MRA show that perceived usefulness (PU) is a significant factor influencing ATU for participants (p-value=0.0001). It has a positive effect on attitude towards using e-books (β=0.518).

The findings of the AHP indicate that PU is an effective dimension for attitudes toward using e-books for participants (weight for participants=0.253). PU is an effective dimension since its weight is greater than the threshold value of 0.166.

Table 34: Summary of Regression Results for Participants

	Coefficient (β)	p-value
PU	0.518	**0.0001**
PEU	0.455	**0.0001**
PR	-0.814	0.066
EC	0.155	0.214
SI	0.165	0.071
CO	-0.605	0.130
PR*CO	0.235	0.117

The findings of both of the methods are in parallel with the previous indications of Davis (1985, 1989), Letchumanan and Tarmizi (2011), Lai and Ulhas (2012), Anton, Camarero and Rodriguez (2013), Agarwal and Prasad (1997), Phan and Daim (2011) and Al-Adwan, Al-Adwan and Smedley (2013). Hence, Hypothesis 1 (H_1) is supported.

H_2: Perceived ease of use is an effective dimension for (per AHP) and/or has a significant positive effect on (per MRA) attitude towards using e-books.

The results of the MRA point out that perceived ease of use (PEU) is a significant factor for participants (p-value=0.0001). It has a positive impact on attitude towards using e-books (β=0.455).

The results of the AHP claim that PEU is an effective dimension for attitudes toward using e-books for participants (weight for participants=0.222). It is considered as an effective dimension because the value of the weight is higher than the threshold value of 0.166.

The results of both of the methods are in line with the previous studies of Davis (1985, 1989), Letchumanan and Tarmizi (2011), Lai and Ulhas (2012), Anton, Camarero and Rodriguez (2013), Agarwal and Prasad (1997), Phan and Daim (2011) and Al-Adwan, Al-Adwan and Smedley (2013). Thus, Hypothesis 2 (H_2) is supported.

H_3: Perceived risk is an effective dimension for (per AHP) and/or has a significant negative effect on (per MRA) attitude towards using e-books.

The findings of the MRA imply that perceived risk (PR) is not a significant factor on attitudes toward using e-books for participants (p-value for participants=0.066). Its relationship with ATU is negative due to negative β coefficient of -0.814.

The results of the AHP show that PR is not an effective dimension for attitudes toward using e-books for participants (weight for participants=0.111). It is not an effective dimension because its weight is smaller than the threshold value of 0.166.

While research of Lin, Tzeng, Chin and Chang (2010), Pavlou (2003) and Wu and Wang (2005) conclude that PR has a significant influence on adoption of e-books, the studies of Claudia, Alexandra and Ionut (2012) and Liu and Wei (2003) state that

PR does not have a significant influence on adoption of e-books. Because of these reasons Hypothesis 3 (H_3) is not supported.

H_4: Environmental concerns are effective dimensions for (per AHP) and/or have a positive significant effect on (per MRA) attitude towards using e-books.

It can be reported based on the findings of the MRA that EC do not have a significant effect on attitudes toward using e-books for participants (p-value=0.214). The relationship of EC with attitudes toward using e-books is positive because β coefficient is positive.

It can be noted from the results of AHP that EC are effective dimensions for attitudes toward using e-books because the value of the weight is larger than the threshold value of 0.166 (weight for participants=0.196).

The studies of Bansal (2011) and Hwang (2014) point out that EC have a significant effect on attitudes toward using e-books but the research performed by Gill, Crosby and Taylor (2001) support the opposite. Regarding this view, Hypothesis 4 (H_4) is not supported.

H_5: Social influences are effective dimensions for (per AHP) and/or have a positive significant effect on (per MRA) attitude towards using e-books.

MRA confims that SI do not have a significant impact on attitudes toward using e-books for participants (p-value for participants=0.071). β coefficient is positive so SI have a positive relationship with ATU.

The results of AHP is consistent with the results of MRA. Since the value for the weight is smaller than the threshold value, SI are not effective dimensions for ATU. The weight for participants is 0.073.

While researchers of Hsiao (2013) and Chiang & Chia-Chen (2014) imply that SI have a significant influence on adoption of e-books, the studies of Davis (1989) and Phan and Daim (2011) indicate that SI do not have a significant influence on adoption of e-books. Hence, Hypothesis 5 (H_5) is not supported.

H_6: Cost is an effective dimension for (per AHP) and/or has a negative significant effect on (per MRA) attitude towards using e-books.

The findings of the MRA show that CO is not a significant factor for participants (p-value=0.130). It has a negative effect on attitude towards using e-books since β is -0.605.

The findings of the AHP indicate that CO is not an effective dimension for attitudes toward using e-books for participants (weight for participants=0.144) because the value of the weights is less than the threshold value of 0.166.

The researchers Bansal (2011) and Hwang (2014) indicate that CO has a significant effect on attitudes toward using e-books but the research performed by Williams, Slade & Dwivedi (2014) support the opposite. Thus, Hypothesis 6 (H_6) is not supported.

H_7: Cost increases the negative effect of perceived risk on attitude towards using e-books.

This hypothesis is only assessed employing MRA. The interaction term is not significant (p-value=0.117). The interaction term PR*CO does not have a significant influence on acceptance of e-books because the interaction term is not significant. Thus, Hypothesis 7 (H_7) is not supported.

CHAPTER 6

ANALYSES OF GROUP DIFFERENCES

AHP and MRA are employed to observe the impact of each factor on e-book acceptance. This study is carried out with two different student groups that are from BA and EEE & CE departments. Group analyses are performed in this chapter in order to make comparison and to understand differences between two groups.

6.1. Analytic Hierarchy Process Method

6.1.1. Descriptive Statistics

AHP Analyses are carried out with 64 BA and 64 EEE & CE graduate students since 22 of the students are eliminated from analyses. The descriptive statistics for both of the groups are explained and presented in the following sections.

6.1.1.1. Descriptive Statistics of BA Group

The descriptive statistics for the main factors, sublevel factors of PU and PEU for BA group are reported in Tables 6, 7 and 8 of Appendix B. It is confirmed from Jarque-Bera Test of Table 6 that PU (p-value=0.231) and PEU (p-value=0.273) have approximately normal distributions since p-values are greater than α=0.05. The skewness values for those variables are within the minimum and maximum range so it is verified that population being sampled is expected to be normal (Doane & Seward, 2011).

It is noted from Table 7 that Clarity (p-value=0.446) and Conciseness (p-value=0.064) have approximately normal distributions among the sublevel factors of PU because p-values are higher than α=0.05. It can be noted from skewness values that they are within the interval so populations being sampled are expected to be normal.

The findings in Table 8 state that only Portability has approximately normal distribution among the sublevel factors of PEU because p-value (0.267) is greater than α=0.05. Since the value of mean (0.189) is close to value of median (0.176) for this variable, the shape of the distribution is symmetric and approximately normal.

6.1.1.2. Descriptive Statistics of EEE & CE Group

The descriptive statistics for the main factors, sublevel factors of PU and PEU for EEE & CE group are presented in Tables 9, 10 and 11 of Appendix B. It is confirmed from Jarque-Bera Test of Table 9 that PU (p-value=0.277) and PEU (p-value=0.374) have approximately normal distributions since p-values are bigger than α=0.05. The mean values are close to the median values so it can be interpreted that data is normally distributed.

It is observed from Table 10 that Business Content (p-value=0.148) and Personal Content (p-value=0.099) display approximately normal distributions among the sublevel factors of PU because p-values are greater than α=0.05.

It is viewed from Table 11 that Navigation (p-value=0.291) and Read Online/Offline (p-value=0.123) show approximately normal distributions among the sublevel factors of PEU because p-values are higher than α=0.05. The closeness of mean values to median values for these variables supports that the data has normal distribution.

6.1.2. Mathematical Analyses

The weights and consistency ratios for main factors, sublevel factors of perceived usefulness and perceived ease of use are calculated using the explanations in Section 4.2.1.2 of Chapter 4. The outputs of AHP analyses for each group are presented and explained in Section 6.1.4.1.

6.1.3. Statistical Tests for Group Differences

Critical part of AHP is ranking the items which are obtained from ratio-scale judgements (Saaty, 1980). Priority vectors are produced as a result of AHP Analyses. A question here arises whether the values within a priority vector are really different. In order to come with an exact answer to this question, statistical tests are performed (Schmoldt, Kangas, Mendoza & Pesonen, 2013). Two-sample t-test and Mann-

Whitney U Test are applied in this thesis to observe the real differences between BA and EEE & CE groups.

Two-sample t-test is used for determining whether two population means are different. The test focuses on sample standard deviations (σ) which are used to determine σ for each population group. The population means are different if sample mean difference is greater than estimated variability of sample means. The test includes some assumptions that are as follows. Data should be continuous and randomly selected. There should be two independent samples and populations should be distributed normally. The variances of the two populations should be the same (Minitab, 2010).

Mann-Whitney U Test is a non-parametric test that is used for comparing differences between two independent groups or testing whether the medians of the two populations are equal or not. The data is either ordinal or continuous. It has 4 assumptions. First of all, the dependent variable should be ordinal or continuous. Next, independent variable should include two categorical independent groups. Observations should be independent. Last, Mann-Whitney U Test can be used when two variables do not display normal distribution (Laerd Statistics, 2013).

Two-sample t-test and Mann-Whitney U Test are conducted in Minitab 16 Statistical Software Programme to observe whether there really is difference between two independent groups.

First of all, the role of main factors of the model are examined between BA and EEE & CE groups. The factors of PU and PEU are tested using Two-sample t-test because PU and PEU for each population are distributed approximately normal and meet the other assumptions of two-sample t-test. The tested hypothesis is stated below:

H_0: There is no statistically significant difference in the means of main factors between BA and EEE & CE students. ($\mu_{BA} - \mu_{EEE\ \&\ CE} = 0$)

H_1: There is a statistically significant difference in the means of main factors between BA and EEE & CE students. ($\mu_{BA} - \mu_{EEE\ \&\ CE} \neq 0$)

The importance of the other main factors are investigated using Mann-Whitney U Test. PR, EC, SI and CO for each population are not distributed normally and meet

the other assumptions of Mann-Whitney U Test. The tested hypothesis is stated below:

H_0: There is no statistically significant difference in the medians of main factors between BA and EEE & CE students. ($\eta_{BA} - \eta_{EEE\ \&\ CE} = 0$)

H_1: There is a statistically significant difference in the medians of main factors between BA and EEE & CE students. ($\eta_{BA} - \eta_{EEE\ \&\ CE} \neq 0$)

The role of sublevel factors of PU are tested utilizing Mann-Whitney U Test. Each sample (variable) for both of the populations is not distributed normally and meets the other assumptions of Mann-Whitney U Test. The tested hypothesis is stated below:

H_0: There is no statistically significant difference in the medians of sublevel factors of PU between BA and EEE & CE students. ($\eta_{BA} - \eta_{EEE\ \&\ CE} = 0$)

H_1: There is a statistically significant difference in the medians of sublevel factors of PU between BA and EEE & CE students. ($\eta_{BA} - \eta_{EEE\ \&\ CE} \neq 0$)

The importance of sublevel factors of PEU are also investigated benefiting from Mann-Whitney U Test. Each sample (variable) for both of the populations is not distributed normally and satisfies the other assumptions of Mann-Whitney U Test. The tested hypothesis is stated below:

H_0: There is no statistically significant difference in the medians of sublevel factors of PEU between BA and EEE & CE students. ($\eta_{BA} - \eta_{EEE\ \&\ CE} = 0$)

H_1: There is a statistically significant difference in the medians of sublevel factors of PEU between BA and EEE & CE students. ($\eta_{BA} - \eta_{EEE\ \&\ CE} \neq 0$)

The results for these tests are included in Section 6.1.4.2.

6.1.4. Results

6.1.4.1. Weights and Consistency Ratios

The data is collected from two different participant groups: 75 of them are from Business Administration (BA) and the other 75 are from Electrical & Electronics Engineering (EEE) and Computer Engineering (CE) departments. The weights and

consistency ratios for BA and EEE & CE groups are calculated. The average value of these weights and consistency ratios are taken and shown in Table 35 and Table 36. The consistency ratios that are greater than 0.1 are eliminated. For each group 11 participants are not involved due to inconsistent ratio so 64 of them remain in the study.

Table 35: Consistency Ratios of Both Groups

	BA	**EEE & CE**
Main Factors	0.066	0.055
Sublevel Factors for PU	0.062	0.052
Sublevel Factors for PEU	0.053	0.052

Table 36: Attribute Priorities for Both Groups

MAIN FACTORS	**BA**	**EEE & CE**
Perceived Risk	0.119	0.102
Environmental Concerns	0.205	0.187
Perceived Usefulness	0.246	0.258
Perceived Ease of Use	0.219	0.225
Cost	0.155	0.132
Social Influences	0.053	0.093
SUBLEVEL FACTORS OF PU		
Conciseness	0.220	0.197
Clarity	0.180	0.151
Visual Design	0.152	0.149
Musicality	0.067	0.097
Business Content	0.184	0.190
Personal Content	0.195	0.214
SUBLEVEL FACTORS OF PEU		
Interface	0.164	0.118
Ergonomics	0.128	0.155
Portability	0.189	0.223
Installation	0.154	0.135
Navigation	0.118	0.130
Read Online/Offline	0.245	0.238

Average values of consistency ratios for each group are presented in Table 35. It can be stated that the decisions for both of the groups (BA and EEE & CE) regarding each attribute are highly consistent because CR's are smaller than 0.1.

The average values of the weights (or priorities) for each group are summarized briefly in Table 36.

Table 36 and Figure 16 present the weights of the main factors that effect attitudes toward using e-books. When prioritising the six attributes for ATU, both of the groups give highest priority to perceived usefulness with weighting values of 0.246 and 0.258. Perceived ease of use with the weighting values of 0.219 and 0.225 is placed on second position. Environmental concerns with the weighting values of 0.205 and 0.187 take the third position and social influences are placed on the last position possessing values of 0.053 and 0.093. All of the attributes except PR, CO and SI are considered as effective dimensions for attitudes toward using e-books because their weights are higher than threshold value 0.166 (16.6 %).

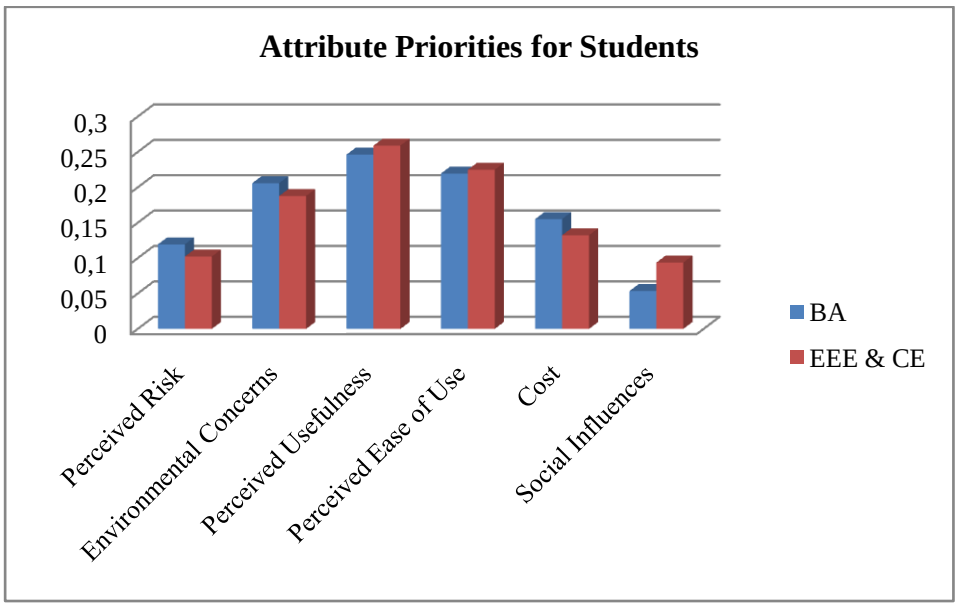

Figure 16: Attribute (Main Factor) Priorities for Both Groups

Table 36 and Figure 17 indicate weights of sublevel factors of PU that affect attitudes toward using e-books. When prioritising the six attributes for PU, BA gives highest priority to conciseness with weighting value of 0.220. Personal content with the weighting value of 0.195 is placed on second position. Personal content (0.214) is the first priority and conciseness (0.197) is the second for EEE & CE group. Business Content with the weighting values of 0.184 and 0.190 takes the third position and musicality is placed on the last position possessing values of 0.067 and 0.097. The attributes of conciseness, business content, personal content and clarity (for only BA) are considered as effective dimensions for attitudes toward using e-books because their weights are higher than threshold value 0.166 (16.6 %).

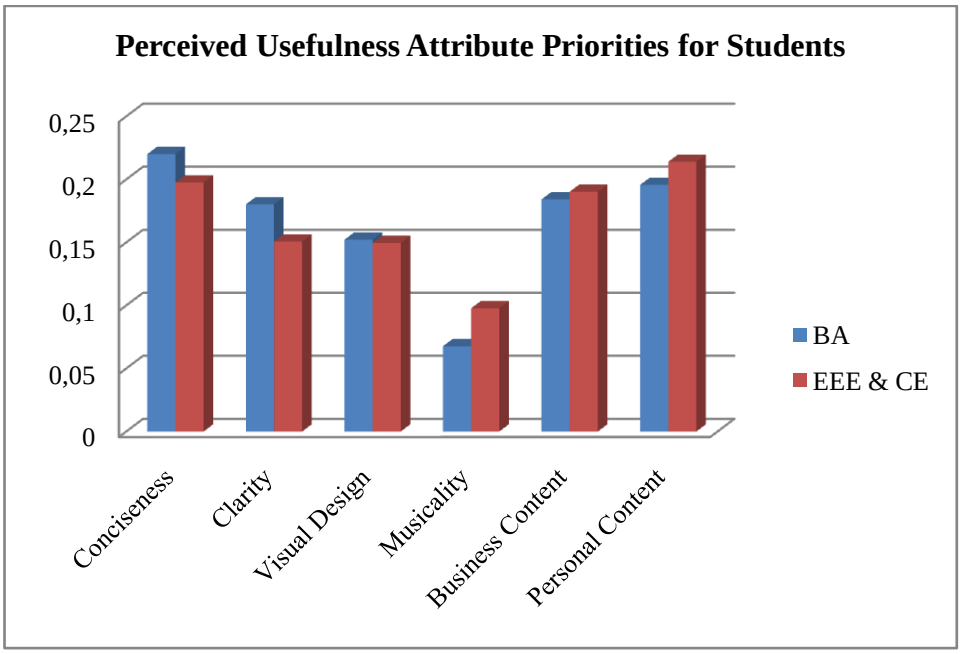

Figure 17: Attribute Priorities of Perceived Usefulness for Both Groups

Table 36 and Figure 18 display weights of sublevel factors of PEU. Among the six attributes for PEU, groups of BA and EEE & CE give highest priority to read online/offline with weighting values of 0.245 and 0.238. Portability with the weighting values of 0.189 and 0.223 is placed on second position. The third priority differs among the groups. While BA gives third position to interface with weighting value of 0.164, EEE & CE give it to ergonomics with value of 0.154. The smallest

weights also change among the groups. While BA prefer navigation that possess value of 0.118, EEE & CE contribute it with interface that has weight value of 0.118. The attributes of read online/offline and portability are considered as effective dimensions for attitudes toward using e-books because their weights are higher than threshold value 0.166 (16.66 %).

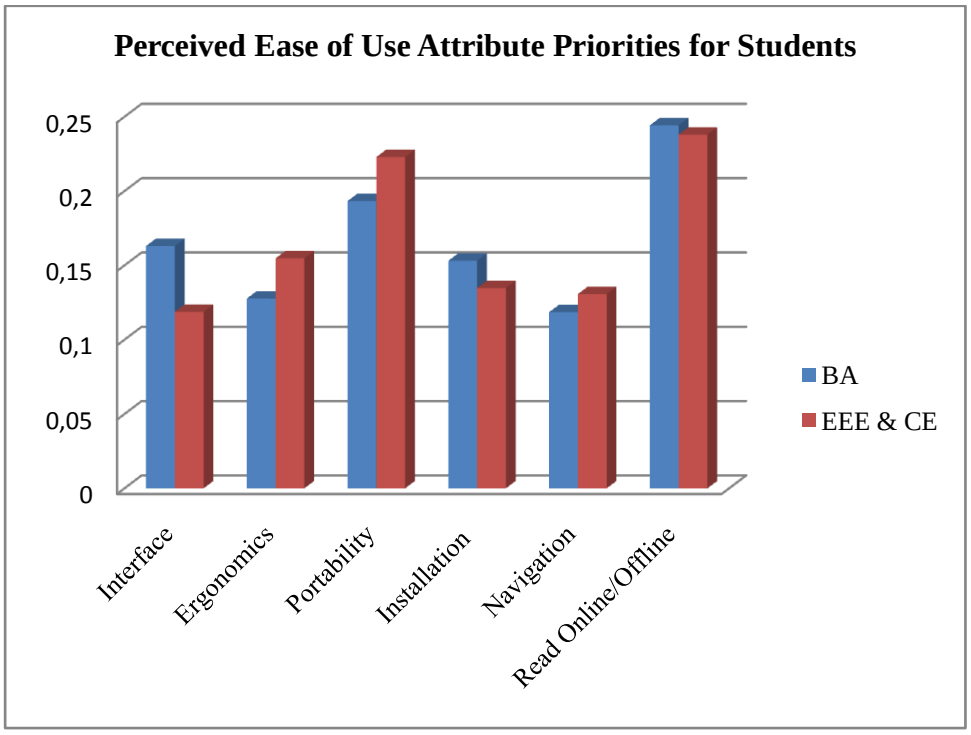

Figure 18: Attribute Priorities of Perceived Ease of Use for Both Groups

6.1.4.2. Statistical Tests For Group Differences

The results of Two-sample t-test and Mann-Whitney U Test are presented and discussed in this section.

The results of the hypothesis test (Two-sample t-test), which consist of main factors of the model, is shown in Table 17. For the factor PU, the difference between sample means (-0.013) is an estimate of the difference between population means. There is 95 % of confidence that the difference between the mean number of PU is between -0.005 and 0.027. Since p-value (0.534)>$\propto$=0.05. Null hypothesis is accepted at $\propto$=0.05 level and it is stated that there is no statistically significant difference in the

means of PU between BA and EEE & CE students. For the factor of PEU, null hypothesis is also accepted at $\propto$=0.05 level since p-value (0.788)>$\propto$=0.05. There is no statistically significant difference in the means of PEU between BA and EEE & CE students. Detailed outputs of Two-Sample T-Test for main factors are contained in Table 37 of Appendix B.

Table 17: Two-Sample T-Test Outputs for Main Factors

	Perceived Usefulness	**Perceived Ease of Use**
Estimate for Difference	-0.013	-0.005
95% CI for Difference	(-0.053; 0.027)	(-0.045; 0,034)
p-value	0.534	0.788
Difference in means	No	No

These findings present supportive evidences to the results of AHP that the weighting values of PU (0.246 and 0.258) and PEU (0.219 and 0.225) for BA and EEE & CE students in Table 36 and Figure 16 are close.

Table 18: Mann-Whitney U Test Outputs for Main Factors

	Perceived Risk	**Environmental Concerns**	**Social Influences**	**Cost**
Point Estimate for ETA1-ETA2	0.005	0.007	-0.013	0.005
95.0 Percent CI for ETA1-ETA2	(-0.004; 0.017)	(-0.027; 0.048)	(-0.029;-0.002)	(-0,018;0,037)
p-value	0.276	0.708	0.007	0.625
Difference in Medians	No	No	Yes	No

The results of the hypothesis test (Mann-Whitney U Test), which provide information about the other main factors of the model, is shown in Table 18. It is seen that among the main factors of PR, EC, SI and CO, only SI differs between the groups since p-value (0.007)<$\propto$=0.05. Null hypothesis is rejected at $\propto$=0.05 level and it is concluded that there is a statistically significant difference in the medians of

SI between two groups. For this factor, the point estimate (-0.013) is the estimated median of difference between two groups. There is 95 % of confidence that the estimated median difference of SI between two groups is between -0.029 and -0.003. Detailed outputs of Mann-Whitney U Test for main factors are included in Table 38 of Appendix B.

The findings can be supported using Table 36 and Figure 16 that the weighting values of PR (0.119 and 0.102), EC (0.205 and 0.187) and CO (0.155 and 0.132) for BA and EEE & CE students are near. However, there is more difference in the value of the weights for SI (0.005 and 0.094).

Table 19: Mann-Whitney Test Outputs for Sublevel Factors of Perceived Usefulness

	Conciseness	**Clarity**	**Visual Design**	**Musicality**	**Business Content**	**Personal Content**
Point Estimate for ETA1-ETA2	0.025	0.033	-0.001	-0.014	-0.010	-0.015
95.0 Percent CI for ETA1-ETA2	(-0.020; 0.067)	(0.0004 ; 0.062)	(-0.029; 0.032)	(-0.029; -0.006)	(-0.049; 0.030)	(-0.057; 0.025)
p-value	0.278	0.047	0.881	0.001	0.684	0.416
Difference in Medians	No	Yes	No	Yes	No	No

The findings of the hypothesis test (Mann-Whitney U Test), which includes the examination of sublevel factors of PU, is provided in Table 19. It is observed that among the sublevel factors of PU, clarity and musicality differ between the groups. Since p-value of c (0.047)$<\propto=0.05$ and p-value of musicality (0.001)$<\propto=0.05$. Null hypothesis is rejected at $\propto=0.05$ level and it is concluded that there is a statistically significant difference in the medians of clarity and musicality between two groups. The point estimate for clarity is 0.033 and there is 95 % of confidence that the estimated median difference of clarity between two groups is between 0.0005 and 0.062. The point estimate for Musicality is -0.014 and there is 95 % of confidence that the estimated median difference of musicality between two groups is between

-0.029 and -0.061. Detailed outputs of Mann-Whitney U Test for sublevel factors of PU are included in Table 39 of Appendix B.

It is noted that there are differences in both clarity and musicality between BA and EEE & CE students. It can also be observed from Table 36 and Figure 17 that there is more difference in the weighting values of clarity and musicality than the other factors.

Table 20: Mann-Whitney Test Outputs for Sublevel Factors of Perceived Ease of Use

	Interface	**Ergonomics**	**Portability**	**Installation**	**Navigation**	**Read Online/ Offline**
Point Estimate for ETA1-ETA2	0.024	-0.026	-0.025	0.0160	-0.018	-0.003
95.0 Percent CI for ETA1-ETA2	(-0.002; 0.058)	(-0.058; 0.00002)	(-0.066; 0.007)	(-0.008; 0.052)	(-0.046; 0.004)	(-0.053; 0.045)
p-value	0.095	0.039	0.130	0.219	0.119	0.851
Difference in Medians	No	Yes	No	No	No	No

The findings of the hypothesis test (Mann-Whitney U Test), which are related to sublevel factors of PEU, is pointed out in Table 20. It is discovered that among the sublevel factors of PEU, ergonomics varies between the two groups. Since p-value of ergonomics (0.039)$<\propto=0.05$, null hypothesis is rejected at $\propto=0.05$ level and it is concluded that there is a statistically significant difference in the medians of ergonomics between two groups. The point estimate for the factor is -0.026 and it is within the 95 % confidence interval. Table 40 in Appendix B consists of detailed results of Mann-Whitney U Test for sublevel factors of PEU.

6.2. Multiple Regression Analyses

The regression analyses are applied separetely for graduate students of BA and EEE & CE groups This section is comprised of descriptive statistics, regression analyses, results and hypotheses testing for both groups.

6.2.1. Descriptive Statistics

The descriptive statistics are explained and presented using Eviews 8 Software Programme in this section. A total of 149 graduate students participated in the study. 75 of the students are from BA and 74 of them are from EEE & CE departments.

6.2.1.1. Descriptive Statistics of the Variables for BA Group

Table 22 indicates descriptive statistics for the variables of BA group. Jarque-Bera Test statistics reveals that variables show approximately normal distributions since p-values are greater than α=0.05. The mean values are close to the median values so data is distributed approximately normal. Table 42 in Appendix C presents detailed descriptive statistics of variables for BA group.

Table 22: Descriptive Statistics of Variables for BA Group

	ATU	PU	PEU	PR	EC	SI	CO
Mean	3.863	3.484	3.899	2.738	4.363	2.606	2.951
Median	4	3.5	4	2.8	4.4	2.75	3
Skewness	-0.498	0.106	-0.104	0.150	-0.345	-0.157	-0.079
Kurtosis	2.664	2.706	2.594	3.048	2.773	2.495	2.643
Jarque-Bera	3.462	0.411	0.651	0.291	1.653	1.105	0.478
p-value	0.177	0.814	0.722	0.865	0.437	0.575	0.787
Observations	75	75	75	75	75	75	75

6.2.1.2. Descriptive Statistics of the Variables for EEE & CE Group

Table 23 reports descriptive statistics for the variables of EEE & CE group. It is viewed from the table that the variables except SI have approximately normal distributions because p-values are greater than α=0.05. The closeness of mean values

to median values for all the variables is also an evidence of the distribution being symmetric and approximately normal. Detailed descriptive statistics of variables for EEE & CE group is shown in Table 43 of Appendix C.

Table 23: Descriptive Statistics of Variables for EEE & CE Group

	ATU	PU	PEU	PR	EC	SI	CO
Mean	3.787	3.617	3.847	2.654	4.092	2.632	2.923
Median	3.875	3.666	3.857	2.8	4.2	2.75	3
Skewness	-0.612	-0.244	-0.010	-0.046	-0.693	-0.051	-0.008
Kurtosis	2.709	2.856	2.794	2.530	3.415	2.283	3.699
Jarque-Bera	4.876	0.798	0.132	0.706	6.464	1.618	1.507
p-value	0.0873	0.671	0.936	0.703	0.039	0.445	0.470
Observations	74	74	74	74	74	74	74

6.2.2. Correlations

Correlations between variables for each group are shown in Table 24 of Appendix C. The correlation coefficient values for BA students are examined primarily considering Pearson's Correlation Coefficient Intervals. It is remarked that the relationship between ATU and PU (0.568) and ATU and PEU (0.522) are strong. The correlation between ATU and EC (0.325), PU and PEU (0.451), PR and PU (-0.243), EC and PU (0.488), SI and PU (0.306), PR and PEU (-0.479) and PR and CO (0.337) are moderate to strong. The other correlations, which are left in the table, indicate weak relationship because the values are approaching to 0.

The correlation coefficient values among variables for EEE & CE students are discussed. It is observed that the relationship between variables of ATU and PU (0.543) and ATU and PEU (0.528) are strong. The correlation between ATU and SI (0.330), PU and PEU (0.433), EC and PU (0.398), SI and PU (0.433) and PR and PEU (-0.305) are moderate to strong. The remaining correlations, which are not mentioned, point out weak relationship because the values are approaching to 0.

6.2.3. Regression Analyses and Results

This subsection provides MRA results for the collected data from BA and EEE & CE department students for the aim of analyzing the influence of the factors on attitudes toward using e-books. Regression models, which use the conceptual model in Figure 3, are applied to two different groups. First analyses consist of BA and second analyses include EEE & CE students.

The outputs of the regression model are included in Appendix C. It consists of various tables of diagnostic tests results such as serial correlation, homoscedasticity, multicollinearity, stability and normality tests.

6.2.3.1. Regression Results of BA Group

The results of regression analysis for BA students group are reported in Table 25. The model is statistically significant since F-statistic=7.099 and p-value<0.0001 (p-value<α). Statistically significant F implies that at least some regression coefficients are statistically significant and it gives information about the effects of the variables in the model. It is a good model and it has a good fit (R^2=42.585 %). 36.586 % (Adjusted R^2) of the variation in attitudes toward using e-books is explained by change in the independent variables.

Perceived Usefulness (PU) (β=0.607, p-value=0.003) is the most significant factor or the strongest predictor in the model. It differs significantly from zero and the likelihood of being wrong is 0.3 %. It has a positive impact on attitude towards using e-books. One unit increase in the value of PU leads to an increase in the average value of attitudes toward using e-books by 0.607 units. PU is positively related with ATU because it is the belief that using the system improves the performance. The increase in PU leads more acceptance behaviour of e-books (Davis, 1989).

Perceived Ease of Use (PEU) (β=0.445, p-value=0.014) is the other significant factor. It differs significantly from zero and the likelihood of being wrong is 1.4 %. It has a positive relationship with attitude towards using e-books. One unit increase in the value of PEU results in an increase in the average value of attitudes toward using e-books by 0.445 units. PEU has a positive impact on attitudes toward using e-books because it is the belief that using the system requires less effort. Increase in the level

of PEU brings about more positive attitudes toward using a technology (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013).

Table 25: The Outputs for Regression Analyses of BA Group

Variable	Coefficient	Std. Error	t-Statistic	p-value	Standardized Coefficient
C	1.060	2.242	0.472	0.637	
PU	0.607	0.195	3.110	**0.003**	0.386
PEU	0.445	0.176	2.519	**0.014**	0.295
PR	-0.685	0.716	-0.957	0.341	-0.496
EC	0.093	0.223	0.417	0.677	0.045
SI	0.109	0.126	0.866	0.389	0.088
CO	-0.575	0.688	-0.835	0.406	-0.415
PR*CO	0.223	0.253	0.879	0.382	0.712
R-squared	0.42		**Mean dependent var**		3.863
Adjusted R-squared	0.365		**S.D. dependent var**		0.920
S.E. of regression	0.732		**Akaike info criterion**		2.316
Sum squared resid	35.977		**Schwarz criterion**		2.563
Log likelihood	-78.872		**Hannan-Quinn criter.**		2.415
F-statistic	7.099		**Durbin-Watson stat**		1.873
p-value	p<0.0001				

The results indicate that PU and PEU are significant predictors of attitude towards using e-books. They affect acceptance of e-books. However, factors of PR, EC, SI and CO and interaction term of PR*CO are not significant determinants of students acceptance of e-books. The regression equation for the model is as follows:

$$ATU = 1.060 + 0.607\ PU + 0.445\ PEU - 0.685\ PR + 0.093\ EC + 0.109\ SI - 0.575\ CO + 0.223\ PR*CO \quad (5)$$

The diagnostic tests are included in Appendix C. It is observed from the outputs that the assumptions of serial correlation, homoscedasticity, normality, stability and multicollinearity are not violated. The interpretation of these tests described in

Section 5.2.3.1. The results of the diagnostic tests are shown in Table 26, Table 27, Figure 10 and Figure 11 of Appendix C.

6.2.3.2. Regression Results of EEE & CE Group

The results of regression analysis for EEE and CE student groups are presented in Table 28. 1 outlier is eliminated from analyses. The model is statistically significant since F-statistic=7.953 and p-value<0.0001 (p-value<α). Statistically significant F means that there exists at least some regression coefficients that are statistically significant and it gives information about the influences of the variables in the model. It is a good model and it has a good fit (R^2=45.755 %). 40.002 % (Adjusted R^2) of the variation in attitudes toward using e-books is explained by change in independent variables.

Perceived Ease of Use (PEU) (β=0.461, p-value=0.005) is the most significant factor or the strongest predictor in the model. It differs significantly from zero and the likelihood of being wrong is 0.57 %. It has a positive relationship with attitudes toward using e-books. One unit increase in the value of PEU leads to an increase in the average value of ATU by 0.461 units. PEU has a positive relationship with ATU because the increase in the level of perceived ease of use causes more positive attitudes towards using a technology (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013).

Perceived Usefulness (PU) (β=0.502, p-value=0.007) is the other significant factor in the model. It differs significantly from zero and the likelihood of being wrong is 0.7 %. It has a positive effect on attitudes toward using e-books. One unit increase in the value of PU leads to an increase in the average value of ATU by 0.502 units. PU is positively related with ATU because it is the belief that using the system improves the performance. The increase in PU leads to an increase in acceptance behaviour of e-books (Davis, 1989).

The findings point out that PU and PEU are significant factors that affect acceptance of e-books. Still, factors of PR, EC, SI and CO and interaction term of PR*CO are not significant predictors of students acceptance of e-books. The regression equation for the model is as follows:

$$ATU = 1.625 + 0.502\ PU + 0.461\ PEU - 1.017\ PR + 0.138\ EC + 0.220\ SI - 0.690\ CO + 0.272\ PR*CO \quad (6)$$

Table 28: The Outputs for Regression Analyses of EEE & CE Group

Variable	Coefficient	Std. Error	t-Statistic	p-value	Standardized Coefficient
C	1.625	1.725	0.942	0.349	
PU	0.502	0.183	2.749	**0.007**	0.328
PEU	0.461	0.161	2.861	**0.005**	0.316
PR	-1.017	0.617	-1.649	0.104	-0.674
EC	0.138	0.173	0.798	0.427	0.081
SI	0.220	0.145	1.519	0.133	0.156
CO	-0.690	0.525	-1.312	0.194	-0.477
PR*CO	0.272	0.201	1.3556	0.179	0.815
R-squared	0.457		**Mean dependent var**		3.787
Adjusted R-squared	0.400		**S.D. dependent var**		0.965
S.E. of regression	0.748		**Akaike info criterion**		2.359
Sum squared resid	36.93		**Schwarz criterion**		2.608
Log likelihood	-79.28		**Hannan-Quinn criter.**		2.458
F-statistic	7.953		**Durbin-Watson stat**		2.196
p-value	p<0.0001				

The diagnostic tests are demonstrated in Appendix C. The outputs indicate that the assumptions of serial correlation, homoscedasticity, normality, stability and multicollinearity are not violated. The logic of how these tests are performed is explained in Section 5.2.3.1. Tables 29 and 30 include serial correlation, heteroscedasticity tests and values of variance inflation factors for EEE & CE Group. Figure 12 and Figure 13 are comprised of normality and stability tests results.

6.3. Hypotheses Testing

The developed hypotheses in Section 3.2 are examined utilizing AHP and MRA results. A summary of regression results for both groups (BA and EEE & CE) are given in Table 44.

Table 44: Summary of Regression Results for Both Groups

		Coefficient (β)	p-value
PU	**BA**	0.607	**0.003**
	EEE & CE	0.502	**0.007**
PEU	**BA**	0.445	**0.0142**
	EEE & CE	0.461	**0.005**
PR	**BA**	-0.685	0.341
	EEE & CE	-1.017	0.104
EC	**BA**	0.093	0.677
	EEE & CE	0.138	0.427
SI	**BA**	0.109	0.389
	EEE & CE	0.220	0.133
CO	**BA**	-0.575	0.406
	EEE & CE	-0.690	0.192
PR*CO	**BA**	0.223	0.382
	EEE & CE	0.272	0.179

H_1: Perceived usefulness is an effective dimension for (per AHP) and/or has a significant positive effect on (per MRA) attitude towards using e-books.

It is observed from the results of MRA that perceived usefulness (PU) is a significant factor effecting ATU for both groups (p-value for BA=0.003 and p-value for EEE & CE=0.007). It has a positive effect on attitude towards using e-books (β for BA=0.607 and β for EEE & CE=0.502).

The findings of the AHP show that PU is an effective dimension for attitudes toward using e-books for both groups (weight for BA=0.246 and weight for EEE & CE=0.258). It is an effective dimension since the weights are greater than the threshold value of 0.166.

The findings of both of the methods are in line with the previous studies of Davis (1985, 1989), Letchumanan and Tarmizi (2011), Lai and Ulhas (2012), Anton, Camarero and Rodriguez (2013), Agarwal and Prasad (1997), Phan and Daim (2011) and Al-Adwan, Al-Adwan and Smedley (2013). Thus, Hypothesis 1 (H_1) is supported.

H_2: Perceived ease of use is an effective dimension for (per AHP) and/or has a significant positive effect on (per MRA) attitude towards using e-books.

The results of the MRA claim that perceived ease of use (PEU) is a significant factor for both groups (p-value for BA=0.014 and p-value for EEE & CE=0.005). It has a positive impact on attitude towards using e-books (β for BA=0.445 and β for EEE & CE=0.461).

The results of the AHP point out that PEU is an effective dimension for attitudes toward using e-books for both groups (weight for BA=0.219 and weight for EEE & CE=0.225). Since the weights are higher than the threshold value of 0.166, it is considered as an effective dimension.

The results of both of the methods are in parallel with the previous indications of Davis (1985, 1989), Letchumanan and Tarmizi (2011), Lai and Ulhas (2012), Anton, Camarero and Rodriguez (2013), Agarwal and Prasad (1997), Phan and Daim (2011) and Al-Adwan, Al-Adwan and Smedley (2013). Hence, Hypothesis 2 (H_2) is supported.

H_3: Perceived risk is an effective dimension for (per AHP) and/or has a significant negative effect on (per MRA) attitude towards using e-books.

It is noted from the findings of the MRA that perceived pisk (PR) is not a significant factor on attitudes toward using e-books for both groups (p-value for BA=0.341 and p-value for EEE & CE=0.104). PR has a negative relationship with ATU due to negative β coefficients.

The findings of the AHP reveal that PR is not an effective dimension for attitudes toward using e-books for both groups (weight for BA=0.119 and weight for EEE & CE=0.102) because the weights are smaller than the threshold value of 0.166.

While the studies of Claudia, Alexandra and Ionut (2012) and Liu and Wei (2003) state that PR does not have a significant influence on adoption of e-books, research of Lin, Tzeng, Chin and Chang (2010), Pavlou (2003) and Wu and Wang (2005) conclude that PR has a significant influence on adoption of e-books. Regarding this view, Hypothesis 3 (H_3) is not supported.

H_4: Environmental concerns are effective dimensions for (per AHP) and/or have a positive significant effect on (per MRA) attitude towards using e-books.

When the results of MRA are scanned, it is seen that EC do not have a significant effect on attitudes toward using e-books for both groups (p-value for BA=0.677 and p-value for EEE & CE=0.427). There is a positive relationship between EC and attitudes toward using e-books because β coefficients are positive.

The results of AHP imply that EC are effective dimensions for attitudes toward using e-books because the values of the weights are larger than the threshold value of 0.166 for both groups (weight for BA=0.205 and weight for EEE & CE=0.187).

While the studies performed by Gill, Crosby and Taylor (2001) support that EC do not have a significant influence on attitudes toward using e-books, the research of Bansal (2011) and Hwang (2014) point out the opposite. On account of these facts, Hypothesis 4 (H_4) is not supported.

H_5: Social influences are effective dimensions for (per AHP) and/or have a positive significant effect on (per MRA) attitude towards using e-books.

The outputs of MRA verify that SI do not have a significant effect on attitudes toward using e-books for both groups (p-value for BA=0.389 and p-value for EEE & CE=0.133). SI have a positive relationship with ATU since β coefficients are not negative.

The results of both AHP and MRA indicate similar findings that SI are not effective dimensions for attitudes towards using e-books because the values of the weights are smaller than the threshold value (weight for BA=0.053 and weight for EEE & CE=0.093).

Whereas the articles of Davis (1989) and Phan and Daim (2011) show that SI do not have a significant influence on adoption of e-books, the studies of Hsiao (2013) and Chiang & Chia-Chen (2014) indicate that SI have a significant influence on adoption of e-books. Thus, Hypothesis 5 (H_5) is not supported.

H_6: Cost is an effective dimension for (per AHP) and/or has a negative significant effect on (per MRA) attitude towards using e-books.

MRA confirms that CO is not a significant factor for both groups (p-value for BA=0.406 and p-value for EEE & CE=0.194). Negative β coefficients show its negative relationship with attitude towards using e-books.

The results of AHP are consistent with the findings of MRA. Since the values for the weights are less than the threshold value of 0.166, CO is not an effective dimension for e-book adoption of both groups (weight for BA=0.155 and weight for EEE & CE=0.132).

The researchers Bansal (2011) and Hwang (2014) noted that CO has a significant effect on e-book acceptance but the studies performed by Williams, Slade & Dwivedi (2014) support the opposite. Hence, Hypothesis 6 (H_6) is not supported.

H_7: Cost increases the negative effect of perceived risk on attitude towards using e-books.

This hypothesis is only tested using MRA. It is viewed from the results that the interaction term for each group is not significant (p-value for BA= 0.382 and p-value for EEE & CE = 0.179). This means that the interaction term PR*CO does not have a significant effect on adoption of e-books. In this manner, Hypothesis 7 (H_7) is not supported.

CHAPTER 7

DISCUSSION AND CONCLUSION

Electronic books (e-books) are recognized as the next generation of traditional printable books (Poon, 2014). Improvements in technology have given rise to an increase in the availability of different e-book types and featured devices. The diversity of these features have led to an increase in the use of e-books.

The acceptance of the technology for e-books varies depending on users' interests and preferences. The purpose of this study is to investigate and determine the factors that affect acceptance of technology for e-books. The Technology Acceptance Model (TAM) is used to explain reasons behind the adoption of technology in this thesis. Existing studies are reviewed to determine the factors which influence e-book technology adoption. Factors of perceived usefulness and perceived ease of use are selected based on TAM. The other factors, which are main factors (perceived risk, environmental concerns, social influences and cost), sublevel factors of PU (conciseness, clarity, visual design, musicality, business content and personal content) and sublevel factors of PEU (of interface, ergonomics, portability, installation ability, navigation and capability to read online or offline), are determined considering the relevant literature.

These factors are chosen because each of them plays a critical role and has an effect on consumers' decision making process of purchasing. This process is comprised of psychological, personal & environmental uncontrollable and content factors. Each factor in the conceptual model is involved in one of these factors. Perceived risk is included in psychological, environmental concerns and social influences are considered as a part of personal & environmental uncontrollable factors and cost is related to content factors. Motivations to purchase products are influenced directly by these factors (Constantindes, 2004).

A conceptual model (as given in Figure 3) is developed based on the factors that are mentioned above. By using the conceptual model, questionnaires are prepared to obtain the data from 150 graduate and doctorate students of BA, EEE and CE departments from METU.

The methods of AHP and MRA are used to analyze the effects of factors on e-book adoption and to test the proposed model. Although the AHP Method is used to examine the importance of both sublevel and main factors of the model, MRA is applied to explain only main factors on ATU.

The results of the AHP Method and MRA present important implications about the importance and effects of main factors. According to the results of AHP, it is reported that PU, PEU and EC are considered as effective dimensions for attitudes toward using e-books. PU, PEU and EC are the most important factors that have influence on e-book adoption for participants. PU is the first priority, PEU is the second priority and EC are the third priority for participants.

According to the results of the MRA, it is reported that PU and PEU are the significant predictors of attitude towards using e-books for participants. They affect acceptance of e-books and they both have a positive relationship with attitude towards using e-books.

The results show that the findings of the two methods are consistent. It is noted that PU and PEU are the most important factors that have impact on acceptance of electronic books for students. The results are expected because TAM focuses on mainly two factors which are perceived usefulness and perceived ease of use. These factors help to develop an understanding and determination of the attitude towards using a new technology. Since PU is related to the usages that improve job performances, people give more importance to this attitude. PEU is also a significant factor because it is about ease of the use of system (Davis, 1989). It has a direct influence on attitudes toward adopting a technology. Higher levels of PU and PEU bring about more positive attitudes toward using a technology (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013). The results align with the previous findings of Davis (1985, 1989), Letchumanan and Tarmizi (2011), Lai and Ulhas (2012), Anton, Camarero and Rodriguez (2013), Agarwal and Prasad (1997), Phan and Daim (2011) and Al-Adwan, Al-Adwan and Smedley (2013).

EC is determined to be an important dimension in AHP but not in MRA. The reason can be explained with different findings of various studies. Although the studies of Bansal (2011) and Hwang (2014) state that EC has a significant effect on attitudes toward using e-books, the research performed by Gill, Crosby and Taylor (2001) support the opposite. EC can or cannot not be considered as an important dimension because it depends on people's consciousness of saving the environment.

Sublevel factors are examined using AHP and the results of AHP for sublevel factors of PU state that conciseness, business content and personal content are considered to be effective dimensions for attitudes toward using e-books. Participants give the first priority to conciseness, the second priority to personal content and the third priority to business content. Since conciseness is related to the structure of how easily the contents are designed and arranged to give meaning, it is not surprising that participants give highest priority to it. The other features of the e-book device depend on this component. In order to use the e-book device and reach other features, people must first understand the contents in a simple way (Kim, Oh & Shin, 2010; Tsai & Li, 2011). Participants also give importance to content (business and personal) because people have different interests and needs. Consumers purchase e-books according to the needs that have to be fulfilled. The results are supported with the studies of Phan and Daim (2011) and Tsai and Li (2011).

The findings of AHP for sublevel factors of PEU indicate that the capability to Read online or offline and portability are effective dimensions for attitudes toward using e-books. Students give the first priority to read online or offline and the second priority to portability. The top decision is read online or offline because the availability of information is important whenever needed regardless of being online or offline. Portability is an essential feature for consumers. When purchasing devices, lighter and smaller devices are always preferred due to ease of carrying (Phan & Daim, 2011).

The comparison of the two groups is also made to understand the influence of each factor on adoption of e-books. The first group includes graduates of the Business Administration department and the second group is comprised of Electrical & Electronics Engineering and Computer Engineering department graduates.

The results of AHP show that both groups consider PU, PEU and EC as effective dimensions for e-book adoption. PU is the first rank, PEU is the second rank and EC are the third rank for both groups. Two-sample t-tests are performed to investigate whether there really exists statistical differences between the two groups in terms of means of each factor. Test findings show that there is no significant difference in the means of each factor between BA and EEE & CE students.

The findings of the MRA reports that PU and PEU are the significant predictors of attitude towards using e-books for BA and EEE & CE department graduates. These factors have a positive significant effect on attitude towards using e-books. It is observed that the findings of the both methods are coherent in a way that PU and PEU are important predictors that influence e-book adoption for both groups.

When the sublevel factors of PU are analyzed with AHP, it is seen that conciseness (for each group), business content (for each group), personal content (for each group) and clarity (for only BA) are considered to be effective dimensions for attitudes toward using e-books. While BA group prefer primarily conciseness, then personal content and lastly business content, EEE & CE groups give the first rank to personal Content, the second rank to conciseness and the third rank to business content. Mann-Whitney U Test is performed to observe whether there is a difference between the two groups in terms of medians of each factor. The test results imply that there is a statistically significant difference in medians of clarity between BA and EEE & CE students.

The results of AHP for sublevel factors of PEU point out that the capability to read online or offline and portability are effective dimensions for attitudes toward using e-books. They are significant factors that have effect on e-book acceptance for each group. Both groups give the first rank to capability to read online or offline and the second rank to portability. No differences exist among the effective factors according to the result.

According to both of the methods, perceived usefulness and perceived ease of use are the most influential factors on acceptance of electronic books. Both BA and EEE & CE students give importance to factors of perceived usefulness and perceived ease of use. While PEU is more significant in EEE & CE group, BA group gives more importance to PU. When the effective factors are taken into consideration, it is

observed from AHP analyses that the main factors did not differ between two groups. However, there is a difference in clarity between BA and EEE & CE students.

This study is significant because the way technology develops is related to an understanding of the factors that positively affect consumers' use or purchase of e-books. This may lead to technology advancement procedure that improve consumer satisfaction and purchase of e-books. The features of e-books change with the improvement of technology. The product must be updated continuously with new improvements and it must be widely accepted in the long run. This can be attained by understanding consumer needs, satisfying those needs and exploring the factors that influence product acceptance.

The main contributions of this study are as follows. This study integrates new factors of perceived risk, environmental concerns, social influence and cost with the main factors of TAM. Thus, TAM is enhanced with the described factors. Methods of AHP and MRA are used to analyze the influence of the factors on e-book adoption and to see if both of the results are consistent.

There are limitations of this study. This study is conducted with 150 students from METU. They are from the Business Administration, Electrical & Electronics Engineering and Computer Engineering departments. It is limited to graduate and doctorate students of different departments. These departments and education level may not be enough to explain the influence of factors that affect acceptance of e-books.

Several factors, which are identified from the literature, are chosen considering the features of e-books. Other researchers might select these factors differently because external variables may change depending on the researcher and literature. Moreover, the resarch is only confined with two methods that are: AHP and MRA.

This study may be developed further in some other dimensions. For future research, the number of participants of the survey can be increased to get more precise results. Using online surveys instead of hard copies can save time and can help to increase the number of participants.

The Structural Equational Modeling (SEM) Method is generally used in similar types of studies that are related to TAM. The method needs at least 150 participants for a

group. With the increase in the number of participants, SEM can also be used rather than AHP and Multiple Regression Analysis. Thus, coherency and reliability of the results can be improved regarding the influence of each factor on decision making behaviours among electronic books' features.

Different departments may be selected for further analysis because these departments may not be enough to clarify the impact of factors that influence adoption of e-books.

New factors and different models can be integrated to TAM in order to understand the effects of some other variables and models on technology acceptance of electronic books.

To sum up, the adoption of the technology varies even if there is an increase in the use of e-books. In order for a product to be accepted by consumers for a long time, the needs of the consumer must be fulfilled and the factors that affect product adoption process must be examined.

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APPENDICES

APPENDIX A: QUESTIONNAIRE FORM

Dear participant,

You are kindly invited to carry out a research study that is being performed by an MBA student from Middle East Technical University. The purpose of this study is to obtain your opinion about **your attitudes towards using electronic books.** Your opinion will be acquired with various tests that have no right or wrong answers. It is important to answer the questions that best reflect your real opinion. Your confidentiality and anonymity will be assured. No personal information will be disclosed and the results of this study will only be used for research purposes. Your effort and time spent for this study is truly appreciated.

INSTRUCTIONS:

There are 2 sections of tests in this study. If there is any concept that does not make sense, you may use **Appendix** for reference. **For each section of the study:**

- Please read the instructions **CAREFULLY!**
- Then, answer the given questions by providing the best choice that reflect your real opinion.

THANK YOU FOR YOU TIME, PATIENCE AND CONTRIBUTION!

In this survey, we would like to obtain your opinion about **your attitudes towards using electronic books.** The electronic books are stored on and used with devices that include readers such as Kindle, tablets and smartphones if used for reading purposes.

SECTION 1

In this section of the survey, we would like to obtain your opinion about **your attitudes towards using electronic books.** You have to give your opinion by answering the questions below.

1. Please state your age: _____

2. Please state your gender: _____

3. Please state your occupation: _____

4. Would you prefer to use an electronic bookor a printed book? _____

5. Do you own an e-book device? Yes____ No_____

6. When did you first use e-book device? (Which year) _____

7. Primary purpose of using electronic books. (Choose only 1)

____ Business ____ Personal

8. What type of electronic books do you use? (You may choose more than 1)

____ Novel/Story ____ Textbook ____ Newspaper ____ Article

9. How often do you use e-book devices?

____ Every day ____ Once a week ____ Several times a week

____ Every month

10. Please answer the following questions about **attitude towards using e-book devices.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I think I will be using an e- book device.	1	2	3	4	5
I think it is a good idea to use e-book devices.	1	2	3	4	5
I would suggest others about owning e-book devices.	1	2	3	4	5
I will tell about the benefits of electronic book devices.	1	2	3	4	5

11. Please answer the following questions about **perceived usefulness.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Electronic books are source of useful information.	1	2	3	4	5
Electronic books are useful in my job.	1	2	3	4	5
I think my job performance will enhance with the help of e-book devices.	1	2	3	4	5
I think my reading performance will improve with the help of e-book devices.	1	2	3	4	5
Using e-book device increases time efficiency.	1	2	3	4	5
Usage of electronic books will completely replace the habit of reading from printed books.	1	2	3	4	5

12. Please answer the following questions about **perceived ease of use.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
It is easy to use or scroll around e-book devices.	1	2	3	4	5
Reading online is practical with e-book devices.	1	2	3	4	5
Reading offline is practical with e-book devices.	1	2	3	4	5
Installing/loading electronic books to e-book devices is simple.	1	2	3	4	5
The user interface of e-book device is straightforward.	1	2	3	4	5
The interaction with e-book devices is easy.	1	2	3	4	5
The interaction with e-book devices is flexible.	1	2	3	4	5

13. Please answer the following questions about **perceived risk.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I believe e-book device does not operate as described.	1	2	3	4	5
I believe e-book devices do not work perfectly.	1	2	3	4	5
I think using electronic books puts my privacy at risk.	1	2	3	4	5
I think making payments with e-book devices is not safe.	1	2	3	4	5
I think using e-book devices negatively affects my health (e.g. eyes, posture).	1	2	3	4	5

I would perceive myself as a risk taker. Please indicate a percentage 0 means risk averse, 100 means risk taker.	**0%_____100%**

14. Please answer the following questions about **environmental concerns.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I think environmental problems are important.	1	2	3	4	5
I think environmental problems cannot be ignored.	1	2	3	4	5
Electronic books are environmentally friendly due to having lower paper consumption.	1	2	3	4	5
I think I can contribute to environment by saving forests.	1	2	3	4	5
When compared with printable books, electronic books help us to conserve more library/office space.	1	2	3	4	5

15. Please answer the following questions about **social influences.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I use e-book devices because people around me use them.	1	2	3	4	5
People around me support electronic book usage.	1	2	3	4	5
Important people advice me to use e-book devices.	1	2	3	4	5
E-book device enhances my social image.	1	2	3	4	5

16. Please answer the following questions about **cost.**

Please indicate your degree of agreement or disagreement about the given statements					
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I think e-book devices (e.g. tablets or special gadgets) are expensive.	1	2	3	4	5
E-book devices are a financial burden.	1	2	3	4	5
Overall, obtaining and keeping books in electronic form are more expensive than keeping a library of printable books.	1	2	3	4	5

SECTION 2

In this section of the survey, we would like to obtain your opinion to select among alternatives. You have to give your opinion about **preference of some factors that are about using electronic books**.

1. Which factor/criteria is more important for you **to use e-book devices**?

Use scale from 1 to 9 (9 is extremely and 1 is equally more important), please indicate (x) relative importance of Options X (left column) to Options Y (right column)																		
X Options	**Extremely**		**Very Strongly**		**Strongly**		**Weakly**		**Equally**		**Weakly**		**Strongly**		**Very Strongly**		**Extremely**	**Y Options**
Perceived Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Environ-mental Concerns**
Perceived Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Usefulness**
Perceived Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Ease Of Use**
Perceived Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Cost**
Perceived Risk	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social Influence**
Environ-mental Concerns	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Usefulness**
Environ-mental Concerns	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Ease Of Use**
Environ-mental Concerns	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Cost**
Environ-mental Concerns	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social Influence**
Usefulness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Ease Of Use**
Usefulness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Cost**
Usefulness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social Influence**
Ease Of Use	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Cost**
Ease Of Use	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social Influence**
Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Social Influence**

2. Which factor do you think makes **an e-book device more useful**?

Use scale from 1 to 9 (9 is extremely and 1 is equally more important), please indicate (x) relative importance of Options X (left column) to Options Y (right column)																		
X Options	**Extremely**		**Very Strongly**		**Strongly**		**Weakly**		**Equally**		**Weakly**		**Strongly**		**Very Strongly**		**Extremely**	**Y Options**
Conciseness (Simplicity)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Clarity**
Conciseness (Simplicity)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Visual Design**
Conciseness (Simplicity)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Musicality**
Conciseness (Simplicity)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Business Content**
Conciseness (Simplicity)	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Personal Content**
Clarity	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Visual Design**
Clarity	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Musicality**
Clarity	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Business Content**
Clarity	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Personal Content**
Visual Design	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Musicality**
Visual Design	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Business Content**
Visual Design	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Personal Content**
Musicality	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Business Content**
Musicality	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Personal Content**
Business Content	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Personal Content**

3. Which factor do you think makes **an e-book device easy to use**?

Use scale from 1 to 9 (9 is extremely and 1 is equally more important), please indicate (x) relative importance of Options X (left column) to Options Y (right column)																		
X Options	**Extremely**		**Very Strongly**		**Strongly**		**Weakly**		**Equally**		**Weakly**		**Strongly**		**Very Strongly**		**Extremely**	**Y Options**
Interface	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Ergonomics**
Interface	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Portability**
Interface	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Installation ability**
Interface	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Navigation**
Interface	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Read online or offline**
Ergonomics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Portability**
Ergonomics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Installation ability**
Ergonomics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Navigation**
Ergonomics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Read online or offline**
Portability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Installation ability**
Portability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Navigation**
Portability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Read online or offline**
Installation ability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Navigation**
Installation ability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Read online or offline**
Navigation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	**Read online or offline**

APPENDIX

In order to test your opinion towards using e-book devices, several factors that influence the usage are taken into consideration. Those are perceived usefulness, perceived ease of use, perceived risk, environmental concerns, social influences of referent groups and cost.

- **Attitude towards using** is defined as eagerness of the usage of the application.

- **Perceived usefulness** means that a person believes the usage of the application will have a positive impact on doing the job and increase the performance. It comprises of sublevel factors that are conciseness, clarity, visual factors, musicality, entertainment content, business content and personal content.
    - **Conciseness** is how simply the contents are structured to deliver the meaning.
    - **Clarity** refers to how clearly the graphics, pictures and sound are assembled into a coherent whole.
    - **Visual factors** are perceptible by sense of sight and related to graphics and pictures in which content appears realistic and natural**.**
    - **Musicality** means the quality of sound effects to match the story background.
    - The **content of e-book** is used in different types of fields that are **business and personal.**

- **Perceived ease of use** means that a person believes the usage of the application will be free of effort. It comprises of sublevel factors that are interface, ergonomics, portability, ability to install, navigate and read online or offline.
    - **Interface** provides connection between human and computer.
    - **Ergonomics** are defined as designing the job to fit the worker not forcing the worker to fit the job.
    - **Navigation** means moving from one part to another of a document, website, etc.

- **Perceived risk** is the uncertainty consumers face when they cannot foresee the consequences of their purchase decisions.

- **Environmental concerns** reflect general attitudes about how you care about environment.

- **Social influence** is the degree to which an individual perceives how important others believe he or she could use the system.

- **Cost** is related to the financial situations.

APPENDIX B: AHP ANALYSES OUTPUTS

Table 3: Descriptive Statistics for Main Factors

	PU	PEU	PR	EC	SI	CO
Mean	0.253	0.222	0.111	0.197	0.074	0.144
Median	0.256	0.216	0.049	0.142	0.040	0.102
Maximum	0.477	0.524	0.566	0.568	0.492	0.553
Minimum	0.034	0.025	0.021	0.024	0.021	0.023
Std. Dev.	0.114	0.113	0.129	0.150	0.082	0.113
Skewness	0.034	0.379	1.810	0.688	2.784	1.331
Kurtosis	1.992	2.548	5.149	2.153	11.203	4.327
Jarque-Bera	5.441	4.160	94.501	13.929	524.162	47.187
p-value	0.066	0.125	0.000	0.001	0.000	0.000
Sum	32.339	28.440	14.187	25.199	9.430	18.404
Sum Sq. Dev.	1.662	1.619	2.103	2.867	0.844	1.629
Observations	128.000	128.000	128.000	128.000	128.000	128.000

Table 4: Descriptive Statistics for Sublevel Factors of PU

	Conciseness	Clarity	Visual Design	Musicality	Business Content	Personal Content
Mean	0.209	0.165	0.151	0.083	0.187	0.205
Median	0.179	0.159	0.126	0.047	0.152	0.174
Maximum	0.558	0.441	0.522	0.456	0.498	0.563
Minimum	0.026	0.037	0.021	0.021	0.026	0.022
Std. Dev.	0.151	0.091	0.112	0.081	0.121	0.125
Skewness	0.691	0.523	1.162	2.120	0.633	0.662
Kurtosis	2.284	2.827	4.030	7.645	2.433	2.572
Jarque-Bera	12.913	5.992	34.435	210.962	10.259	10.336
p-value	0.002	0.050	0.000	0.000	0.006	0.006
Sum	26.737	21.178	19.316	10.590	23.962	26.217
Sum Sq. Dev.	2.910	1.045	1.595	0.829	1.859	1.970
Observations	128.000	128.000	128.000	128.000	128.000	128.000

Table 5: Descriptive Statistics for Sublevel Factors of PEU

	Interface	Ergonomics	Portability	Installation Ability	Navigation	Read Online / Offline
Mean	0.141	0.142	0.206	0.144	0.124	0.242
Median	0.120	0.118	0.186	0.123	0.110	0.207
Maximum	0.476	0.498	0.520	0.514	0.477	0.581
Minimum	0.023	0.023	0.040	0.026	0.021	0.031
Std. Dev.	0.099	0.098	0.106	0.101	0.079	0.144
Skewness	1.251	1.360	0.710	1.288	1.151	0.592
Kurtosis	4.324	4.968	3.182	4.799	5.333	2.340
Jarque-Bera	42.744	60.082	10.933	52.663	57.307	9.801
p-value	0.000	0.000	0.004	0.000	0.000	0.007
Sum	18.089	18.128	26.417	18.480	15.920	30.967
Sum Sq. Dev.	1.248	1.219	1.426	1.286	0.789	2.637
Observations	128.000	128.000	128.000	128.000	128.000	128.000

Table 6: Descriptive Statistics for Main Factors of BA Group

	PU	PEU	PR	EC	SI	CO
Mean	0.246	0.219	0.119	0.206	0.054	0.155
Median	0.255	0.204	0.051	0.142	0.037	0.117
Maximum	0.468	0.479	0.566	0.568	0.323	0.553
Minimum	0.034	0.025	0.021	0.024	0.021	0.023
Std. Dev.	0.113	0.111	0.136	0.163	0.050	0.128
Skewness	0.066	0.337	1.729	0.692	3.310	1.299
Kurtosis	1.960	2.279	4.901	2.076	15.759	4.004
Jarque-Bera	2.930	2.597	41.531	7.382	550.931	20.680
p-value	0.231	0.273	0.000	0.025	0.000	0.000
Sum	15.765	14.047	7.646	13.182	3.425	9.934
Sum Sq. Dev.	0.803	0.774	1.165	1.681	0.157	1.040
Observations	64	64	64	64	64	64

Table 7: Descriptive Statistics for Sublevel Factors of PU for BA Group

	Conciseness	Clarity	Visual Design	Musicality	Business Content	Personal Content
Mean	0.220	0.180	0.152	0.068	0.184	0.196
Median	0.196	0.188	0.122	0.036	0.141	0.163
Maximum	0.553	0.441	0.522	0.362	0.498	0.563
Minimum	0.026	0.037	0.021	0.022	0.035	0.028
Std. Dev.	0.150	0.091	0.117	0.071	0.125	0.120
Skewness	0.590	0.325	1.292	2.534	0.735	0.886
Kurtosis	2.183	2.573	4.459	9.171	2.466	3.314
Jarque-Bera	5.498	1.613	23.477	170.075	6.523	8.629
p-value	0.064	0.446	0.000	0.000	0.038	0.013
Sum	14.089	11.534	9.738	4.331	11.787	12.522
Sum Sq. Dev.	1.421	0.518	0.860	0.319	0.984	0.903
Observations	64	64	64	64	64	64

Table 8: Descriptive Statistics for Sublevel Factors of PEU for BA Group

	Interface	Ergonomics	Portability	Installation Ability	Navigation	Read Online/ Offline
Mean	0.164	0.128	0.190	0.154	0.118	0.246
Median	0.139	0.097	0.176	0.153	0.099	0.181
Maximum	0.476	0.498	0.422	0.514	0.477	0.581
Minimum	0.023	0.023	0.040	0.026	0.021	0.031
Std. Dev.	0.119	0.100	0.097	0.102	0.087	0.158
Skewness	0.930	1.765	0.444	1.005	1.720	0.550
Kurtosis	2.996	6.650	2.550	4.203	6.899	2.045
Jarque-Bera	9.221	68.761	2.639	14.635	72.095	5.654
p-value	0.010	0.000	0.267	0.001	0.000	0.059
Sum	10.489	8.223	12.149	9.853	7.554	15.733
Sum Sq. Dev.	0.896	0.632	0.594	0.653	0.474	1.572
Observations	64.000	64.000	64.000	64.000	64.000	64.000

Table 9: Descriptive Statistics for Main Factors of EEE & CE Group

	PU	PEU	PR	EC	SI	CO
Mean	0.259	0.225	0.102	0.188	0.094	0.132
Median	0.259	0.230	0.046	0.135	0.062	0.089
Maximum	0.477	0.524	0.479	0.468	0.492	0.373
Minimum	0.042	0.025	0.021	0.030	0.022	0.028
Std. Dev.	0.116	0.116	0.121	0.137	0.100	0.095
Skewness	-0.005	0.411	1.877	0.584	2.152	1.042
Kurtosis	2.020	2.754	5.263	1.933	7.205	3.033
Jarque-Bera	2.563	1.964	51.232	6.677	96.529	11.594
p-value	0.278	0.375	0.000	0.035	0.000	0.003
Sum	16.574	14.393	6.541	12.017	6.005	8.470
Sum Sq. Dev.	0.854	0.844	0.928	1.176	0.635	0.573
Observations	64.000	64.000	64.000	64.000	64.000	64.000

Table 10: Descriptive Statistics for Sublevel Factors of PU for EEE & CE Group

	Conciseness	Clarity	Visual Design	Musicality	Business Content	Personal Content
Mean	0.198	0.151	0.150	0.098	0.190	0.214
Median	0.162	0.146	0.129	0.059	0.166	0.190
Maximum	0.558	0.433	0.486	0.456	0.472	0.484
Minimum	0.030	0.037	0.027	0.021	0.026	0.022
Std. Dev.	0.153	0.089	0.108	0.087	0.118	0.129
Skewness	0.805	0.758	0.985	1.848	0.520	0.462
Kurtosis	2.434	3.360	3.350	6.687	2.407	2.062
Jarque-Bera	7.763	6.468	10.666	72.663	3.822	4.619
p-value	0.021	0.039	0.005	0.000	0.148	0.099
Sum	12.648	9.644	9.578	6.259	12.175	13.695
Sum Sq. Dev.	1.473	0.499	0.734	0.481	0.874	1.055
Observations	64.000	64.000	64.000	64.000	64.000	64.000

Table 11: Descriptive Statistics for Sublevel Factors of PEU for EEE & CE Group

	Interface	Ergonomics	Portability	Installation Ability	Navigation	Read Online /Offline
Mean	0.119	0.155	0.223	0.135	0.131	0.238
Median	0.113	0.144	0.189	0.101	0.125	0.218
Maximum	0.296	0.423	0.520	0.508	0.297	0.562
Minimum	0.025	0.028	0.041	0.026	0.022	0.033
Std. Dev.	0.067	0.095	0.113	0.099	0.070	0.130
Skewness	0.749	1.008	0.802	1.615	0.197	0.603
Kurtosis	2.950	3.594	3.138	5.728	2.122	2.665
Jarque-Bera	5.995	11.775	6.912	47.651	2.469	4.182
p-value	0.050	0.003	0.032	0.000	0.291	0.124
Sum	7.600	9.905	14.268	8.627	8.366	15.234
Sum Sq. Dev.	0.287	0.564	0.798	0.622	0.310	1.063
Observations	64.000	64.000	64.000	64.000	64.000	64.000

Table 37: Detailed Outputs of Two-Sample T-Test for Main Factors

	Perceived Usefulness	Perceived Ease of Use
Estimate for Difference	-0.013	-0.005
95% CI for Difference	(-0.053; 0.027)	(-0.045; 0,034)
t-value	-0.62	-0.27
p-value	0.534	0.788
DF	126	126
Mean BA	0.246	0.219
Mean EEE & CE	0.259	0.225
Difference in means	No	No

Table 38: Detailed Outputs of Mann-Whitney U Test for Main Factors

	Perceived Risk	Environmental Concerns	Social Influences	Cost
Point Estimate for ETA1-ETA2	0.005	0.007	-0.013	0.005
95.0 Percent CI for ETA1-ETA2	(-0.004; 0.017)	(-0.027; 0.048)	(-0.029;-0.002)	(-0,018;0,037)
p-value	0.276	0.708	0.007	0.625
Median BA	0.051	0.142	0.037	0.117
Median EEE & CE	0.045	0.135	0.062	0.089
Difference in Medians	No	No	Yes	No

Table 39: Detailed Outputs of Mann-Whitney U Test for Sublevel Factors of Perceived Usefulness

	Conciseness	Clarity	Visual Design	Musicality	Business Content	Personal Content
Point Estimate for ETA1-ETA2	0.025	0.033	-0.001	-0.014	-0.010	-0.015
95.0 Percent CI for ETA1-ETA2	(-0.020; 0.067)	(0.0004; 0.062)	(-0.029; 0.032)	(-0.029; -0.006)	(-0.049; 0.030)	(-0.057; 0.025)
p-value	0.278	0.047	0.881	0.001	0.684	0.416
Median BA	0.196	0.187	0.121	0.035	0.141	0.163
Median EEE & CE	0.162	0.146	0.128	0.059	0.166	0.190
Difference in Medians	No	Yes	No	Yes	No	No

Table 40: Detailed Outputs of Mann-Whitney U Test for Sublevel Factors of Perceived Ease of Use

	Interface	**Ergonomics**	**Portability**	**Installation**	**Navigation**	**Read Online/ Offline**
Point Estimate for ETA1-ETA2	0.024	-0.026	-0.025	0.0160	-0.018	-0.003
95.0 Percent CI for ETA1-ETA2	(-0.002; 0.058)	(-0.058; 0.00002)	(-0.066; 0.007)	(-0.008; 0.052)	(-0.046; 0.004)	(-0.053; 0.045)
p-value	0.095	0.039	0.130	0.219	0.119	0.851
Median BA	0.138	0.097	0.176	0.153	0.098	0.181
Median EEE & CE	0.112	0.144	0.188	0.101	0.125	0.217
Difference in Medians	No	Yes	No	No	No	No

APPENDIX C: MULTIPLE REGRESSION ANALYSES OUTPUTS

Table 24: Correlations for Participants

BA							
	ATU	**PU**	**PEU**	**PR**	**EC**	**SI**	**COST**
ATU	1.000	0.568	0.522	-0.290	0.325	0.206	-0.165
PU	0.568	1.000	0.451	-0.244	0.489	0.306	-0.210
PEU	0.522	0.451	1.000	-0.480	0.268	0.065	-0.252
PR	-0.290	-0.244	-0.480	1.000	-0.110	0.053	0.338
EC	0.325	0.489	0.268	-0.110	1.000	0.049	-0.223
SI	0.206	0.306	0.065	0.053	0.049	1.000	0.117
COST	-0.165	-0.210	-0.252	0.338	-0.223	0.117	1.000
EEE & CE							
	ATU	**PU**	**PEU**	**PR**	**EC**	**SI**	**COST**
ATU	1.000	0.543	0.529	-0.237	0.277	0.330	-0.200
PU	0.543	1.000	0.434	-0.017	0.398	0.434	-0.135
PEU	0.529	0.434	1.000	-0.305	0.169	0.076	-0.293
PR	-0.237	-0.017	-0.305	1.000	0.077	0.015	0.275
EC	0.277	0.398	0.169	0.077	1.000	0.286	-0.124
SI	0.330	0.434	0.076	0.015	0.286	1.000	-0.090
COST	-0.200	-0.135	-0.293	0.275	-0.124	-0.090	1.000
ALL							
	ATU	**PU**	**PEU**	**PR**	**EC**	**SI**	**COST**
ATU	1.000	0.547	0.527	-0.260	0.297	0.265	-0.182
PU	0.547	1.000	0.434	-0.135	0.390	0.368	-0.172
PEU	0.527	0.434	1.000	-0.387	0.214	0.069	-0.272
PR	-0.260	-0.135	-0.387	1.000	0.009	0.034	0.307
EC	0.297	0.390	0.214	0.009	1.000	0.163	-0.155
SI	0.265	0.368	0.069	0.034	0.163	1.000	0.017
COST	-0.182	-0.172	-0.272	0.307	-0.155	0.017	1.000

Table 26: Serial Correlation and Heteroscedasticity Tests for BA Group

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.840	Prob. F(2,65)	0.436
Obs*R-squared	1.890	Prob. Chi-Square(2)	0.388

Heteroskedasticity Test: Harvey

F-statistic	0.767	Prob. F(7,67)	0.616
Obs*R-squared	5.565	Prob. Chi-Square(7)	0.591
Scaled explained SS	5.978	Prob. Chi-Square(7)	0.542

Heteroskedasticity Test: White

F-statistic	1.191	Prob. F(33,41)	0.295
Obs*R-squared	36.707	Prob. Chi-Square(33)	0.301
Scaled explained SS	43.592	Prob. Chi-Square(33)	0.103

Heteroskedasticity Test: ARCH (lag=1)

F-statistic	1.352	Prob. F(1,72)	0.248
Obs*R-squared	1.364	Prob. Chi-Square(1)	0.243

Heteroskedasticity Test: ARCH (lag=2)

F-statistic	0.722	Prob. F(2,70)	0.489
Obs*R-squared	1.476	Prob. Chi-Square(2)	0.478

Table 27: Values of Variance Inflation Factors for BA Group

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	5.026	702.053	NA
PU	0.038	66.442	1.803
PEU	0.031	67.992	1.610
PR	0.513	568.030	31.005
EC	0.049	133.669	1.376
SI	0.016	16.340	1.207
CO	0.474	605.120	28.391
PR*CO	0.064	683.406	75.488

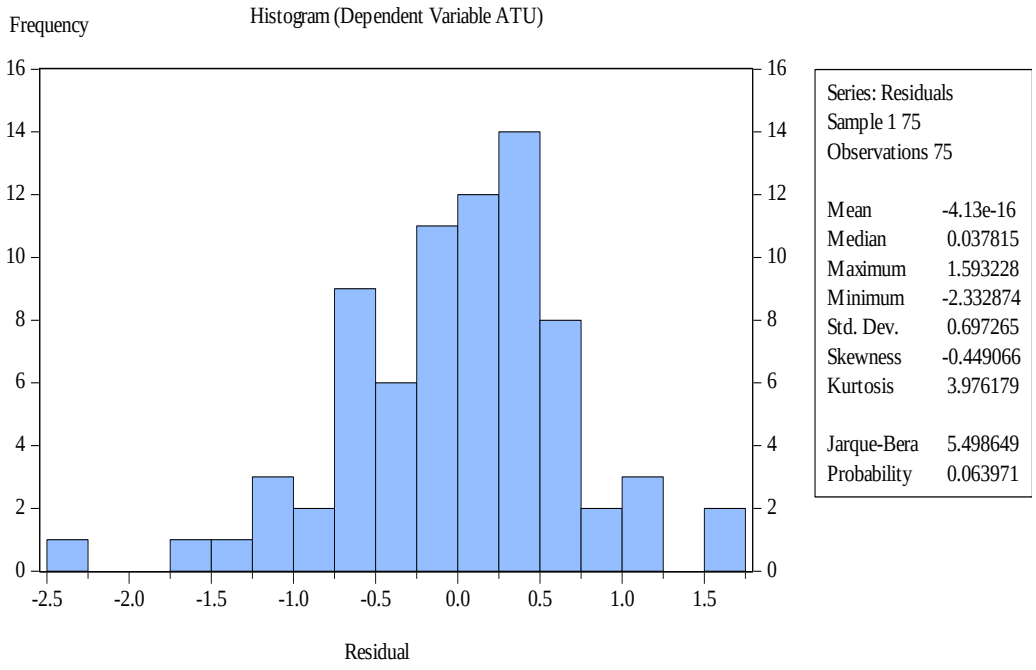


Figure 10: Histogram of Residual for BA Group

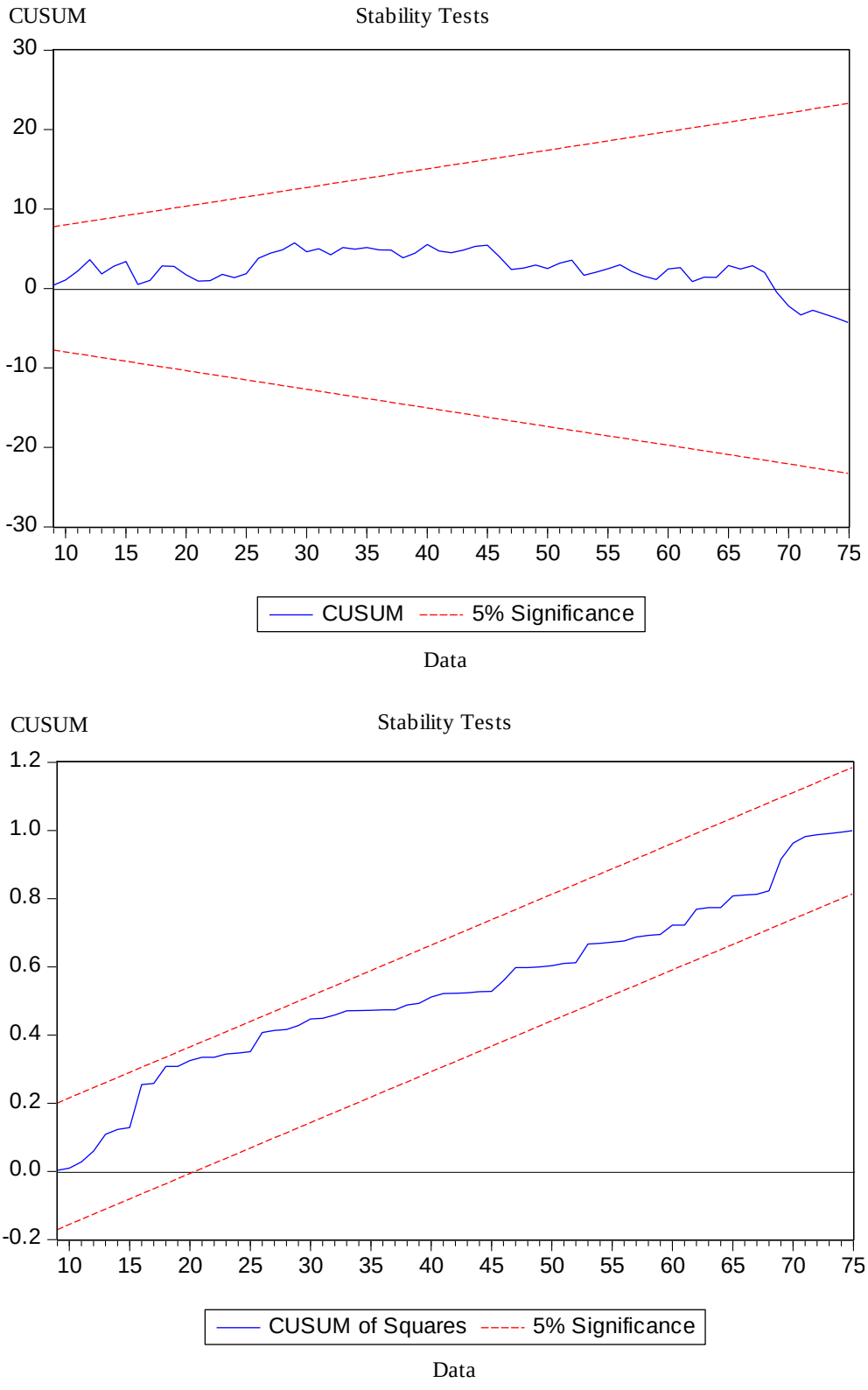


Figure 11: Stability Tests for BA Group

Table 29: Serial Correlation and Heteroscedasticity Tests for EEE & CE Group

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.418	Prob. F(2,64)	0.659
Obs*R-squared	0.956	Prob. Chi-Square(2)	0.620

Heteroskedasticity Test: Harvey

F-statistic	1.827	Prob. F(7,66)	0.096
Obs*R-squared	12.013	Prob. Chi-Square(7)	0.100
Scaled explained SS	7.674	Prob. Chi-Square(7)	0.362

Heteroskedasticity Test: White

F-statistic	1.041	Prob. F(33,40)	0.447
Obs*R-squared	34.195	Prob. Chi-Square(33)	0.410
Scaled explained SS	27.661	Prob. Chi-Square(33)	0.730

Heteroskedasticity Test: ARCH (lag=1)

F-statistic	0.127	Prob. F(1,71)	0.722
Obs*R-squared	0.130	Prob. Chi-Square(1)	0.718

Heteroskedasticity Test: ARCH (lag=2)

F-statistic	0.436	Prob. F(2,69)	0.648
Obs*R-squared	0.898	Prob. Chi-Square(2)	0.638

Table 30: Values of Variance Inflation Factors for EEE & CE Group

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.975	393.491	NA
PU	0.033	59.532	1.734
PEU	0.026	52.237	1.485
PR	0.381	375.333	20.441
EC	0.030	67.931	1.249
SI	0.021	20.513	1.285
CO	0.276	328.684	16.201
PR*CO	0.040	375.194	44.358

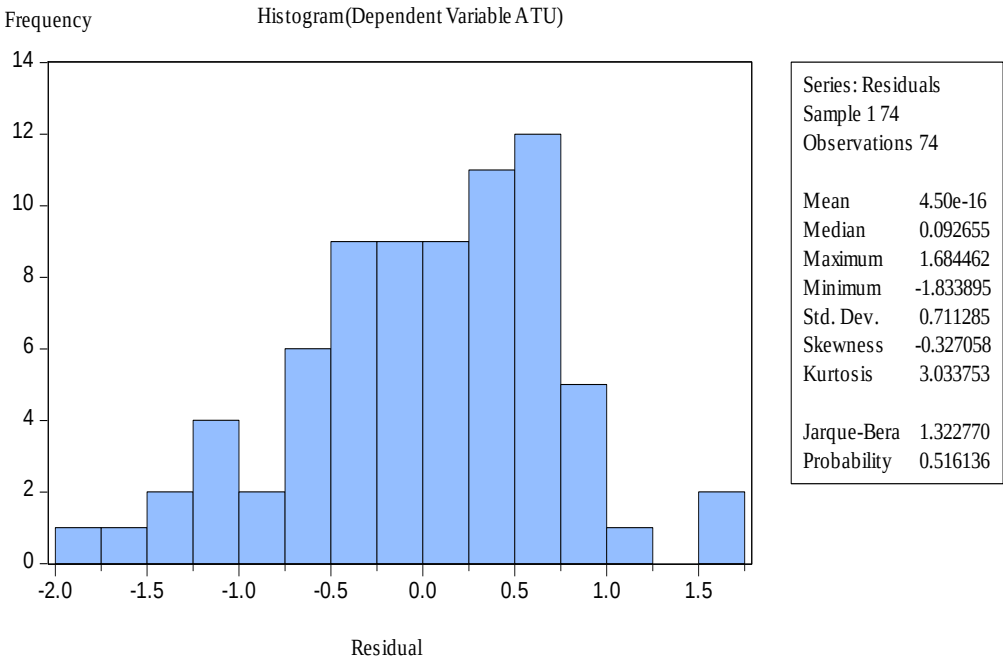
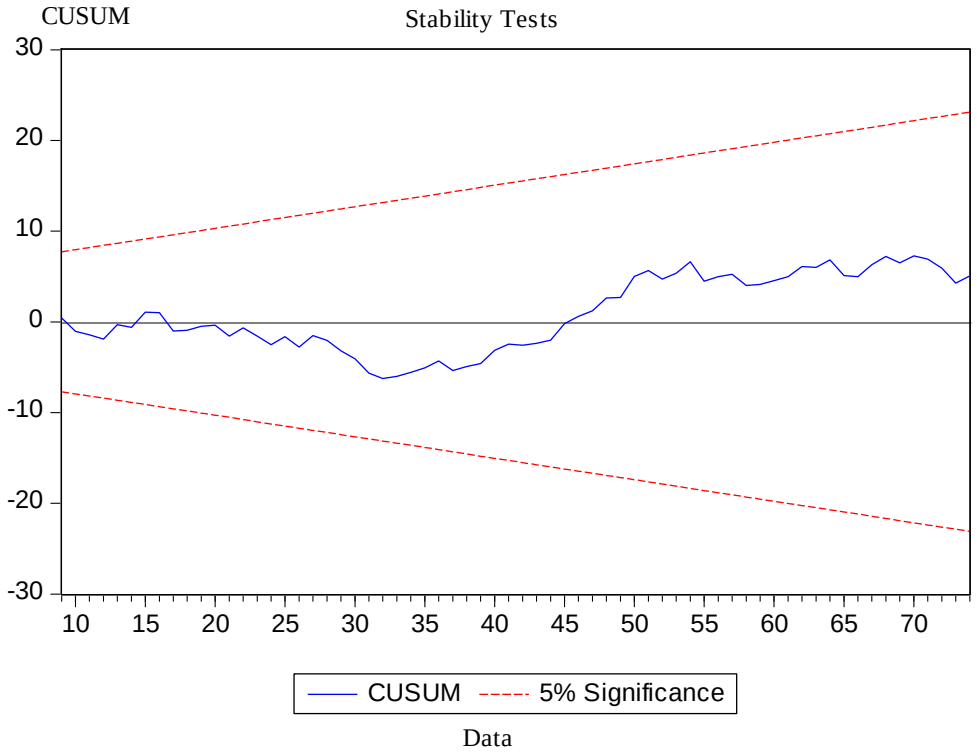


Figure 12: Histogram of Residual for EEE & CE Group



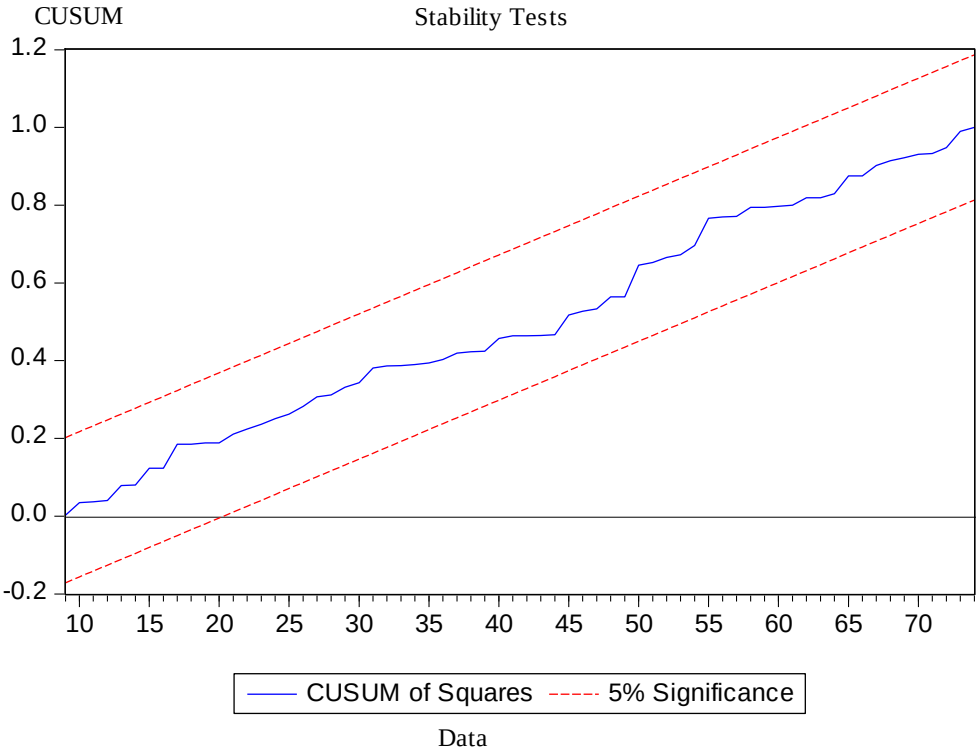


Figure 13: Stability Tests for EEE & CE Group

Table 32: Serial Correlation and Heteroskedasticity Tests for Participants

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.298	Prob. F(2,139)	0.742
Obs*R-squared	0.637955	Prob. Chi-Square(2)	0.726

Heteroskedasticity Test: Harvey

F-statistic	1.449	Prob. F(7,141)	0.190
Obs*R-squared	10.004	Prob. Chi-Square(7)	0.188
Scaled explained SS	9.848	Prob. Chi-Square(7)	0.197

Heteroskedasticity Test: White

F-statistic	1.186	Prob. F(33,115)	0.251
Obs*R-squared	37.836	Prob. Chi-Square(33)	0.257
Scaled explained SS	45.212	Prob. Chi-Square(33)	0.076

Heteroskedasticity Test: ARCH (lag=1)

F-statistic	1.215	Prob. F(1,146)	0.272
Obs*R-squared	1.222	Prob. Chi-Square(1)	0.268

Heteroskedasticity Test: ARCH (lag=2)

F-statistic	0.632	Prob. F(2,144)	0.532
Obs*R-squared	1.280	Prob. Chi-Square(2)	0.527

Table 33: Values of Variance Inflation Factors for Participants

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.694	481.379	NA
PU	0.015	57.1033	1.627
PEU	0.013	57.509	1.498
PR	0.194	423.805	23.206
EC	0.015	80.203	1.209
SI	0.008	17.394	1.188
CO	0.158	408.252	19.639
PR*CO	0.022	464.898	53.272

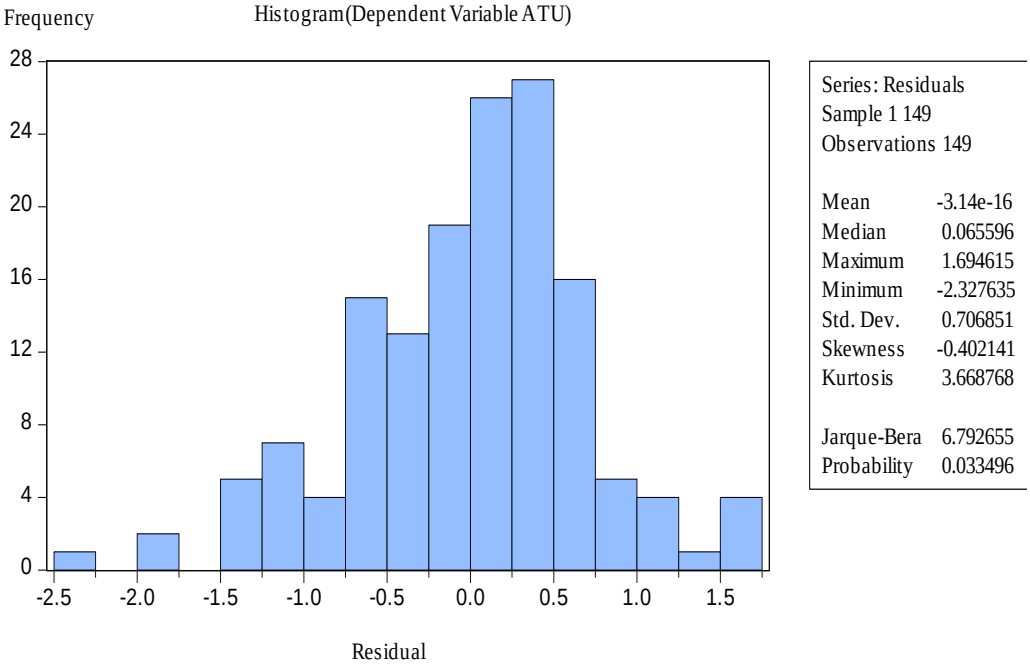


Figure 14: Histogram of Residual for Participants

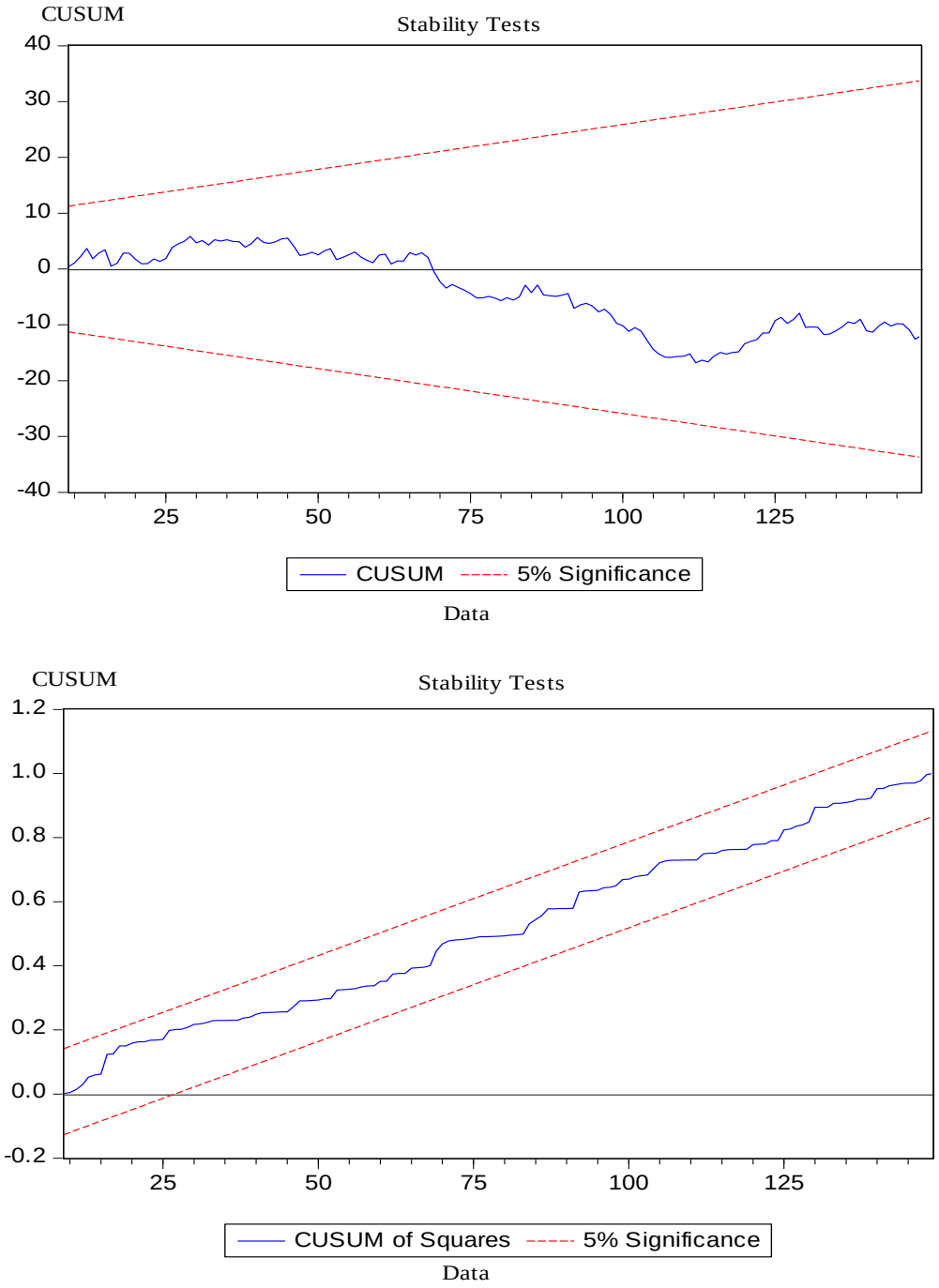


Figure 15: Stability Tests for Participants

Table 41: Detailed Descriptive Statistics of Variables

	ATU	PU	PEU	PR	EC	SI	CO
Mean	3.825	3.550	3.873	2.696	4.228	2.619	2.937
Median	4	3.5	3.857	2.8	4.2	2.75	3
Maximum	5	5	5	4.6	5	4.25	5
Minimum	1	1.833	2	1.2	2.4	1	1.333
Std. Dev.	0.941	0.610	0.636	0.651	0.525	0.712	0.662
Skewness	-0.564	-0.062	-0.062	0.064	-0.693	-0.115	-0.044
Kurtosis	2.712	2.733	2.721	2.838	3.667	2.426	3.183
Jarque-Bera	8.414	0.537	0.577	0.262	14.705	2.374	0.256
p-value	0.0148	0.764	0.749	0.877	0.0006	0.305	0.879
Sum	570	529	577.142	401.8	630	390.25	437.666
Sum Sq. Dev.	130.963	55.095	59.817	62.768	40.802	74.947	64.971
Observations	149	149	149	149	149	149	149

Table 42: Detailed Descriptive Statistics of Variables for BA Group

	ATU	PU	PEU	PR	EC	SI	CO
Mean	3.863	3.484	3.899	2.738	4.363	2.606	2.951
Median	4	3.5	4	2.8	4.4	2.75	3
Maximum	5	5	5	4.6	5	4	4.666
Minimum	1.25	2.166	2.571	1.2	3	1	1.333
Std. Dev.	0.920	0.585	0.611	0.662	0.448	0.741	0.659
Skewness	-0.498	0.106	-0.104	0.150	-0.345	-0.157	-0.079
Kurtosis	2.664	2.706	2.594	3.048	2.773	2.495	2.643
Jarque-Bera	3.462	0.411	0.651	0.291	1.653	1.105	0.478
p-value	0.177	0.814	0.722	0.865	0.437	0.575	0.787
Sum	289.75	261.33	292.428	205.4	327.2	195.5	221.333
Sum Sq. Dev.	62.661	25.398	27.664	32.477	14.855	40.646	32.154
Observations	75	75	75	75	75	75	75

Table 43: Detailed Descriptive Statistics of Variables for EEE & CE Group

	ATU	PU	PEU	PR	EC	SI	CO
Mean	3.787	3.617	3.847	2.654	4.092	2.632	2.923
Median	3.875	3.666	3.857	2.8	4.2	2.75	3
Maximum	5	5	5	4	5	4.25	5
Minimum	1	1.833	2	1.4	2.4	1.25	1.333
Std. Dev.	0.965	0.631	0.662	0.6413	0.564	0.685	0.670
Skewness	-0.612	-0.244	-0.010	-0.046	-0.693	-0.051	-0.008
Kurtosis	2.709	2.856	2.794	2.530	3.415	2.283	3.699
Jarque-Bera	4.876	0.798	0.132	0.706	6.464	1.618	1.507
p-value	0.0873	0.671	0.936	0.703	0.039	0.445	0.470
Sum	280.25	267.666	284.714	196.4	302.8	194.75	216.333
Sum Sq. Dev.	68.085	29.041	32.054	30.024	23.215	34.277	32.788
Observations	74	74	74	74	74	74	74

APPENDIX D: TURKISH SUMMARY

Elektronik kitaplar (e-kitaplar) basılı materyallerin dijital sürümleri olarak tanımlanır. Bu materyaller çeşitli ortamlar aracılığı ile kişilere aktarılır (Poon, 2014). Ortamlardan bazıları akıllı telefonlar, iPad'ler, cep telefonları, kindle'lar ve tabletlerdir. E-kitapların not alma, vurgulama ve arama yapma gibi birçok fonksiyonu vardır. Piyasada ders kitabı, gazete, makale, referans kitabı ve dergi gibi farklı çeşitlerde e-kitaplar mevcuttur (Ashcroft, 2011).

Teknolojideki gelişmeler mevcut e-kitap ve ilgili cihaz çeşitlerinin artışına yol açmıştır. Bu özelliklerin çeşitliliği ise e-kitapların kullanımında bir artışa neden olmuştur. E-kitapların önemi ve avantajları tüm bu gelişmelerle doğru orantılı olarak yükseliş göstermiştir. E-kitapların avantajları şu şekildedir. Belgelere erişim kolaydır ve ihtiyaç duyulan herhangi bir zamanda e-kitaplar indirilebilir. Kullanıcı çevrimiçi veya çevrimdışı olduğunda e-kitaplar okunabilir ve hafif olmalarından dolayı her tarafa taşınabilir. Teslimat ya da sevkiyat masrafları yoktur. Kâğıt kullanımı olmadığından dolayı çevreyi korumada önemli bir rol oynar. Kolay ve hızlı erişilebilmesi, içeriklerin her kesime hitap etmesi ve uygun bir eğitim modeli olması nedeniyle okuma deneyimlerini ve etkili öğrenmeleri geliştirir. E-kitap kullanımındaki artış bilgi paylaşım alışkanlıklarının kazanılmasına yardımcı olarak insanlar arasındaki bilgi paylaşımını özendirecektir (Poon, 2014; Sasson, 2016).

E-kitapların bir takım avantajları olmasına rağmen, e-kitap kullanım davranışının benimsenmesi kişilere göre değişiklik gösterir. Bu çalışmanın amacı, kullanıcıların e-kitap teknolojisinin kabulünü etkileyen faktörleri tespit etmektir. Bir ürünün kullanıcılar tarafından benimsenmesi ve o ürünü tüketicinin uzun süre kullanmaya devam etmesi önemlidir. Teknoloji kabulü, Teknoloji Kabul Modeli (TKM) ile açıklanmaktadır. TKM kullanıcıların bilgi sistemlerini kabul edip etmeme nedenlerini açıklamak ve bu nedenleri tahmin etmek için kullanılır (Szajna, 1996). TKM bilgi teknolojileri hakkındaki davranışları iyi bir şekilde açıklayan herkesçe bilinen bir modeldir (Park, 2009).

TKM iki amacı gerçekleştirmek için geliştirilmiştir. Kullanıcıların farklı davranış biçimleri arasındaki teknoloji kabulünü yeni yöntemler ve bilgi sistemleri

uygulamaları tasarlayarak ve geliştirerek anlamaya çalışır. Ayrıca, yeni sistemler kullanıma konulmadan önce kullanıcının kabul yöntemini test etmesine olanak sağlar (Davis, 1985).

TKM 1985 yılında Davis tarafından geliştirilmiştir. Bu model temel olarak iki faktör üzerine odaklanmıştır. Algılanan kullanışlılık ve algılanan kullanım kolaylığı olarak adlandırılan bu faktörler yeni bir teknolojinin kullanımına yönelik tutumları veya davranışları anlamaya yardımcı olur (Davis, 1985; King & He, 2006; Chutter, 2009; Phan & Daim, 2011).

TAM yalnızca teknolojinin kabulünü açıklamak için kullanılmaz, aynı zamanda evrensel bir model olarak kabul edilmiştir. Evrensel bir model olduğundan dolayı modelin kavramları genelleştirilebilir (Phan & Daim, 2011; Davis et al., 1989). TKM (Şekil 2 de gösterildiği gibi) 6 kavramdan oluşmaktadır. Bu kavramlar: dış değişkenler, algılanan kullanışlılık, algılanan kullanım kolaylığı, kullanıma yönelik tutum, kullanımdaki davranışsal niyet ve gerçek sistem kullanımıdır. Dış değişkenler; algılanan kullanışlılık, algılanan kullanım kolaylığı ve kullanıma yönelik tutum faktörlerini etkiler. Algılanan kullanışlılık bir kişinin uygulamayı kullanımının işi yapması üzerinde olumlu bir etkisi olduğuna ve iş performansını arttırdığına inanmasıdır. Algılanan kullanışlılık kullanıma yönelik tutumu anlamaya ve belirlemeye yardımcı olur (Davis, 1985; King & He, 2006; Porter & Donthu, 2006; Chuttur, 2009).

Algılanan kullanım kolaylığı ise bir kişinin belirli bir sistemi kullanımının çaba sarfetmeden yapılmasına inanmasıdır (Davis, 1989). Bu faktör bilgi sistemi kabulünü anlamaya yardımcı olan önemli bir belirleyicidir ve teknoloji kullanımına yönelik tutum üzerinde doğrudan etkisi vardır (Kim & Hahn, 2012; Porter & Donthu, 2006; Davis, 1985; King & He, 2006; Chuttur, 2009). Algılanan kullanışlılık ve algılanan kullanım kolaylığı değerlerinin yüksek seviyede olması teknolojiyi kullanıma yönelik olumlu tutumlara yol açar (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013).

Kullanıma yönelik tutum bir uygulamayı kullanım için gösterilen şevk olarak açıklanmıştır. Bu tutum pozitif veya negatif olabilir. Kullanıma yönelik tutum ve algılanan kullanışlılık tarafından tahmin edilen kullanımdaki davranışsal niyet, bir

kişinin harekete geçmesi için özenli planları olup olmadığı şeklinde tanımlanır. Gerçek sistem kullanımı ise kullanımdaki davranışsal niyetin sonucudur ve algılanan kullanışlılık, algılanan kullanım kolaylığı ve gerçek sistem kullanımı arasında her zaman bir ilişki vardır (Venkatesh, 2002; Venkatesh, Morris, Davis & Davis, 2003; Legris, Ingham & Collerette, 2003; Lala, 2014).

TKM sahip olduğu bazı avantajlardan dolayı çeşitli çalışmalarda uygulanmaktadır. Algılanan kullanışlılık ve algılanan kullanım kolaylığı faktörlerini uygulamaya çalışan, bilgi sistemleri için kullanılan özel bir modeldir. TKM sınırlı sayıda faktör içerir ve bu faktörleri farklı modellerle birleştirebilir. Sabit ana faktörlerin kullanımından dolayı sağlam bir modeldir (Li, Li & Chen, 2011).

Bu çalışmada algılanan kullanışlılık (AK) ve algılanan kullanım kolaylığı (AKK) faktörleri TKM esas alınarak seçilmiştir. Diğer ana faktörler (algılanan risk, çevresel kaygılar, sosyal etkiler ve maliyet), AK'nin alt faktörleri (kısalık, açıklık, görsel tasarım, müzikalite, iş içeriği ve kişisel içerik) ve AKK'nın alt faktörleri (arayüz, ergonomi, taşınabilirlik, kurulum yeteneği, gezinme ve çevrimiçi veya çevrimdışı okuma yeteneği) ilgili literatür dikkate alınarak belirlenmiştir.

Bu faktörlerin seçilme nedeni ise faktörler tüketicilerin satın almadaki karar verme sürecinde etkilidir ve önemli bir rol oynamaktadır. Bu süreç psikolojik, kontrol edilemeyen kişisel & çevresel faktörler ve içerik faktörlerinden oluşur. Çalışmadaki faktörlerden her biri süreç faktörlerinden birinde yer almaktadır. Algılanan risk psikolojik, çevresel kaygılar ve sosyal etkiler kontrol edilemeyen kişisel & çevresel faktörler ve maliyet ise içerik faktörleri ile alakalıdır. Ürünleri satın alma sürecindeki sahip olunan motivasyonlar bu faktörlerden doğrudan etkilenmektedir (Constantindes, 2004).

Yukarıda bahsedilen faktörlerin açıklamaları kısaca şu şekildedir. Algılanan kullanışlılık (AK) bir kişinin uygulamayı kullanımının görevi yerine getirmesi üzerinde olumlu bir etkisi olduğuna inancıdır (Davis 1989; Khosrow-Pour, 2004; Hiraoka, 2009). AK'nin alt faktörleri kısalık, açıklık, görsel tasarım, müzikalite, iş içeriği ve kişisel içeriktir. Kısalık ve açıklık e-kitabın dijital içerik yapısı (ses, resim ve grafik) ile ilgilidir. Kısalık içeriğin anlam vermek üzere kolay bir biçimde tasarlanması ve düzenlenmesi olarak tanımlanır. İçerikteki anlam ve kısalıktaki artış

ürünün daha yüksek bir değere ulaşmasını sağlar. Açıklık resimlerin, grafiklerin ve sesin bir bütün olarak dikkatli bir şekilde bir araya getirilmesidir. Bu özelliklerin uygun tasarımı, içeriğin değerinde artışa yol açmaktadır (Kim, Oh & Shin, 2010; Tsai & Li, 2011).

Tasarım; resim, grafik ve sesin müzikalitesinin görsel cazibesi olarak açıklanmaktadır. Bu yüzden, görsel tasarım ve müzikalite e-book tasarımı ile ilgilidir. Resim ve grafiklerin görsel tasarımı, görsel ve artistik efektlerden çıkarılmıştır. Görsel tasarım görme duyusu ile saptanabilir ve içeriğin varlığının gerçekçi ve doğal olduğu grafik ve resimlerle ilgilidir. İyi görsel tasarım yüksek dijital içerik değeri ve akışına yol açar. Müzikalite arka planın ses efekt kalitesi ile olan uyumudur. Ses efektleri e-kitaplara entegre edilebilen ses, arka plan müziği ve sesli e-kitaplarla ilişkilidir. Bu ses efektleri kişilerin tepkisi üzerinde daha yüksek dijital içerik değeri ve akışına yol açacak şekilde bir etkiye sahiptir (Kim, Oh & Shin, 2010; Tsai & Li, 2011).

İnsanların ihtiyaçları ve önceliklerine göre e-kitap tercihleri değişebilir. Bu yüzden kişiler farklı içeriklerde e-kitaplara odaklanır. Bu içerikler iş ve kişisel olmak üzere iki çeşittir. İş içeriği, işle ilgili e-kitapları içerir ve kişisel içerik ise eğlence ve kişisel ilgilerle alakalıdır (Kim, Oh & Shin, 2010; Tsai & Li, 2011).

Algılanan kullanım kolaylığı (AKK) ise bir kişinin belirli bir sistemi kullanımının zorluk olmadan yapılmasına inanmasıdır (Davis, 1989; Khosrow-Pour, 2004; Hiraoka, 2009). AKK'nın alt faktörleri arayüz, ergonomi, taşınabilirlik, kurulum yeteneği, gezinme ve çevrimiçi veya çevrimdışı okuma yeteneğidir. Arayüz insan ve bilgisayar arasındaki bağlantıyı sağlayan bir sınır olarak düşünülebilir. Bu kullanıcının sistem ile haberleşmesini sağlar. Ergonomi işi çalışana uygun olarak tasarlamak ve çalışanı işe uyması için zorlamamak olarak tanımlanmaktadır. Ürün ve sistemleri kullanıcılara uygun bir şekilde tasarlama yöntemidir (Dohrmann Consulting, 2014). Taşınabilirlik bir cihazın bir ortamdan başka bir ortama kolay bir şekilde yerinin değiştirilmesidir. Bir cihaz ne kadar küçükse taşıması o kadar kolaydır. Kurulum yeteneği yeni bir sistemi veya programı konumuna yerleştirme ve kullanım için hazırlama sürecidir. Gezinme web sitesi veya belgenin bir bölümünden diğer bölümüne geçiş veya hareket etme olarak tanımlanır. Hızlı gezinme ve kurulum yeteneği kullanıcıların memnuniyetinin artmasına neden olur. Çevrimiçi veya

çevrimdışı okuma yeteneği istenen zamanda mevcut olma avantajını sunar (Poon, 2014; Phan & Daim, 2011).

Algılanan risk kişinin bir davranışı gerçekleştirirken belirsiz ve olumsuz sonuçlara karşı oluşturduğu algı olarak tanımlanmaktadır (Rohrmann, 2005; Wu & Wang, 2005; Lin, Tzeng, Chin & Chang, 2010). Bu çalışmada algılanan risk; işleyiş, güvenlik ve sağlık konularını dikkate almıştır. Algılanan riskin bilgi teknolojilerinin kullanım davranışları üzerinde olumsuz bir etkisi vardır (Pavlou, 2003; Lin, Tzeng, Chin & Chang, 2010).

Çevresel kaygılar çevreyi korumaya yönelik genel tutumlar veya davranışlardır. Olumlu çevresel davranışlar olumlu ve özenli tüketim davranışlarına sebep olur (Hwang, 2014).

Sosyal etkiler çevremizdeki diğer kişilerin bilgi sistemlerini kullanmamıza olan etkileridir. Bu etkilerin kullanıcı davranışları ile pozitif bir ilişkisi vardır (Chiang & Chia-Chen, 2014).

Maliyet, tüketicilerin bir servis veya ürünü kullanmak yada almak için ödedikleri miktar olarak tanımlanır. Tüketiciler maliyetin kaliteyle doğru bir orantısı olduğunu düşünmelerine rağmen, maliyetin teknoloji kabulünde azaltıcı bir etkisi vardır (Wu & Wang, 2005; Chiang & Ch,a-Chen, 2014; Au & Kaufmann, 2003; Ittersum et al., 2006).

Yukarıda bahsedilen faktörlere bağlı olarak bir kavramsal model (Şekil 3'te verildiği gibi) geliştirilmiştir. Veri toplamak icin anketler uygulanmıştır. Anketler farklı iki metot için hazırlanmıştır. Analitik Hiyerarşi Proses yöntemi için 1-9 frekans ölçeği kullanılmıştır. Çoklu Regresyon Analizi yönteminde ise her bir kavramın e-kitap kullanım davranışlarını ölçmek amacıyla beşli Likert ölçeği kullanılmıştır. Veri İşletme, Elektrik ve Elektronik Mühendisliği ve Bilgisayar Mühendisliği bölümleri yüksek lisans ve doktora öğrencilerinden oluşan 150 kişilik bir gruptan toplanmıştır. Bu çalışmada, rastgele olmayan örnekleme yöntemi uygulanmıştır çünkü örneklemi seçerken kişisel kararlar etkili olmuştur. Ayrıca, kolaylıkla bulunabilen örnekleme yöntemi kullanılmıştır çünkü fazla sayıda yüksek lisans ve doktora öğrencisi bulunmaktadır ve bu öğrenciler içinden e-kitap kullananları belirlemek kolay değildir. Yüksek lisans ve doktora öğrencilerinin fazlalığı, bu öğrencilere anketlerin

elden ulaştırma maliyetinin fazla oluşu ve zaman sınırlaması olduğundan dolayı, rastgele olmayan örnekleme yöntemi kullanılmıştır.

Faktörlerin e-kitap kabulü üzerindeki etkisini analiz etmek ve sunulan modeli test etmek amacı ile Analitik Hiyerarşi Proses (AHP) ve Çoklu Regresyon Analizi (ÇRA) yöntemleri kullanılmıştır. AHP yöntemi ana ve alt faktörlerin etkisini test etmek için kullanılmasına rağmen, ÇRA metodu sadece ana faktörlerin e-kitap kullanım davranışı üzerindeki etkisini açıklamak için uygulanmıştır.

Çok ölçütlü karar verme aracı olan ve çeşitli karar verme uygulamalarında kullanılan AHP yöntemi, bu çalışmada faktörlerin ağırlıklı önemini elde edip onların TKM üzerindeki genel etkisini belirlemek için uygulanmıştır (Saaty, 1980; Saaty, 1983). AHP; hiyerarşi oluşturma, öncelik analizi (ikili karşılaştırma ve ağırlıklar) ve tutarlılık sınaması olmak üzere 3 süreçten oluşur. Karmaşık problemler amaç, kriterler, alt kriterler ve alternatifler olmak üzere hiyerarşik seviyelere bölünür. Her bir kriter ve alternatif için ikili karşılaştırmalar yapılarak karşılaştırma matrisleri elde edilir. Özdeğer yaklaşımı uygulanarak karşılaştırma matrislerinden ağırlıklar hesaplanır. Tutarlılık oranı değerleri de her bir matris için özdeğerler göz önüne alınarak bulunur. Bu oran 0.1'den küçük olmak zorundadır aksi takdirde analizden çıkartılması gerekir. AHP karar vericiler için kolay, anlaşılır, kararlı, esnek ve uygun bir metottur. Hiyerarşik bir yapısı olan bu yöntem problemleri daha gerçekçi kılan duyarlılık (hassasiyet) analizi testini uygular (Vaidya & Kumar, 2006).

ÇRA yöntemi, Basit Regresyona birden fazla bağımsız değişkenler ekleyerek Basit Regresyonu genişletilmiş halini elde eder. ÇRA tek bağımlı değişken ile birden fazla bağımsız değişkenler arasındaki ilişkiyi analiz etmek için kullanılan bir istatistiksel tekniktir. Amaç bilinmeyen değişkeni bilinen değişkenlerden tahmin etmektir (Hair Jr, Black, Babin & Anderson, 2010). ÇRA birden çok değişken kullanarak tahmin yürütmeye çalışan esnek bir yöntemdir. Bu yöntem karmaşık hipotezleri analiz etmek, belirleyicilerin uygun olmayan birleşmelerini önlemek ve bağımlı ve bağımsız değişkenler arasındakı ilişkiyi keşfetmeye yardımcı olur (Tabachnick & Fidell, 2001; "Multiple Regression Models", 2016).

AHP ve ÇRA metotları sonuçlarından ana faktörlerin önemini ve etkilerini gösteren önemli çıkarımlar elde edilmiştir. AHP yöntemi bulgularına göre AK, AKK ve

çevresel kaygılar e-kitap kullanımına yönelik tutumlar için etkili ölçütlerdir. AK, AKK ve çevresel kaygılar tüm katılımcılar için e-kitap benimsenmesi üzerinde etkiye sahip en önemli faktörlerdir. Katılımcıların ilk tercihi AK, ikinci tercihi AKK ve üçüncü tercihi ise çevresel kaygılar olmuştur.

Diğer bir yandan ÇRA bulgularına göre AK ve AKK faktörleri e-kitap kullanımına yönelik tutumlar için önemli belirleyici unsurlardır. İki faktör de e-kitap kabulünü olumlu yönde etkiler.

Elde edilen sonuçlar her iki yöntemin bulgularının tutarlı olduğunu belirtmektedir. AK ve AKK faktörlerinin öğrenciler için e-kitap kabulünü etkileyen en önemli faktörler olduğu doğrulanmıştır. Bu bulgular beklenildiği gibidir çünkü TKM temel olarak iki faktör üzerine yoğunlaşmıştır. AK ve AKK yeni bir teknolojinin kullanım davranışlarını anlamaya ve belirlemeye yardımcı olur. Yüksek seviyelerdeki AK ve AKK teknolojiyi kullanıma yönelik daha olumlu tutumlar geliştirilmesine neden olur (Davis, 1989; Al-Adwan, Al-Adwan & Smedley, 2013). Bu sonuçlar Davis (1985, 1989), Letchumanan & Tarmizi (2011), Lai & Ulhas (2012), Anton, Camarero & Rodriguez (2013), Agarwal & Prasad (1997), Phan & Daim (2011) ve Al-Adwan, Al-Adwan & Smedley'in (2013) çalışmaları ile örtüşmektedir.

Çevresel kaygılar sadece AHP sonuçlarında önemli bir ölçüt olarak belirlenmiştir. Bunun nedeni farklı çalışmaların bulguları ile açıklanabilir. Bansal (2011) ve Hwang (2014) çevresel kaygıların e-kitap kullanım davranışı üzerinde önemli belirleyici unsur olduklarını belirtirken, Gill, Crosby ve Taylor'ın (2011) çalışmaları tam tersini desteklemektedir. Çevresel kaygıların önemli bir ölçüt olarak kabul edilebilmesi insanların çevreyi korumaya karşı ne kadar bilinçli olduğuna bağlıdır.

AK'nin alt faktörleri AHP metodu ile analiz edilmiştir. Elde edilen bulgulardan kısalık, iş içeriği ve kişisel içerik faktörlerinin e-kitap kullanım davranışları üzerinde etkili ölçütler olduğu görülmüştür. Katılımcıların ilk tercihi kısalık, ikinci tercihi kişisel içerik ve üçüncü tercihi ise iş içeriğidir. Kısalık yapı ile ilgili olup bu yapının anlamlandırılabilmesi için kolayca tasarlanıp, düzenlenmesi gerekir. Bu yüzden öğrencilerin en çok bu faktörü tercih etmesi beklenen bir durumdur. E-kitabın diğer özellikleri bu bileşene bağımlıdır. E-kitap cihazının kullanılması ve diğer özelliklerine erişilebilmesi için içeriğin kolayca anlaşılması gerekir (Kim, Oh &

Shin, 2010; Tsai & Li, 2011). Öğrenciler için içeriğin önemli olması insanların farklı ilgi alanları ve ihtiyaçları olmasından kaynaklıdır. Tüketiciler ihtiyaçlarına göre e-kitap satın alır ve bu ihtiyaçların karşılanması gerekmektedir. Sonuçlar Phan & Daim (2011) ve Tsai & Li'nin (2011) çalışmaları ile desteklenmektedir.

AKK'nin alt faktörleri için AHP'ten elde edilen sonuçlar çevrimiçi veya çevrimdışı okuma kabiliyeti ve taşınabilirlik faktörlerinin e-kitap kullanım davranışları için etkili ölçütler olduğunu göstermiştir. Öğrenciler tercihlerinde ilk sırayı çevrimiçi veya çevrimdışı okuma kabiliyetine, ikinci sırayı ise taşınabilirliğe vermişlerdir. Çevrimiçi veya çevrimdışı okuma kabiliyetinin ilk öncelik olmasının sebebi bilgiye istenildiği zaman ulaşılabilmesinin insanlar için önemli olmasıdır. Taşınabilirlik ise tüketiciler için gerekli bir özelliktir. Kişiler taşıma kolaylığı olması açısından hafif ve küçük cihazları satın almayı tercih ederler (Phan & Daim, 2011).

Ek analiz olarak iki grubun karşılaştırılması her faktörün e-kitap kullanım davranışı üzerindeki etkisini gözlemlemek için yapılmıştır. İlk grup İşletme bölümü öğrencilerini içerir, ikinci grup ise Elektrik & Elektronik Mühendisliği ve Bilgisayar Mühendisliği bölümleri öğrencilerinden oluşur.

AHP sonuçlarına göre her iki grup AK, AKK ve çevresel kaygıları e-kitap kabulü için etkili ölçütler olarak görmektedir. İki grup için de ilk tercih AK, ikinci tercih AKK ve üçüncü tercih ise çevresel kaygılardır. Two-sample t-testleri iki grup arasında istatistiksel olarak fark olup olmadığını gözlemlemek için yapılmıştır. Test bulguları İşletme ve Elektrik & Elektronik Mühendisliği & Bilgisayar Mühendisliği öğrencileri arasında her faktörün ortalamasında istatistiksel olarak anlamlı bir fark olmadığını belirtmektedir.

İki grup için elde edilen ÇRA bulgularına göre AK ve AKK e-kitap kullanıcılarının davranışları için önemli belirleyici unsurlardır. Bu faktörlerin e-kitap kabulü ile pozitif bir ilişkisi vardır. Her iki metottan elde edilen sonuçlar tutarlı olup, AK ve AKK faktörlerinin iki grup için de e-kitap kabulünü etkileyen önemli ölçütler olduğu doğrulanmıştır. Elektrik & Elektronik Mühendisliği & Bilgisayar Mühendisliği bölümü öğrencileri AKK'yi daha önemli görürken, İşletme bölümü öğrencileri AK'yi daha çok önemsemektedir.

Algılanan kullanışlılığın alt faktörleri AHP ile test edildiğinde kısalık (iki grup için), kişisel içerik (iki grup için), iş içeriği (iki grup için) ve açıklık (İşletme bölümü) faktörlerinin e-kitap kullanım davranışı için etkili ölçütler olduğu doğrulanmıştır. İşletme öğrencileri ilk kısalık, ikinci kişisel içerik ve son olarakta iş içeriğini tercih ederken, Elektrik & Elektronik Mühendisliği & Bilgisayar Mühendisliği öğrencileri ise ilk sırayı kişisel içerik, ikinci sırayı kısalık ve üçüncü sırayı ise iş içeriğine vermiştir. Mann-Whitney U Testi iki grup arasında istatistiksel bir fark olup olmadığını anlamak için uygulanmıştır. Test sonuçları İşletme ve Elektrik & Elektronik Mühendisliği & Bilgisayar Mühendisliği öğrencileri arasında sadece açıklığın medyanında istatistiksel olarak anlamlı bir fark olduğunu göstermektedir.

Algılanan kullanım kolaylığının alt faktörleri için AHP ile yapılan analiz bulguları incelendiğinde her iki grup için çevrimiçi veya çevrimdışı okuma kabiliyeti ve taşınabilirlik faktörlerinin e-kitap kabulü için etkili ölçütler olduğu belirlenmiştir. Her iki grup için çevrimiçi veya çevrimdışı okuma kabiliyeti ilk sırada ve taşınabilirlik ikinci sırada yer almaktadır. Etkili faktörler gözlemlendiğinde bu faktörlerden hepsi için iki grup arasında istatistiksel bir fark olmadığı doğrulanmıştır.

Bu çalışmanın bazı kısımları Phan ve Daim'in (2011) mevcut bir çalışmasına dayanmaktadır. O çalışmanın amacı mobil hizmetlerin kabulünü etkileyen faktörleri belirlemekti. Bu çalışmada ise, mobil hizmetler yerine e-kitapların benimsenmesi analiz edilmiştir. Her iki çalışmada da, faktörleri belirlemek için TKM ve ilgili literatür kullanılır. Phan ve Daim'in çalışmasında kullanılan faktörler: algılanan kullanışlılık, algılanan kullanım kolaylığı, teknoloji, sosyal faktörler ve alışkanlıklardır. Bu araştırmaya ise algılanan kullanışlılık, algılanan kullanım kolaylığı, algılanan risk, çevresel kaygılar, sosyal etkiler ve maliyet faktörleri dahil edilmiştir. Phan ve Daim (2011) AHP ve Kümeleme Analizi yöntemleri kullanarak mobil hizmetin kabulünü etkileyen faktörleri tespit etmiştir. Bir yenilik olarak, AHP ve ÇRA yöntemleri bu tez çalışmasındaki veriyi test etmek için kullanılır.

E-kitap kullanımını veya satın alımını olumlu şekilde etkileyen faktörleri anlamak teknolojinin gelişme biçimini hızlandırmakta önemli rol oynadığı için bu çalışma oldukça önemlidir. Bu bilgi teknoloji geliştirme stratejisinin tüketici memnuniyeti ve e-kitap satın alımını ilerletmesine yardım eder. Teknolojideki sürekli gelişim e-kitaplarda değişikliğe neden olmaktadır. Ürün yeni gelişmeler ile birlikte sürekli

yenilenmeli, güncelleştirilmeli ve tüketicilerden uzun vadede kabul görmelidir. Bu da tüketicilerin ihtiyaçlarını anlama, ihtiyaçlarını karşılama ve ürün kabul sürecini etkileyen faktörleri inceleyerek elde edilebilir.

Bu çalışmanın literatüre olan bazı temel katkıları öne sürülebilir. Yeni faktörleri (algılanan risk, çevresel kaygılar, sosyal etkiler ve maliyet) TKM'nin ana faktörleri (algılanan kullanışlılık ve algılanan kullanım kolaylığı) ile birleştirir. Böylece TKM belirtilen faktörlerle birlikte geliştirilmiş olur. AHP ve ÇRA yöntemleri faktörlerin e-kitapların benimsemesi üzerindeki etkisini analiz etmek ve sonuçların tutarlı olup olmadığını görmek için uygulanmıştır.

Bu araştırmanın bazı sınırlamaları da vardır. Bu çalışma Orta Doğu Teknik Üniversitesinden (ODTÜ) 150 öğrenci ile gerçekleştirilmiştir. Öğrenciler İşletme, Elektrik & Elektronik Mühendisliği ve Bilgisayar Mühendisliği bölümlerindendir. Çalışma farklı bölümlerin yüksek lisans ve doktora öğrencileri ile sınırlandırılmıştır. Bu bölümler e-kitap kabulünü etkileyen faktörleri açıklamak için yeterli olmayabilir.

Faktörler literatür ve e-kitap özellikleri dikkate alınarak seçilmiştir. Dışsal faktörler araştırmacıya ve literatüre göre değişiklik gösterebileceğinden dolayı farklı araştırmacılar aynı faktörleri seçmeyebilir. Ayrıca, bu araştırma için AHP ve ÇRA yöntemleri uygulanmıştır.

Bu araştırma farklı açılardan geliştirilebilir. Gelecekteki çalışmalar için daha kesin ve hassas sonuçlar elde etmek amacıyla anketlerdeki katılımcı sayısı arttırılabilir. Anketleri katılımcılara elden ulaştırmak yerine anketlerin çevrimiçi yaptırılması zaman tasarrufu sağlayabilir ve katılımcı sayısının artmasına yardımcı olabilir.

TKM ile ilgili benzer çalışmalar incelendiğinde bu çalışmaların genellikle Yapısal Eşitlik Modellemesi metodunu kullandığı görülmüştür. Bu yöntem her bir grup için en az 150 katılımcıya ihtiyaç duyar. AHP ve ÇRA metodları haricinde Yapısal Eşitlik Modellemesi yöntemi de katılımcı sayısı arttırılarak uygulanabilir. Böylece, sonuçların güvenilirliği ve tutarlılığı arttırılmış olur.

İleride yapılacak çalışmalar için farklı bölümler seçilebilir çünkü seçilen bölümler e-kitap kabulünü etkileyen faktörleri anlamlandırmak için yeterli olmayabilir.

Ayrıca, literatürdeki çalışmalar incelendiğinde yapılan katkılar ya TKM'yi etkileyen faktörlerle ilgili ya da TAM'i bazı modellerle geliştirme ile alakalıdır. Bu yüzden yeni faktörler ve farklı modeller TKM'ye entegre edilebilir. Böylece farklı faktör ve modellerin e-kitap kabulü üzerindeki etkisi gözlemlenmiş olur.

Sonuç olarak, teknoloji benimsenmesi e-kitap kullanımında artış olmasına rağmen değişiklik gösterebilir. Bir ürünün tüketiciler tarafından kabul görmesi için, tüketicilerin ihtiyaçları karşılanmalı ve ürün kabul sürecini etkileyen faktörler incelenmelidir.

APPENDIX E: TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü [ ]

Sosyal Bilimler Enstitüsü [X]

Uygulamalı Matematik Enstitüsü [ ]

Enformatik Enstitüsü [ ]

Deniz Bilimleri Enstitüsü [ ]

YAZARIN

Soyadı : BULUR

Adı : Hatice Gonca

Bölümü : İşletme

TEZİN ADI (İngilizce) : Analyzing the Acceptance of Technology for Electronic Book Users

TEZİN TÜRÜ : Yüksek Lisans [X] Doktora [ ]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: