

AN ANALYSIS ON USER PROFILES AND USAGE PREFERENCES FOR MOBILE
APPLICATION RECOMMENDATIONS

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AN ANALYSIS ON USER PROFILES AND USAGE PREFERENCES FOR MOBILE
APPLICATION RECOMMENDATIONS

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ABSTRACT

AN ANALYSIS ON USER PROFILES AND USAGE PREFERENCES FOR MOBILE APPLICATION RECOMMENDATIONS

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In this thesis, we investigated the relationship between personality features and mobile technology use, particularly the use of traditional communication channels such as voice calls and SMS messaging and rapidly evolving mobile applications, specifically in communication and commerce domains. This was the first study to investigate the relationship between different personality features and different aspects of mobile technology use to this extent. The rapid growth in the mobile application market presents a significant challenge for users in terms of finding interesting and relevant applications. Recommendation systems deal with ends that are consumed by users in which similarity between consumer tastes is generally taken into account. In almost all of the application stores mobile applications are grouped under headings that employ consensus or authority influence strategies such as the most popular, most downloaded, editor's choice or applications of the day. However, the literature contains limited information about the users' perception of such influence strategies and the underlying factors that lie beyond the users' preferences. In this thesis, influence strategies used in mobile application recommendations and the users' compliance to the recommendations are investigated in an experimental context. Two complementary experiments are conducted; one on the web and the other on a mobile platform. The users' compliance with mobile application recommendations and the question of how the personality features of users affect their compliance with recommendations are explored in the experiments. Furthermore, this thesis analyses the applications owned by the user, the composition of applications under categories and their relation with personality features. The main contribution of this thesis is to ground the design of recommending systems in an understanding of users' needs and to provide means for personalization to better address users' individual differences.

Keywords: Mobile Phone Use; Mobile Applications; Recommendation Systems; User Profiling

ÖZ

MOBİL UYGULAMA TAVSİYELERİNDE KULLANICI PROFİLLERİ VE KULLANIM TERCİHLERİNİN ANALİZİ

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Bu tez kapsamında, kişilik özellikleri ile mobil teknoloji kullanımı; özellikle de sesli çağrı ve SMS mesajlaşma gibi geleneksel iletişim kanalları ile iletişim ve ticaret alanlarında her geçen gün gelişmekte olan mobil uygulama kullanımı arasındaki ilişki araştırılmıştır. Bu çalışma, farklı kişilik özellikleri ile teknoloji kullanımının farklı yönleri arasındaki ilişkiyi bu kadar kapsamlı olarak araştıran ilk çalışmadır. Tavsiye sistemleri, kullanıcılar tarafından satın alınan ürünlerle ilgili olup bu sistemlerde kullanıcı zevkleri göz önüne alınmaktadır. Neredeyse tüm uygulama sitelerinde mobil uygulamalar en popüler, en çok indirilen, editörün seçimi ve günün uygulaması gibi oylama ya da otorite etki stratejilerine dayalı alt başlıklarda toplanmaktadır. Ancak, literatürde, kullanıcıların bu tür etki stratejileri ile algısı ve kullanıcı tercihlerinin altında yatan etkenlerle ilgili sınırlı bilgi yer almaktadır. Bu tez kapsamında, mobil uygulama önerilerinde kullanılan etki stratejileri ve kullanıcıların bu önerileri ne kadar dikkate aldığı deneysel bir bağlamda ele alınmıştır. Bu amaçla biri web, diğeri ise mobil platformda olmak üzere birbirini tamamlayıcı iki deney gerçekleştirilmiştir. Bu deneyler yoluyla, kullanıcıların mobil uygulama tavsiyelerini ne derecede dikkate aldığı ve kişilik özelliklerinin bu noktada ne kadar etkili olduğu araştırılmıştır. Bunun yanı sıra, bu tezde, kullanıcıların sahip olduğu uygulamalar, bu uygulamaların hangi kategoriler altında toplandığı ve kişilik özelliklerle ilgisi incelenmiştir. Bu tezin ana katkısı, tavsiye sistemlerinin tasarımlarını kullanıcıların ihtiyaçlarını anlama bağlamına oturtması ve kullanıcıların bireysel farklılıklarını daha iyi anlamak için kişiselleştirme sağlamasıdır.

Anahtar Kelimeler: Mobil Telefon Kullanımı; Mobil Uygulamalar; Tavsiye Sistemleri; Kullanıcı Profili

dedicated to my beloved family

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ITHACA

As you set out for Ithaca
hope that your journey is a long one,
full of adventure, full of discovery.
Laestrygonians and Cyclops,
angry Poseidon-don't be afraid of them:
you'll never find things like that on your way
as long as you keep your thoughts raised high,
as long as a rare sensation
touches your spirit and your body.
Laestrygonians and Cyclops,
wild Poseidon-you won't encounter them
unless you bring them along inside your soul,
unless your soul sets them up in front of you.

Hope that your journey is a long one.
May there be many summer mornings when,
with what pleasure, what joy,
you come into harbors you're seeing for the first time;
may you stop at Phoenician trading stations
to buy fine things,
mother of pearl and coral, amber and ebony,
sensual perfume of every kind-
as many sensual perfumes as you can;
and may you visit many Egyptian cities
to learn and learn again from those who know.

Keep Ithaca always in your mind.
Arriving there is what you're destined for.
But don't hurry the journey at all.
Better if it lasts for years,
so that you're old by the time you reach the island,
wealthy with all you've gained on the way,
not expecting Ithaca to make you rich.

Ithaca gave you the marvelous journey.
Without her you would have not set out.
She has nothing left to give you now.

And if you find her poor, Ithaca won't have fooled you.
Wise as you will have become, so full of experience,
you'll have understood by then what these Ithacas mean.
Constantine P. Cavafy
(Translation by Josh Jones)

This poem reminds me of my PhD journey, which was long, full of novelty and discovery. I cherish that journey during which I learned a lot and gained wisdom and experience. This wonderful journey of discovery could not have been possible without the help of the dear people I have met on the way and those that have always been there with me.

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LIST OF ABBREVIATIONS

<i>BCSS</i>	:	Behavior Change Support Systems
<i>BFI</i>	:	Big Five Inventory
<i>ELM</i>	:	Elaboration Likelihood Model
<i>IMEI</i>	:	International Mobile Equipment Identity
<i>INN</i>	:	Innovativeness Index
<i>OS</i>	:	Operating System
<i>PDA</i>	:	Personal Digital Assistant
<i>PEOU</i>	:	Perceived Ease of Use
<i>PIIT</i>	:	Personal Innovativeness in Information Technology
<i>PSD</i>	:	Persuasive Systems Design
<i>PU</i>	:	Perceived Usefulness
<i>SMS</i>	:	Short Messaging Services
<i>STPS</i>	:	Susceptibility to Persuasion Scale
<i>TAM</i>	:	Technology Acceptance Model
<i>TRA</i>	:	Theory of Reasoned Action
<i>TUPI</i>	:	The Ten Item Personality Inventory
<i>VOIP</i>	:	Voice Over IP
<i>WAP</i>	:	Wireless Application Protocol
<i>WIMT</i>	:	Wireless Internet Services via Mobile Technology

CHAPTER 1

INTRODUCTION

Across the globe the primary communication device is the mobile phone which now has enriched functionality and interaction features including ubiquity, personalization, flexibility, dissemination, convenience, instant connectivity and location specific services. The built-in sensors and the digital traces left by users interacting with cyber world and applications with their mobile phones offer a significant amount of digital footprints. This data provides valuable information in terms of identifying the patterns of individual and group behaviors, personal information such as gender, age and aspects of their personality which are all essential to personalizing and improving user experience.

1.1 Background and Motivation of the Research

There is no doubt that the use of internet and mobile technologies has deeply influenced our lives. Mobile applications emerged from the existence of mobile phones and personal devices such as the Personal Digital Assistant (PDA). Mobile users have shown wide interest in mobile applications to communicate and share information, and to fulfill their personal needs from business to entertainment. Application markets have grown rapidly as a result of responding to user interest in mobile applications. In May 2015, the number of available apps in the Google Play Store was 1.5 million where it was only 16,000 in February 2009. Similarly since the launch of the Apple Store in 2008, the number of available apps reached 1.4 million (Alkis, 2015). One of the most important results of this ever-increasing number of mobile applications has been the significant challenge to find interesting and relevant applications that appeal to users.

In almost all application stores, mobile applications are grouped under headings that employ consensus or authority influence strategies such as the most popular, most downloaded, editor's choice or applications of the day. However, in the literature there is limited information about users' perception of such influence strategies and the factors that lie behind users' preferences. Recommender systems, which are accepted as a form of persuasive systems, can be used for application recommendations, and they make use of influence strategies and personalization. Persuasive systems that are intentionally designed to change a person's attitude or behavior and they are widely used in information systems. Persuasive systems employ influence strategies to attain their goal.

Cialdini (2001) identifies six principles of persuasion that can be used as influence strategy as: 1. Reciprocity; People feel obligated to return a favor, 2. Scarcity; When something is scarce, people will value it more, 3. Authority; When a request or statement is made by a legitimate authority, people are more inclined to comply or find the information credible; 4. Commitment and consistency; People do as they said they would. People try to be consistent

with the previous or reported behavior; 5. Consensus: People do as other people do and 6. Liking: We say “yes” to people we like. The effects of using these influence strategies differ on the basis of the user characteristics. This means that an Individual’s persuasion profile indicates which influence strategies will be effective on them and these profiles are regarded as the most relevant variables in the consumer’s adoption of application. Persuasion profiles are a kind of personalization process which are suggested to be based on demographics, personality traits, behavioral data and context. Recently, persuasive systems have not only become popular in research but have also become relevant to commercial applications in many domains such as energy saving, health, losing weight, and mobile and ubiquitous commerce. Consequently, they receive more attention in the popular media as well as literature.

Although they offer a promising field of study, none of the previous research has studied the influence strategies employed or could be employed in the context of mobile application recommendations. Therefore, this thesis focuses on user characteristics and persuasion profiles affecting the consumers’ adoption in mobile environment.

1.2 Significance of the Study

This research has particular significance for academia, the business world and consumers. For the academic world, this work offers a new insight into the use of mobile phone and application usage data and influence strategies in mobile application recommendations which will be valuable for further research. From a business perspective, the findings in this study present information that can be utilized by mobile business designers, especially those designing for specific populations. Furthermore, other stakeholders in this business sector including; phone operators, service providers, application developers and advertising companies can benefit from the results to further explore the behaviors of mobile technology users from the perspective of consumers.

Finally, from the consumers’ point of view, they can benefit from personalization opportunities triggered by this study. Recommendation services for mobile applications as well as for other domains may find the findings of this study useful to address the specific needs of users.

1.3 Research Questions

This thesis explores mobile phone and application usage profiles and identifies the individual differences in the compliance with mobile application recommendations. To achieve this goal two main research questions are addressed.

RQ1: What are the individual differences for the use of mobile phones and applications?

This question will be answered by addressing user profiles in mobile phone and applications use. The user characteristics that can be considered as the building blocks of user profiles will be identified and defined.

To address the first research question, the following sub-questions are formed:

RQ1.1: Are the extraversion and innovativeness traits of individuals effective on their use of mobile phones?

RQ1.2: Are the extraversion and innovativeness traits of individuals effective on their use of mobile applications?

RQ1.3: Are the extraversion and innovativeness traits of individuals effective on their use of communication applications?

RQ1.4: Do the user's evaluation of general purpose mobile applications and mobile commerce applications differ in relation to their personality features?

Our second research question addresses the users' personalization needs in rapidly growing mobile application markets. There is a significant challenge in finding interesting and relevant applications for users and this research assesses the factors that are effective in the acceptance of recommended applications.

RQ2: What affects the users' compliance with mobile application recommendations?

To address this question, two experiments were conducted. The first was conducted via experimental sessions on web and the second using a mobile application specifically designed for this thesis to recommend mobile applications to users.

RQ2.1.1: Does the evaluation of mobile applications differ according to personality features and the persuasive messages that are used?

RQ2.1.2: Are users subject to authority persuasive messages equally compliant as those users who are subject to consensus persuasive messages?

RQ2.1.3: Are users subject to visible persuasive messages equally compliant with users who are subject to semi-visible persuasive messages?

In the second experiment, there were two goals; first, to learn about users' personality and the applications they downloaded to their mobile phones, second, to recommend applications to users via notifications through the use of the specifically designed mobile application and assess the users' compliance.

RQ2.2.1: Do attitude, intention and download behaviors towards the recommended applications differ with personality features?

RQ2.2.2: Do attitude and intention to download for recommended application affect download behavior of recommended application?

RQ2.2.3: Is there a relation between personality features and number of applications owned by the user in total and in each application category?

RQ2.2.4: Is there a relation between users' acceptance of recommended applications and the categories of applications owned by the user?

RQ2.2.5: Are people, having more applications in a category, more eager to download new applications due to their interest in the category or do they resist downloading more new applications since they have already downloaded many applications?

RQ2.2.6: Does the evaluation of mobile applications differ according to the influence strategy employed by application stores namely the consensus influence strategy (most popular apps, most downloaded apps) and authority influence strategy (editor's choice)?

RQ2.2.7: Is there a significant relation between personality features and influence strategy that is effective?

1.4 Contributions of the Thesis

This study contributes to the literature in several ways:

- Measuring personality traits, Big Five Inventory (BFI) which is consisted of 44 questions has been, for the first time, translated into Turkish and used in academic research in Turkey.
- The Susceptibility to Persuasion Scale (STPS) was translated to Turkish for the first time and used in academic research in Turkey.
- Investigating the relationship between personality features and mobile technology use, specifically traditional communication channels such as voice calls and SMS messaging and rapidly evolving mobile applications use, specifically in the communication domain based on self-reported data. To our knowledge, this is the first study to investigate the relationship between various personality features and different aspects of mobile technology use.
- Exploring mobile applications as a means of communication. Mobile applications in the communications category are further analyzed in terms of the subcategories of voice over IP communication (VoIP), instant messaging, e-mails and photograph sharing.
- Analyzing the relation between mobile phone use, mobile application use and personality features.
- Exploring the relation between innovativeness and mobile phone and application use.
- Investigating whether the gender factor and Operating System (OS) being used on a user's mobile device has any correlation with that user's perception of the applications in general and commerce applications in particular.
- Showing that individual differences are effective on users' compliance with application recommendations.
- Exploring the effects of influence strategies in mobile application recommendations domain.
- Comparing the effects of visible and semi-visible influence strategies which is examined in terms of user compliance in an experimental context.
- Examining the effects of Big Five personality features on users' responses to mobile application recommendations on a mobile platform and the finding that attitude, intention and download behavior towards recommended applications differ with personality features.

- Exploring the download behavior for recommended application with respect to attitude, intention and download behavior towards recommended application.
- Revealing that there is a relation between personality features and number of applications owned by the user in total and in each application category.
- The finding that the number of apps downloaded is positively correlated with having apps in books & references, education, health and fitness and games categories.
- Finally, the main contribution of this thesis is to ground the design of recommending systems in the understanding of users' needs and to provide for personalization that better address users' individual differences. Understanding the patterns of mobile phone use is significant in revealing user preferences in order to improve the features of mobile phones and personalized mobile services. It can also be used to tailor for specific needs and specific populations and make predictions based on the available data.

1.5 Structure of the Thesis

The remainder of this thesis is divided into five chapters. Chapter 2 reviews the literature and presents the related academic studies. Chapter 3 begins with the background of the mobile phone and application usage and explores the findings of the current study. Chapter 4 is devoted to the experimental studies conducted on the web. The problem is stated and the research questions and hypothesis are given to describe the research framework. The findings and significance of the study is discussed. Chapter 5 presents the research framework and the findings of the experiment conducted through the mobile application. Finally, Chapter 6 presents the overall conclusions of the thesis and discusses future directions for research.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter provides an overview of the methodology and the results of the systematic literature review. The main purposes of the literature review are to create an understanding of the context of the research problem, gain an insight into the theoretical framework, capture the state of the art in mobile phone and applications use research, explore possible data mining and machine learning methods and to discover the research that is relevant to comparing with the final results from the current study.

2.1 Literature Review Methodology

The systematic literature review was conducted using ACM Digital Libraries, IEEE Xplore, and ScienceDirect libraries. The search engine Google Scholar was also widely used. In some cases, topic elaboration was required and to this end additional papers were added by identifying relevant articles from the reference lists of articles found during the review.

A list of keywords was created in various compositions such as; mobile phone, smartphone, mobile applications, personality, Big Five, smartphone use, mobile commerce applications, social media mobile applications, innovativeness, extraversion, behavior change support systems (BCSS), intervention, mobile application recommendation, persuadability, persuasive technology, mobile commerce.

The first selection step consisted of filtering all the papers found from the literature sources. The next step comprised of noting the title, abstract and methodology relevance for each article. The papers were selected on the basis of being sufficiently relevant to the context of mobile phones, applications and user profiles furthermore that they conducted empirical research or contribute to the theoretical background of the topic of this thesis.

2.2 Persuasive Systems and Use of Influence Strategies

Persuasive technology is intentionally designed to change a person's attitude or behavior. Today, persuasive technology is based on theories of attitude and behavior change and uses information technology as a tool to change users' attitudes or behaviors. Persuasive technology can be used in software and information systems as well as in the areas of welfare, commerce, education and health (Oinas-Kukkonen & Harjumaa, 2008). When used for marketing purposes these technologies now extend beyond traditional marketing. This is achieved through applications that track consumers and their preferences over the internet provide the data to efficiently target their interests (Kaptein, de Ruyter, Markopoulos, & Aarts, 2012).

2.2.1 Influence Strategies

Persuasive Technologies employ influence strategies to attain their goal. B. J. Fogg (2003) describes 40 strategies, Cialdini (2001) outlines 6 strategies and Toring and Oinas-Kukkonen (2009) present 28 strategies. The most extensively studied groupings were reciprocity, commitment and consistency, liking, scarcity, authority and the social proof principles of persuasion (Cialdini, 2001). These six principles are considered to be the means of influence that can affect the tendency of people to comply with a request. Each of the principles is described in detail below.

Reciprocity refers to the fact that people feel obligated to the future repayment of any favor, gift or like they have received. The obligation to repay is easily triggered by the obligation to accept. Although not requested or chosen, a favor or gift makes a person feel indebted and obliged to return the favor.

Consistency is a central motivator for human behavior that is highly valued in society whereas inconsistency is perceived as an undesirable personality trait. The commitment and consistency principle refers to the fact that individuals tend to remain consistent with their prior choices, statements and actions. When an individual makes a commitment such as taking a stand or going on record to do something, compliance will be attained through the pressures of consistency.

Liking refers to the principle that people are more likely to accept requests from people that they know and like. It is known that people tend to respond more favorably to requests from people they like than those they dislike. The physical attractiveness of people, their physical, mental or personal similarities with the person receiving the request, together with familiarity and positive associations increase the tendency for liking. Scarcity indicates the fact that the opportunities are more valuable when their availability is limited. When there is limited supply of a good or limited time left to purchase an item or service, people are more inclined to own and purchase it.

The authority principle means that individuals are influenced by those that they perceive to be in legitimate positions and tend to accept the requests coming from them. Authority may be symbolized by titles and signatures, style of dress or uniforms or by credentials certifying their expertise. However, there are controversial issues related to the influence of authority figures in regard to the relevance of their expertise and trustworthiness. People's perception of a threat to their freedom to choose can also lead to resist compliance (Fuegen & Brehm, 2004). Lack of social interaction and cues such as eye contact, voice tone and a uniform may also affect the power of authority figures in online interactions. Guadagno and Cialdini (2005) point out that the authority principle is successful when used as a decision heuristic in cyberspace, but is far less influential when used in an online interactive discussion.

The social proof principle, also known as the consensus principle, refers to the idea that when many people are doing something, it becomes socially acceptable to do the same thing. The perception that other people find an alternative as appropriate and desirable offers others a shortcut to choosing that alternative. The claim that a product is bestselling or most liked is sufficient evidence for most people to buy it. However, the opposite can also be true in that, people also have a desire to consider themselves to be unique and differ from the majority, thus this strategy should be handled carefully and subtly applied (Snyder & Fromkin, 1980).

The effectiveness of social influence strategies in persuasive systems has been studied by examining how an individual's attitudes can be affected by verbal messages presented by others. According to Chaiken (1980), there are two primary decision-making strategies available to individuals; a heuristic approach as using rules of thumb and shortcuts to make decisions or a systematic approach which involves the rational and careful scrutinizing of the facts. Another model developed for persuasive communications is the Elaboration Likelihood Model (ELM). There are two routes to the persuasion of an individual in ELM either by a central route such as carefully evaluating the content of the persuasive messages, or through a peripheral route in the individual uses simple cues or rule of thumb (Petty & Cacioppo, 1986). Elaboration of the persuasive messages means that the individual scrutinizes the message and underlying influence strategies according to their motivation and ability. When the persuasive message is presented obviously and visibly, it is probable that the elaboration likelihood will be high. High elaboration likelihood can trigger argumentation and cause resistance to persuasion. To avoid the latter, influence strategies may be embedded in a semi-visible modality in persuasive messages. This refers to the subtleness of the persuasive messages under evaluation.

2.2.2 Persuasive Systems

The most well-known frameworks supporting the design and/or evaluation of persuasive systems are the 8-step design process by Oinas-Kukkonen and Harjumaa (2008) and the Persuasive Systems Design (PSD) by Oinas-Kukkonen and Harjumaa (Kaptein et al., 2012; Oinas-Kukkonen & Harjumaa, 2008).

Fogg started studying human computer interaction in his early work on how users respond to computers in 1997. With his famous article (B. J. Fogg, 2003) and book on Persuasive Technologies (B. J. Fogg, 2003) he initiated a new research area that has further evolved into Captology (derived by Fogg in 1996 from the acronym: Computers As Persuasive Technologies). He defined persuasive technologies as those "that are intentionally designed to change a person's attitude or behavior" and captology as the study of computers as persuasive technologies..

In his 8-step design framework B. J. Fogg (2009a) presented the steps to be followed in the design of persuasive technology. The framework begins with choosing a behavior to target and the target audience. The next step is to find what is preventing the audience from performing the target behavior. Then the best channel for the technology intervention is chosen. Afterwards, prior examples of persuasive applications that are relevant are identified. The sixth and seventh steps consist of imitating the successful examples and testing them quickly and repeatedly. Finally, successful examples are scaled up and expanded.

In a later work B. J. Fogg (2009a) described the Behavior Grid which is a new way of categorizing behavior change. The grid describes 35 ways to change behavior. Behavior Grid categorizes behavior according to five types of behavior change, for example; perform anew behavior and stop a behavior. There are seven categories of behavior types such as a one-time behavior, and an always performed behavior. This grid framework helps people to clarify ways of changing behavior and the persuasive techniques to be used. For example, the behavior change methods for persuading people to buy a book online are different from

encouraging people to quit smoking. The study also identifies what types of behavior change might most easily be achieved through mobile technology.

The Fogg Behavior Model (FBM) (B. J. Fogg, 2009b) presents a new model for understanding human behavior based on the three factors of motivation, ability, and triggers. In general, persuasive design must focus on increasing motivation, increasing ability (simplicity), and triggering a behavior. Motivators are classified as; pleasure / pain, hope / fear and social acceptance / rejection. There are three types of triggers namely; sparks, facilitators, and signals. A spark is a trigger that motivates behavior, a facilitator makes a behavior easier to adopt and a signal indicates or reminds. To increase persuasiveness, designers of persuasive experiences must make the behavior easier to carry out and simple, for example the 1-click shopping at Amazon B. J. Fogg (2009b). Simplicity has the power to change behaviors and contains six parts; time, money, physical effort, brain cycles, social deviance and non-routine. These three factors of the FBM model must occur at the same time otherwise the target behavior will not happen.

Fogg investigated Mass Interpersonal Persuasion (B. J. Fogg, & Iizawa, D, 2008) and Facebook which he mentions as a new form of persuasion profile. He defined this phenomenon as the power of interpersonal persuasion within the reach of mass media and believed that “this new way to change attitudes and behavior is the most significant advance in persuasion since radio was invented in the 1890s” (B. J. Fogg, & Iizawa, D, 2008).

The PSD model consists of a conceptual framework for designing and evaluating persuasive systems utilizing seven underlying postulates of persuasive systems furthermore, it lists and categorizes persuasion techniques. This model analyzes the use and user contexts of the application; “the use context focuses on what information is relevant for a user in a given situation whereas the user context relates to the larger contexts in a user’s life may be considered (e.g. pre-existing attitudes, persistence of change, cultural factors, or social anchors)” (Oinas-Kukkonen & Harjumaa, 2008).

The framework also assists in identifying the persuasive techniques that have been incorporated into the system under investigation. The PSD framework consists of 28 persuasion techniques or principles grouped under the following four categories; the primary task support focuses on carrying out the primary task, the dialogue support maintains the interaction between the user and the system in a way that users continue towards their goal or target behavior, system credibility support explains how to design a system that is more credible and thus more persuasive, and the social support category shows how to design a system that motivates users by leveraging social influence.

Although there are similar endeavors, such as Ritterband’s behavior model for Internet interventions (Ritterband, Thorndike, Cox, Kovatchev, & Gonder-Frederick, 2009) and Abraham and Michie (2008) taxonomy of behavior change techniques used in interventions, they are quite different from the PSD framework (Lehto & Oinas-Kukkonen, 2011). The PSD is the most recently developed sophisticated theoretical model framework Lehto and Oinas-Kukkonen (2011) created in order to design and evaluate Behavior change support systems (BCSS) from another point of view.

Following Fogg, Oinas-Kukkonen (2012) went one step further and defined the concept of behavior change support systems (BCSS). These systems benefit from persuasive technology

on behalf of an individual's needs and goals and they are designed to assist users in pursuing their goals (Oinas-Kukkonen, 2012).

Today, BCSS are based on persuasive technology, attitude and behavior change theories and use information technology to assist users in attaining their goals. These systems are widely used in health domain as well as welfare, commerce, education, energy saving and other sectors (Oinas-Kukkonen & Harjumaa, 2008). The use of this technology has received growing interest from researchers and service providers in the mobile market. Systems using mobile technology benefit from the ubiquity, interactivity, context awareness and personalization provided by smartphones. With mobile and ubiquitous technology, BCSS can be used to influence individuals based on their context, personal needs and progress. The means provided by BCSS are useful in increasing the effectiveness of recommendation systems.

2.3 Recommendation Systems

Recommendation systems have evolved and have made various important contributions over the past 20 years. These systems frequently have an aim to persuade people to download mobile applications, and thus they can be reasonably counted among the larger category of adaptive persuasive technologies (Kaptein & Eckles, 2010). This section contains a discussion of some of the milestone studies and the current trends in recommendation systems.

Recommendation systems have become an important research topic in information science. Its importance is accompanied by its popularity and usability in many domains. These systems have been successfully employed in recommending goods or information and enjoyed by many users especially within the e-commerce field. The most widely known application is Amazon's recommendation system for its online customers (Linden, Smith, & York, 2003). Recommender systems may make use of persuasive technologies and user persuasion profiles which can then be used to build personalized relevant outputs. They may suggest items to the users according to their needs and preferences. Although they offer a promising field of study, none of the previous research has studied the influence strategies employed or that can be employed in the context of persuasive system capacity of recommendation engines. In this section, some of the milestone studies in literature and the current trends in recommendation systems are discussed.

Recommendation systems are especially helpful in managing the information overload problem which is encountered in many domains. This system can suggest items to users according to their needs and preferences helping users prune the huge information bulk that is mostly useless. To prune information there are mainly two methods that are used (Adomavicius & Tuzhilin, 2005): The first method, called content-based recommendation, depends on recommending items similar to the items the user preferred in the past. The second method recommends items that other customers with similar tastes and preferences liked in the past and is called collaborative recommendation. The first papers on recommendation systems appeared in the mid-1990s and employed collaborative filtering (Adomavicius & Tuzhilin, 2005). Burke (2002) classifies recommendation systems into five types as collaborative, content, utility, demographic, and knowledge based.

Zanker, Jannach, and Gordea (2007) discussed the recommendation systems and their usage domains according to Burke's classification: "Collaborative filtering exploits clusters of users that show similar tastes in the past and proposes products that their statistically nearest neighbors also liked. Pure content-based approaches learn a user's preference model from the characteristics of earlier preferred products. Knowledge-based ones exploit deep domain knowledge in the form of mappings between abstract user preferences and required product characteristics. Utility-based recommendation systems require definitions of utility values that specific product characteristics contribute to the fulfillment of given user requirements. Finally, demographic information filtering approaches are based on the assumption that users with similar social, cultural, and regional backgrounds share similar tastes and needs."

Although one of the goals of recommendation systems is to provide users with personalized items, too much pruning is not always satisfactory in the sense that it may provide only a few recommendations to the user. Recommendations that are more diverse result in more opportunities for users to receive recommended items. Adomavicius and Kwon (2011), introduced and explored a number of item ranking techniques that can generate recommendations that have substantially higher aggregate diversity while maintaining accuracy.

Perugini, Gonçalves, and Fox (2004) implemented a connection-oriented perspective and added a social element that considers the connections between people. Ma, King, and Lyu (2009) coined the term 'Social Trust Ensemble' to determine social trust restrictions on the recommender systems.

According to Burke (2010), researchers have mostly adopted a static view for the evaluation collaborative recommender systems. Burke (2010) examined the dynamic properties of collaborative recommendation and he emphasized the dynamic and evolving nature of the process as new items and users arrive. He argued that the static view is not realistic since it takes a frozen snapshot of the actual circumstances. However, the real world is dynamic with new items and new users being added to the system continuously. Burke argued that dynamic properties are largely unknown and it is a new research area.

In recommendation systems, social networks can be utilized to extract user interests. Akther, Alam, Kim, and Saddik (2012) created new architecture for user personalization which combines both social network data and context data. They argue that based on Service Oriented Architecture, recommendation systems can flexibly utilize users' preference information and context to provide more desirable recommendations.

The current and historical context of a user can be highly beneficial in generating customized recommendations. The context of a user can be determined by time, location, weather, and similar factors. Recently, various studies have been conducted on recommendation systems that consider user context (Etzion, Magid, Rabinovich, Skarbovsky, & Zolotorevsky, 2010; Lin, Jessurun, Vries, & Timmermans, 2011; W.-I. Park, Park, Kim, & Kang, 2010; Zhuang, Mei, Hoi, Xu, & Li, 2011). Some of these papers refer to the mobile commerce environment and on recommending locations (Dhar & Varshney, 2011; Gavalas & Kenteris, 2011; Shabib & Krogstie, 2011; Yu, Pan, Tang, Li, & Han, 2011; V. W. Zheng, Zheng, Xie, & Yang, 2010; Y. Zheng, Zhang, Ma, Xie, & Ma, 2011) and activity and event recommendation (Kayaalp, Özyer, & Özyer, 2009; Quercia, Lathia, Calabrese, Di Lorenzo, & Crowcroft, 2010; Zanda, Menasalvas, & Eibe, 2011; V. W. Zheng et al., 2010)

Persuasive technology has promising features in relation to fostering mobile persuasion. Mobile users predominantly prefer mobile applications rather than browsers to access internet services. Application markets have grown rapidly as a result of the increase in user interest in mobile applications. Mobile application recommendation websites and services fulfill the growing need to filter, rank and recommend the best applications from the hundreds of thousands available. Some of these sites operate in the official application marketplaces such as Genius in the iTunes App Store and the recommendations in Google Play. Other marketplaces including Amazon Appstore, Yandex, and Opera App Store also display recommendations for users.

Little is known about the details in the recommendation mechanism of Google Play or Genius in the iTunes App Store. Commercial mobile application recommendation systems have also been developed to offer recommendations to users. Among these systems, AppJoy (Yan & Chen, 2011) automatically measures application usage patterns and recommends applications based on a collaborative filtering method. AppBrain is a mobile application recommender engine used via a website and mobile application that monitors the installation history and provides application recommendations by linking application preferences between users. GetJar, a mobile application recommender application developed for sparse datasets, presents a personalized app list to users along with a non-personalized most popular list (Shi & Ali, 2012). Applause is a recommender system that considers users' locations to recommend applications (C. Davidson & Moritz, 2011). AppAware is a recommender system that suggests applications based on user's application installations, uninstallations and updates (Girardello & Michahelles, 2010). The Which App? application seamlessly collects data about the use pattern of the applications in the user's smartphone. This application uses a complex recommender system which employs five different filtering techniques, namely content-, collaborative-, tag- and context-based techniques (Costa-Montenegro, Barragáns-Martínez, & Rey-López, 2012).

AppFunnel has been developed as an evaluation framework to investigate the performance of recommender engines (Böhmer, Ganev, & Krüger, 2013). It is shown that contextual factors strongly influence a mobile user's needs, and there is benefit in integrating contextual information into recommender systems (Böhmer, Bauer, Steinfurt, & Krüger, 2010; Böhmer et al., 2013). To track mobile application engagement the process beginning with viewing a recommended application, to installing it, to over using it directly, to using it in the long term is analyzed. In the study by Böhmer et al. (2013) the authors tracked mobile application engagement by analyzing the process beginning with viewing a recommended application, then installing it, using it directly and in the long term. The AppFunnel allows recommender engines to be evaluated through click-through-rates, download statistics and conversion rates from view to installation, installation to direct usage, and installation to long-term usage. It is found that for all engines only a few percent of installed applications that they viewed i.e. for recommendations based on application popularity the conversion rate was 9%. Whereas, the conversion rate from installations to usage (either direct or in the long term) was higher than 30%. The tests revealed that the recommendations addressing the current context of the user show a higher performance in direct usage, whereas non-contextualized recommendations result in a higher long-term usage of installed applications.

Mobile application recommendations are further analyzed to address the research question of whether mobile users prefer viewing or installing similar apps (Xia, Wang, & Zhou, 2013). The authors generated mobile app recommendations by analyzing both the metadata and

measuring the similarity between apps in the same category, using real data on a large scale. The study showed that the mobile users are looking for applications similar to free ones that they own. Users tend to install applications that are more similar for free applications, whereas for paid applications, they prefer to install applications that are less similar.

2.4 Personality Features

In its simplest form, as described by Adomavicius and Tuzhilin (2001), personalization begins with collecting data on the user. This includes demographic data such as age, gender, the OS being used and personality features like innovativeness and personality traits. The features to be analyzed in the context of user profiles are discussed in this section.

2.4.1 The Big Five Personality Traits

Understanding personality is a complex issue and has been the subject of numerous studies in the social and psychological sciences. Personality has fundamental dimensions referred to as traits and it has been shown that people's behavior can be explained by their underlying personality traits, which reflect the enduring dispositions of their nature (Costa & McCrae, 1992). There are various methodologies in the literature that identify and classify the personality traits but the most widely used and accepted model is the Big Five personality framework which defines the traits as extraversion, agreeableness, conscientiousness, neuroticism and openness (McCrae & John, 1992). As Kalimeri, Lepri, and Pianesi (2010) states, the Big Five has been a standard in psychology literature over the last 50 years. The mnemonic convention OCEAN was suggested by John and Srivastava (1999) referring to the ocean of personality:

E Extraversion, Energy, Enthusiasm

A Agreeableness, Altruism, Affection

C Conscientiousness, Control, Constraint

N Neuroticism, Negative Affectivity, Nervousness

O Openness, Originality, Open-mindedness

Openness to Experience refers to being curious, intelligent and imaginative, artistic, sophisticated in taste and appreciates diverse views, ideas, and experiences (Golbeck, Robles, Edmondson, & Turner, 2011). The conscientious personality is characterized by self-control, reflected in a need for achievement, order, and persistence (Costa & McCrae, 1992). Conscientious individuals are extremely reliable and tend to be high achievers, hard workers, and planners (Golbeck, Robles, Edmondson, et al., 2011). Extraversion is related with energy and enthusiasm (John & Srivastava, 1999). Extroverts are friendly and energetic, and they draw inspiration from social situations (Golbeck, Robles, Edmondson, et al., 2011). Agreeableness means being cooperative, helpful, nurturing, optimistic and trusting of others (Golbeck, Robles, Edmondson, et al., 2011). People who score high on agreeableness are sympathetic, good natured, cooperative and forgiving (McElroy, Hendrickson, Townsend, & DeMarie, 2007). Neuroticism refers to being anxious, insecure, sensitive, moody, tense (Golbeck, Robles, Edmondson, et al., 2011).

There are various implementations of the Big Five Model in the form of 100, 50, 44 and 10 question surveys. The Ten Item Personality Inventory (TIPI) introduced by Gosling,

Rentfrow P. J., and W. (2003) which has been widely used in the research is given in APPENDIX A:. It was also shown that the TIPI instrument attains adequate convergence with the Big-Five measures in self-reported ratings.

TIPI has also been used in Turkey in social science research. A Turkish version of the questionnaire prepared and applied by Atak (2013) is referenced by Gosling et al. (2003). The Turkish version of TIPI and related documentation on the “Adaptation of the Ten-Item Personality Inventory in Turkish Culture” is given in APPENDIX A: TIPI is easier to implement from the longer alternatives and it is shown that it yields acceptable results (Gosling et al., 2003). Nevertheless, Gosling et al. (2003) state that the ultra-short version should not be used as substitute for a full-scale assessment of personality unless participant time is truly limited.

The other widely used instrument is the 44-item Big-Five Inventory (BFI) provided by John and Srivastava (1999) given in APPENDIX B:. There are various studies in the literature that compare BFI and TIPI. Rammstedt and John (2007) reported there were substantial losses when the 10 item scale is utilized compared with the 44 item full-scale BFI. Although they admit that 10-item inventory possesses acceptable psychometric properties they conclude that if testing time is not extremely limited, full-length Big Five measures possess clear advantages.

There are a limited number of Big Five personality tests that can be found in Turkish. Somer, Korkmaz, and Tatar (2000, 2001) developed Turkish version of BFI with 220 items. Another test called NEO-PIR originally developed by Costa and McCrae (1992) was translated into Turkish by Gülgöz (2002) and has 240 items. Bacanlı, İlhan, and Aslan (2009) developed a personality test containing 40 adjective pairs in Turkish. This test is more practical to implement due to its length and pragmatic items but it has limitations in terms of comparability with literature and adoptability in different languages and cultures. However, the 44-item BFI that is extensively used in literature was not translated into Turkish prior to our study. In this thesis, the Turkish version of the 44-item BFI was administered and given in APPENDIX B:.

2.4.2 Extraversion

Extraversion is the personality trait used in both experiments in this thesis. Extraversion is related with energy and enthusiasm (John & Srivastava, 1999). It is associated with characteristics such as an individual being active, assertive, energetic, enthusiastic, outgoing and talkative however, individuals rated low on extraversion can be described as quiet, reserved, shy, silent, and withdrawn (Tan & Yang, 2014). People high on the extraversion scale enjoy the company of others (Tan & Yang, 2014). Intuitively, people who are more outgoing, talkative and social are more likely to use communication media, regardless of its modality. Extraversion is the most common personality trait that influences mobile phone and applications use (Butt & Phillips, 2008; Lane & Manner, 2011, 2012; Tan & Yang, 2014). In the study reported in this thesis, extraversion trait was used to determine users’ preferences due to its relevance mentioned in the literature.

2.4.3 Innovativeness

In the literature, innovation is defined as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 1995). Rogers (1995) defines

innovativeness as the degree to which a person is early in adopting innovations when compared to others. In the information systems domain, personal innovativeness is explained as the inclination of an individual to try any new information systems (Agarwal & Prasad, 1998). Agarwal and Prasad (1998) developed a personal innovativeness construct to understand the process by which new information technologies are adopted and they found that people with a higher degree of personal innovativeness were more likely to adopt new technologies.

Innovativeness has been used as a personality construct to predict consumers' innovative tendencies to adopt a wide variety of technological innovations (Hirschman, 1980; Wood & Swait, 2002; Yang, 2005). It has been found that there are significant differences between Wireless Application Protocol (WAP) adopters and non-adopters in terms of their personal innovativeness and users who have higher level of personal innovativeness adopt WAP earlier than others (Hung, Ku, & Chang, 2003). Lu, Yao, and Yu (2005) found that the Technology Acceptance Model (TAM) model integrated with Personal Innovativeness in Information Technology (PIIT) is generally applicable to explain the initial adoption of Wireless Internet Services via Mobile Technology (WIMT). Kuo and Yen (2009) used TAM and incorporated personal innovativeness and perceived cost to further understand consumer's behavioral intention to use 3G mobile value-added services. They found that personal innovativeness enhances the perceived ease of use of 3G mobile value-added services.

It was shown that personal innovativeness can be used to predict the adoption of mobile commerce (Hung et al., 2003). Nov and Ye (2008) suggested that innovators are more promising customers. Limayem et al (Blake, Neuendorf, and Valdiserri (2003) developed a model on online shopping intentions based on the theory of planned behavior with their results revealing that personal innovativeness positively affects attitude and intentions to shop online. Citrin, Sprott, Silverman, and Stem (2000) found that Information System (IS) innovativeness is positively associated with the frequency of shopping online and the variety of product classes in web sites shopped from and visited. Citrin et al. (2000) indicate that innovativeness predicts consumer adoption of Internet shopping. Goldsmith (2001) tested a new model to determine factors that lead customers to purchase online. It is found that generalized innovativeness and innovativeness towards online purchasing predicts both frequency of online buying and intent to buy online in the future. Innovativeness is found to be a very important indicator of consumer intention to use mobile commerce in the United States (Dai & Palvi, 2009).

2.4.4 Susceptibility to Persuasive Strategies

Persuasion profiles are defined as the expected effects of different influence strategies for a specific individual. These profiles are considered to be based on user profiles such as demographics, personality traits, persuadability and behavioral data (Cacioppo & Petty, 1982). Persuadability is an important scale in identifying persuasion profiles. To measure persuadability, the individual's need for cognition (Kaptein, Markopoulos, de Ruyter, and Aarts (2009) is widely used as a scale for a person's compliance with persuasive requests. (Cialdini, 2001) created a 12 item questionnaire to measure an individual's susceptibility to Cialdini's six persuasion principles Cacioppo and Petty (1982). They showed that their scale is more powerful than the need for cognition scale defined by Cacioppo and Petty (1982). Later, Kaptein et al. (2012) elaborated on the items of the questionnaire and developed a new scale called Susceptibility to Persuasive Strategies Scale (STPS) (APPENDIX C:). The

adapted version of this questionnaire (Kaptein, Lacroix, & Saini, 2010) is translated to Turkish and used in the research for this thesis to determine the persuadability levels of participants (Appendix C). The validity of the Turkish scale is analyzed extensively by Alkis (2015). In this version, only the items presented under the consensus and authority principles are used due to their relevance to the focus of the thesis. In the mobile application recommendation domain, implementations of consensus and authority influence strategies were predominantly used on the basis of the most popular ones, most downloaded ones, and editor's choice.

2.5 Mobile Phone and Application Use

The section provides an overview of the background of the research conducted on mobile phone and application use. The implementations of the relevant concepts given in the literature are explored for the mobile domain and the approaches used in the previous studies are discussed together with their results.

2.5.1 Mobile Phone Use and Personality Features

Mobile phones are not just a medium of communication but also imply the status and identity of their users Entner (2010). Several studies have investigated the different characteristics of mobile users. Plant (2000) showed that males (53%) are more likely to have a smartphone than females (47%). Plant (2000) reported that the color of the handset, sound of the ring tone, and the logos and graphics display personal preferences and are affected by gender differences. Gender was found to mediate how users exploit mobile phones in their social interactions (Wei & Lo, 2006). Women are more likely to use social media applications such as Facebook and Twitter while men are more likely to use productivity and financial applications (Greengard, 2010). Age is another demographic determinant of mobile phone use predicting the frequency of mobile phone use (Greengard, 2010). Younger people use mobile applications more frequently than their elders (Greengard, 2010). In addition to the demographic characteristics of mobile phone users, personality is another important determinant of mobile phone use. As mobile phones mediate social interactions, the use of mobile phone reflects the individual's personality (Butt & Phillips, 2008). Prior research has shown that personality is linked to user interface design (Lee, Lee, Lee, & Choo, 2012), preferences for mobile advertisements, and acceptance of the adaptability dimensions of mobile systems (Graziola, Pianesi, Goren-bar, & Sheva, 2005). Wolfradt and Doll (2001) found that personality traits influence the motives of media use. The relation between personality and social media use has been another area of interest for researchers. Almost all previous studies have reported the existence of a correlation between personality traits and the high or low significance of Facebook use (Bachrach, Kosinski, Graepel, Kohli, & Stillwell, 2012; Chen & Marcus, 2012; Golbeck, Robles, Edmondson, et al., 2011; Golbeck, Robles, & Turner, 2011; Ortigosa, Quiroga, & Carro, 2011).

Ehrenberg, Juckes, White, and Walsh (2008) conducted a study with forty participants to investigate the effect of the personality characteristics of users on their social interactions on the internet and compared this with users' real life interactions. Participants were all chat users, and following a discussion in a chat room, they were asked to complete two questionnaires, namely the Real-Me Questionnaire and the Eysenck Personality Questionnaire (EPQ-R). The Real-me questionnaire contained four questions to determine how easy it was for the participants to reveal information about themselves to their friends

on the Internet compared to their real-life interaction. EPQ-R was administered and Extraversion and Neuroticism scales were computed. The authors found that the Internet was the platform preferred by introverted and neurotic people to reveal their 'real me' whereas extroverts and non-neurotic people chose to have traditional social interaction. The authors concluded that this could be the reason why mobile phone users tended to be extraverted.

Lane and Manner (2011) investigated how personality and self-esteem affect university students' use of communication technologies. Two hundred mobile phone user university students were asked to complete a questionnaire inquiring about the average time they spend on calling, texting and instant messaging, and their technology addiction tendencies. A self-esteem test and a personality test based on the Big Five personality traits were also administered to the participants. The authors found that more disagreeable individuals spent an increased time on calls. In addition, more disagreeable individuals and those with lower self-esteem preferred to use instant messaging, and exhibited stronger IM addictive tendencies. On the other hand, extraverted and neurotic individuals reported to spend increased time on text messaging and had stronger addictive tendencies towards mobile phone use.

Bianchi and Phillips (2005) investigated the effect of the Big Five personality traits on the smartphones' ownership and use. For the analysis, the authors used logistic regression and hierarchical linear regression. Of the 312 participants, 233 had a smartphone. The participants with a mobile phone that could download and process information were asked to rate six smartphone functions, namely phone calls, texting, internet, e-mail, music, and games from 1 to 5 with 1 being not important at all and 5 being very important. The results showed that the probability of smartphone ownership increased in parallel with the increase in the level of extraversion. While extraverts tended to spend more time on texting, more agreeable individuals used their smartphones to make calls more than text. The authors attributed the agreeable individuals' preference for calling over text messaging to their higher level of interpersonal skills. Lane and Manner concluded that personality was not as strong a predictor of smartphone ownership and use as demographics, and the most consistent predictor of all personality traits was extraversion. Although there are limited studies in the literature that investigated the relationship between personality features and mobile phone use, however, there has been a consensus that extraversion is the most common personality trait that influences mobile phone and applications use (Butt & Phillips, 2008; Lane & Manner, 2011; Tan & Yang, 2014).

Butt and Phillips (2008) carried out a study with 120 mobile phone owners to investigate the effect of Big-Five personality traits on their use of mobile phones. The authors used the NEO-FFI and Coopersmith self-esteem inventory to determine how many participants owned mobile phones, the type of phones they used and how this related to their personality traits. Bianchi and Phillips (2005) observed that mobile phone users are more likely to be extraverts.

In a later study, Chittaranjan, Blom, and Gatica-Perez (2011) reported that extraverted people received more calls and spent more time making and receiving calls as well as sending and receiving SMS. Extraverts were also reported to spend more time on changing the ring tone and wallpaper of their phone, which indicated that the mobile phone was used as a means of stimulation. On the other hand, neurotic, disagreeable, and unconscientious people were reported to spend increased time on messaging using SMS. In their study,

extraverted people were reported as receiving more calls and spending more time for making and receiving calls (Butt & Phillips, 2008).

On the other hand, Chittaranjan, Blom, and Gatica-Perez (2013) did not find a significant relationship between extraversion and time spent on incoming and outgoing calls. Although not significant, it was found that extraverts spend more time on incoming calls. The duration of calls and the number of unique contacts who called were also found to be significantly higher for extraverts. Chittaranjan et al. (2013) later found that extraverts spend more time on incoming calls and also receive more calls. The total duration of calls and the number of unique contacts in call logs and outgoing calls were also likely to be higher. Oliveira, Cherubini, and Oliver (2013) reported that only the extraversion trait was significantly related with mobile phone use in terms of sending or receiving calls. Outgoing calls were not significantly explained by the personality traits in previous studies (Butt & Phillips, 2008; Chittaranjan et al., 2011, 2013) inferring that extraversion is not a discriminative feature in outgoing calls. It was shown that personality was a fairly weak predictor of smartphone ownership and use, whereas extraversion was found to be the most consistent predictor (Lane & Manner, 2011).

There are studies in the literature that explored the relationship between extraversion and SMS messaging. Lane and Manner (2011) and Wyatt and Phillips (2005) found that extraverts report a higher use of SMS messaging. Reid and Reid (2004) reported that extraverts spend more time sending emails. Butt and Phillips (2008) showed that the preference between messaging and phone calls depends on the personality of the user, and those that are less socially anxious and lonely prefer voice calls to text messages. In the study by Oliveira et al. (2013), extraverts were reported to spend more time on writing and receiving messages using SMS. Similarly, Chittaranjan et al. (2011) found that the only personality trait that was significantly related to sending and receiving SMS messages was extraversion. Although Chittaranjan et al. (2013) showed that the extraversion trait negatively correlates with the number of SMS sent, in a later study Chittaranjan et al. (2013) found that users scoring high on extraversion are more likely to receive and send more SMS messages.

2.5.2 Mobile Application Use and Personality Features

Recommendation systems dealing with ends such as books, movies and consumer goods are consumed by users where similarity between consumer tastes is generally taken into account. On the other hand, recommendation systems for mobile applications differ from traditional systems in terms of the characteristics of the ends they recommend. They present applications that are not just the ends for consumption but also the means to reach various ends (Unal, Taskaya-Temizel, & Eren, 2014). By using applications downloaded users can continuously satisfy their needs and use their apps to buy various goods or services. Recommending an application to the user differs from recommending a book in many ways. When a user downloads an app, it is used as a utility most of the time and can be referred as continuous consumption as opposed to one-shot consumption (Yin, Luo, Lee, & Wang, 2013). In the example of recommendations of books, the downloaded application may be a collection of books or a tool to find relevant books. In either case, the application serves as a continuous utility. If the user is not satisfied with application they have the option to uninstall the application and install a new one, mostly without payment. The limitations to downloading new apps are that they are similar to those already owned, use high battery

consumption, limits on the existing phone memory and sometimes concern over security and data leakage.

Having similar applications has a two-fold consequence on the users' decisions. For example, a user may not download the recommended application if they have a similar one. This may be especially true for applications in the tools category, such as calendar and torch in which the features of the apps are known and well-defined. Only novel applications with user-friendly interfaces and attractive features may appeal to the user and convince them to download the application. This decision is usually taken via the introduction pages of the applications in app stores where features, screenshots, average number of downloads, ratings and reviews are given. The other consequence is that users have a tendency to download apps in specific categories for which the user has an interest and have similar apps. It is easily understandable that a user having an obesity problem downloads applications regarding nutrition or health & fitness or a teenager downloads game applications. As a result, users' responses to mobile application recommendations differ according to their individual needs and preferences with personality features and demographic characteristics have the utmost impact on users' choices.

The process up to downloading an application begins with the name and category of the application recommended. If it addresses users' needs, they will proceed to the introduction page of the application then clicking the application link and showing their intention to download. After reviewing the introduction page, the user will decide whether to download the application. This process can be abstracted as composed of click and download functions.

Application stores such as Apple iTunes and Google Play Store provide non-personalized top application recommendations to customers under certain categories using various arguments like the number of downloads, user ratings and the apps chosen by editors. The number of downloads and user ratings provides the users' point of view and indicates the effectiveness of mobile applications. The number of downloads gives commercially valuable information about the application however, application stores only provide this information to application developers and avoid making the data public. Google Play store is the only application market that gives information about the download statistics of each application however, instead of providing the exact value they give download counts in buckets. The main reason for using Google Play store to select the applications in the experiments, for the research reported in this thesis, is the availability of the download data. Another characteristic of Google Play store is that the majority of the applications are free. This allows us to obtain a set of uniform applications that compete on the same basis.

To provide an aggregate view of the purposes for which users use their smartphones Falaki et al. (2010) categorized applications into eight categories, namely: i) communication ii) browsing iii) media iv) productivity v) system vi) games vii) maps; and viii) other. In the study by City (2013), 12 major application categories were aggregated according to application categories of three major mobile application platforms, namely App Store, Android Market and Windows Market. The following categories were utilized were; tool, game/entertainment, life information, social networking, commerce/business affairs, education/learning, music/ring tones, news/weather, e-books, theme background, GPS, and video and audio. To analyze smartphone user behavior, Verkasalo (2010) used 3 application categories. These were a General Application which includes personal information management, productivity, maps and navigation, and games; Mobile Internet including web browsing, streaming, downloads; and Multimedia usage such as music, imaging, video. Another study by Lane and Manner (2012) used the six categories of smartphone

applications recognized by the Mobile Marketing Associations follows; communications, games, multimedia, productivity, travel, and utilities. In a recent study (Y. Kim, Briley, & Ocepek, 2015), the application types included are books, finance, shopping, lifestyle, game, music/video/picture, news, social networking, instant messaging, sports, and reference management. For the analysis, e-commerce application use was measured as the aggregate of finance and shopping applications. Entertainment application use was sum of using game, music/ video/picture, and sports applications. Information application use was the total of the use of lifestyle and news applications. Literacy application use consisted of using book, education, and reference management applications. Relational application use was the sum of using social networking and instant messaging applications.

All application stores make their user rating data available to the public, which provides valuable information concerning the consumer's perception of the applications. Users can rate the applications they have downloaded with 1 to 5 stars, 5 being the highest possible rating. The average of these ratings is displayed in the application markets for each application. However, there are serious drawbacks in using these ratings; most importantly, the average rating is the average of multiple releases over time, which does not provide valid information for the user, who is generally interested in the latest release (Fu et al., 2013). Then, there are inconsistencies between the user comments and ratings which can result from careless mistakes or most probably the results of attempts to manipulate ratings by the developers and/or competitors (Shi & Ali, 2012). Finally, the ratings are usually polarized, with the vast majority of ratings being either 1 or 5 and this is seen in Google Play store in which most applications are free so users tend to give 1 when an application did not work and 5 when it fulfilled their expectations Shi and Ali (2012). Editors' choice is used in Google Play store to highlight the best apps available. The features that are considered for this list are; quality, user interface, long-term popularity and innovative use of Android features ("The Google Play opportunity," 2015). Editors choose these apps to publicly announce the apps they value and a badge is given for the chosen applications in their introduction pages.

In the literature it was found that there was a significant positive correlation between the number of downloads and user ratings for Android applications (Dehling, Gao, Schneider, & Sunyaev, 2015; Sunyaev, Dehling, Taylor, & Mandl, 2013). Similar results were found in the Blackberry market, in which authors observed a strong correlation between ratings and downloads where highly rated applications were more frequently downloaded (Finkelstein et al., 2014). However, other studies have pointed out that user ratings may vary across different application stores. For example, the average rating score is 4.3 for Google Play store whereas it is 3.4 for iTunes Appstore (d'Heureuse et al., 2012). This may result from Google Play store being dominated by free applications and users tending to give higher rating scores for free apps (Finkelstein et al., 2014). Another reason is that Google Play store users who download free applications have lower expectations so when they are more satisfied they tend to give higher scores (d'Heureuse et al., 2012). A recent study in 2014 concerning Google Play store concluded that although there is an expectation that applications with higher ratings would have higher download rates, this was not the case. All paid applications had an average overall rating of 4 with free applications having an average overall rating greater than 4. On the other hand combining both free and paid applications gave an average rating of between 4 and 4.5 in any bucket of download range (Viennot, Garcia, & Nieh, 2014). Research has been conducted (Unal, Kucukozer-Cavdar, Taskaya-Temizel, & Eren, 2015a, 2015b) concerning the relationship between application features pertaining to the behavior change ends and user ratings, and the download numbers for

mobile health applications. It was found that there is a strong positive relation between the number of features pertaining to social approaches, and the number of downloads and user ratings. The total number of features an application offers to its users was also found to be correlated with user ratings and the number of downloads.

When downloading applications from application stores, users consent is asked. Permission is needed to access personal data such as app usage data, location and call logs. In addition, permission needs to be given for the user to download the app; however, the list of apps installed by the user on their mobile phones can be obtained by any application without asking for permission.

All mobile devices are anonymized by International Mobile Equipment Identity (IMEI) numbers to protect privacy. IMEI are unique identifiers and can be used to track the user extensively. The pictures that are uploaded to social media sharing services such as Flickr with positioning and IMEI tags of the phone can later be acquired by various systems using the IMEI as an identifier (Milrad & Multisilta, 2009). However, the awareness of the usage potential of IMEI is not widely known. In a study conducted with university students revealed that approximately 45% of students did not know what IMEI was (Androulidakis & Kandus, 2011). Targeted marketing companies such as “google.ads” collect users’ location data and the IMEI number (Grace, Zhou, Jiang, & Sadeghi, 2012). The top five most wanted information items from Android apps by the ad networks are found to be IMEI number, location, contact list, camera information, and user’s online accounts (Hornyack, Han, Jung, Schechter, & Wetherall, 2011).

Ad networks gather personal data in order to create detailed dossiers about consumers. Much of the time, ads are embedded to applications by including a library such as AdMob, Flurry, mobclix, adwhirl, mobfox, and many others (D. Davidson, Fredrikson, & Livshits, 2014). In a study conducted for Wall Street Journal it was found that among 101 popular mobile apps 56 transmitted the phone's IMEI, 47 transmitted the phone's location and five sent age, gender and other personal details to outsiders (Kane & Thurm, 2010). For example, in the same study, the iPhone version of Pandora, a well-known music app, sent information to eight ad networks; location data to seven, IMEI to three and demographic data to two (Kane & Thurm, 2010). In the current study, IMEI is used to ensure anonymity which may pose privacy concerns that can be addressed in future work.

Recent studies explored the relationship between installed mobile applications and user attributes such as gender, religion, country and language (Seneviratne, Seneviratne, Mohapatra, & Mahanti, 2014a, 2014b). Using machine-learning algorithms, it was shown that user’s gender can be predicted with 70% accuracy and most personality traits with over 90% precision. It was also shown that smartphone users form clusters based on the characteristic of the apps they install.

Despite the data in the literature, the relationship between mobile application use and personality features is a relatively unexplored field. Chittaranjan et al. (2013) investigated this relationship by examining application logs but due to the sparse dataset obtained from Nokia N95 phones in the period from October 2009 to February 2011, they were only able to examine 11 applications. Although the Nokia N95 could be considered to be a smartphone it is well behind the technology used in today’s smartphones such as the touchscreen interface and the availability of millions of apps to download. In the study by Chittaranjan et al. (2013), only basic applications that are mostly preinstalled in Nokia N95 phones such as calendar, office, camera, video/audio/music, YouTube, internet, mail, chat, SMS, maps, games were examined. The relation between mobile applications and the Big Five

personality traits were investigated in their study. As a brief summary of their regression tests they found that: (1) Office app was more likely to be used by conscientious participants, (2) the Internet by introverts and disagreeable users (3) Mail app by disagreeable and conscientious users (4), the Video/Audio/Music apps by less conscientious more open participants (5), Youtube by extraverts and nonconscientious participants (6) and the Calendar app, by disagreeable participants. The correlation tests showed a positive association between extraversion and the use of office and calendar applications, and negatively with internet, games and camera. Agreeableness was found to be negatively correlated to the use of several applications, including Office, Internet, Video/Audio/ Music, Mail, Calendar, and SMS apps. Conscientiousness was found to be negatively correlated with the use of Video/Audio/Music and Youtube applications. Neuroticism was found to be positively correlated to the use of Office and Calendar apps. The openness trait was found to be negatively correlated to the use of Office and Calendar applications.

Tan and Yang (2014) found that individuals high in extraversion tend to more frequently use internet applications in transaction, social networking, finance, games and online friends categories. Finance applications are more likely to be used by conscientious and open users, entertainment applications are more likely to be used by users who score high in openness and transaction, social networking, and games and online friends categories are more likely to be used by users scoring high in neuroticism. The results revealed by Tan and Yang (2014) should be tackled cautiously since they obtained the users' assessments of internet applications used in web environment. Therefore, the term application in their study does not address mobile applications.

In another study, Lane and Manner (2012) measured the importance of the six categories of smartphone applications, namely, communications, games, multimedia, productivity, travel, and utilities, are measured. The extraversion trait in users was found to be giving greater importance on games and less importance to productivity applications. For neurotic users travel applications were more important. Users scoring low in conscientiousness indicated that communication, productivity, and utilities applications were less important to them. When analyzing the study by Lane and Manner, it should be taken into account that this study only measures the importance attribute with regards to personality traits. Relevance, likeness, intention to download and actual download preferences of users are not tackled in the context of this study.

Y. Kim et al. (2015) engaged in research on a large, diverse sample, and demonstrated that sociodemographics (e.g., gender, age, education, and income) were major predictors of smartphone and application use, but personality traits were also useful to provide additional information. They found that females tended towards a greater use of e-commerce applications, and relational applications. Extraverts were associated with decreased literacy application use and increased relational application use and conscientiousness was associated with decreased e-commerce application use.

A recent study (Gerpott & Thomas, 2014) investigated the factors that contribute to explaining mobile internet usage. The three largest effect sizes were detected for educational level, innovativeness and SMS volume, A lower, but consistently positive relation was found for income and technology self-efficacy. The least conclusive and negative relations were found for age, gender (mobile internet usage level of males exceeds that of females) and the extent of mobile network operators experience. However, the authors conclude that the impact of age, gender and extent of mobile internet experience on mobile internet usage remain inconclusive due to the increasing maturity of the mobile usage market. Furthermore,

since the characteristics of mobile use and features of mobile devices change over time, there is a need to conduct further explorative studies in this domain.

2.5.3 Mobile Communication Applications

Mobile phones, mobile applications and evolving mobile communication modalities represent new and innovative forms of communication. It is obvious that mobile applications disrupt the traditional way of communication monopolized by service providers, namely traditional voice calls and short messaging services (SMS) (Boase, 2013). There is a fundamental shift in people's communication channels which results in a decline in the use of traditional communication services (Palekar, Weerasinghe, & Sedera, 2013). Mobile communication apps can be defined as applications to connect and communicate through mobile devices for sharing news, information and content with others (Palekar et al., 2013). The mobile communication applications can be subdivided into categories (Palekar et al., 2013): 1) social networking 2) voice over Internet protocol (VoIP) 3) instant messaging 4) recommendation services. The use of information sharing applications such as photograph sharing applications like Instagram, use of e-mails and web browsers are also other forms of mobile communication modalities.

One of the most important results of the overwhelming use of mobile applications has been the incumbent change in communication modalities. The traditional communication methods of voice call and SMS are rapidly evolving to new forms of communication. Examining the traditional mobile phone use may give insufficient and misleading results. Therefore, in this research, the investigation focused on whether there is a significant relationship between the use of mobile phones and mobile applications, which are further elaborated to mobile communication applications, and extraversion and innovativeness as personality features of users.

2.5.4 Mobile Commerce Applications and User Perceptions

Mobile commerce (m-commerce) is commonly be defined as electronic commerce transactions carried out via mobile phones and wireless terminals (Dholakia & Dholakia, 2004) in the current study focuses on the former type of transactions. M-commerce is a relatively new area for research which promises potential for rapid growth and wide extension. This type of commerce has some core characteristics that differentiate it from classic e-commerce (Sadeh, 2002) including ubiquity, personalization, flexibility, dissemination, convenience, instant connectivity and location-specific services. M-commerce enabling technologies such as bluetooth and GPS to differentiate mobile commerce from electronic commerce (Grami & Schell, 2004).

There are several research models that can be utilized to depict consumer behavior toward mobile and ubiquitous commerce. Theory of reasoned action (TRA) introduced by Yang (2005) assumes that human behavior is preceded by intentions. Behavioral intention on the other hand is determined by individual attitude and subjective norm concerning the behavior. The technology acceptance model (TAM) which is based on TRA is the most widely known research model used to explain consumer behavior toward technology. TAM proposes that intention to use is determined by the attitude toward using which in turn is determined by the perceived usefulness (PU) and perceived ease-of-use (PEU). The dependent variable in TAM is the adoption intention and/or attitude toward using and the perceived usefulness (PU) and

perceived ease-of-use (PEU) are the independent variables. TAM is widely used in information systems research to create a model of individual human acceptance of technology.

The background of user perception on mobile commerce is built on attitude and behavior change theories like TRA, TAM and ELM. The Persuasive Technology used today is based on these well-known theories and uses information technology as a tool for changing users' attitudes or behaviors.

Studies on consumer behavior in mobile environments are a rapidly growing field of interest. There are empirical studies on users' adoption of m-commerce. A study by Yang (2005), examined the factors that affect the adoption of m-commerce in Singapore. The research results showed that PU, consumer innovativeness, past adoption behavior, technology cluster adoption, age, and gender affect the adoption of m-commerce and the results were consistent with the technology acceptance model employed.

A quantitative study aiming to explore the determinants of m-commerce usage Wu and Wang (2005) used a 22 items survey that measured seven variables, namely, perceived risk, cost, compatibility, PU, PEU, actual use and behavioral intention to use. It was found that, except for PEU, all variables were significant in determining m-commerce usage, with the compatibility factor being the most significant among others.

Consumer perception of mobile applications in the m-commerce environment was investigated by Mahatanankoon, Wen, and Lim (2005). Their study addressed the question of what attributes were important for consumers in terms of their mobile application preferences. The authors used a survey consisting of questions concerning their perception of the importance of mobile application attributes that ranged from 1 being not important to 5 being very important. It was found that mobile applications should possess maximum effectiveness through context aware, location-centric and customized features. The effect of personalization and context on customers' privacy concerns and intention to adopt commerce applications was investigated by Sheng, Nah, and Siau (2008) in an empirical study, which consisted of four scenarios covering different commerce models. The results showed that the adoption intention differs according to the context, namely, it varies among the information, entertainment and payment areas depending on the situation and context. The factors that influence users adoption in the m-commerce environment has been analyzed in a recent empirical study (He, Wang & Liu, 2012). The results indicate that perceived value mediates the effect of PU and perceived security on users' intention to use m-commerce.

H. W. Kim, Chan, and Gupta (2007) explained their reservations for well-known TAM. The authors stated that most adopters and users of technology are the employees of firms and organizations. However, for mobile internet, individuals should be considered as both consumers and users of technology. By adapting the theory of consumer choice and decision making from literature, the authors developed the Value-based Adoption Model. This model evaluates the consumers' perspective of value maximization for the mobile internet. Their study shows that consumers' perception of the value is the principal determinant of adoption intention. In a study conducted with Turkish consumers (Barutcu, 2007), mobile phone users' attitudes towards m-commerce tools were explored. It was found that the respondents had positive attitude towards mobile advertising, mobile discount coupons, mobile entertainment

services, location-based mobile services, mobile internet and mobile banking whereas they have negative attitudes toward mobile shopping.

Trust is a crucial factor in many economic activities and this has been examined in many disciplines ranging from business to psychology. After the landmark study of McKnight and Chervany (2001), trust has been studied extensively in e-commerce as a factor in user adoption. Nevertheless, there are relatively few studies in m-commerce context however, Siau and Shen (2003), developed a framework for trust in m-commerce. They suggested that trust in mobile technology and trust in mobile vendor are the two main factors influencing trust in m-commerce. The constructs the authors used were; reliability of wireless services, usability of m-commerce website, usability of mobile device, information quality, privacy of customer information, security of mobile transaction, trustworthiness of product vendor and quality of product.

Empirical studies have been conducted on consumer adoption of Internet devices exhibit similar results. In a study regarding the mass adoption of 3G mobile phones in Taiwan (Teng, Lu, & Yu, 2009), it was shown that consumers' perception of the utility is the key factor that stimulates mass adoption. In their study on explaining consumer acceptance of handheld Internet devices, Bruner and Kumar (2005) used usefulness, ease of use (EOU) and fun to use (FTU) constructs as scales. Their empirical results showed that while PU contributes to consumer adoption of handheld internet devices, the FTU attribute contributes even more.

Although the above-mentioned studies have focused on technological aspects of m-commerce, only few studies have examined the applications and personalization in m-commerce. Furthermore, most studies on m-commerce adoptions have focused on the relationships between technology adoption factors and behavioral intentions of users based on demographic variables. Demographic variables are widely used since they are easier to obtain and valuable for identifying potential targets and predicting market trends (Tang & Kuo, 2010). Whitley (1997) found that age and gender significantly affect the attitudes towards computer use where men had higher self-efficacy and were more willing to take risks than women. Similarly, Yang (2005) reported that men's perception of m-commerce were more positive. Concerning consumer spending on mobile applications Seneviratne et al. (2014a) found that male users tend to purchase more apps than female users and they are more likely to spend more money on mobile applications.

Anckar and D'Incau (2002) reported contradicting results concerning the attitudes of male and female users towards m-commerce services. Women were found to be more interested in making reservations and purchases via their mobile devices. Men showed more interest in mobile banking and mobile games. There are no empirical studies that have investigated m-commerce user perceptions of mobile applications and m-commerce applications with various constructs based on gender. The current study researches whether gender is a determinant of user perception of mobile applications; in particular m-commerce applications irrespective of the OS that is used.

CHAPTER 3

MOBILE PHONE AND APPLICATION USE

The previous chapter provided an introduction to the literature and the theoretical background of mobile phone and application use. In the literature, there is a limited number of studies that examines the relationship between users' personality features and mobile phone use. There are even fewer studies that investigated the connection between personality features and mobile application use. This current study investigates the relationship between traditional mobile phone use, including SMS messages and call data, rapidly increasing mobile application use as new forms of communication modality and personality features. The personality features considered are; extraversion, and innovativeness of the users. A structured survey was conducted with 343 university students. The results showed that mobile phone use features are predominantly related with extraversion whereas mobile application use features are mostly related with the innovativeness of individuals.

As an extension to analyzing general purpose and communication applications, mobile commerce applications are analyzed in terms of user perception. These perceptions of mobile commerce applications are analyzed based on their gender and the operating system (OS) of the devices being used, which are important factors related to user profiling in mobile business models. The results show that there is a significant difference between the perceptions of Android and iOS device users' of mobile commerce applications except for their perception of advertisements. On the other hand, in general, user perceptions of mobile applications do not exhibit significant differences except for the perception of usefulness for both gender and OS.

As a result, in this chapter, first research question and sub-questions will be addressed, namely:

RQ1: What are the individual differences for the use of mobile phones and applications?

RQ1.1: Are extraversion and innovativeness traits of individuals effective on mobile phone use?

RQ1.2: Are extraversion and innovativeness traits of individuals effective on mobile application use?

RQ1.3: Are extraversion and innovativeness traits of individuals effective on communication applications use?

RQ1.4: Are user's evaluation towards general purpose mobile applications and mobile commerce applications differ with personality features?

3.1 Study I: The Impact of Individual Differences on the Use of Mobile Phones and Applications

3.1.1 Research Method

3.1.1.1 Participants

The empirical data was collected using a questionnaire that was e-mailed to the undergraduate and graduate university student lists of a well-known university in Turkey. The questionnaire was completed by 343 people of whom 154 were female and 131 male, 58 of them did not state their gender. The average age of participants was 21.7.

3.1.1.2 Materials

Measuring Extraversion

Within the framework of the Big-Five model, Gosling et al. (2003) introduced the Ten Item Personality Inventory (TIPI), which includes ten questions to determine the Big-Five personality traits. In the same study, it has been found that, the TIPI instrument reaches adequate convergence with widely used Big-Five measures in both self-reported ratings and peer or observer reports (Gosling et al., 2003). Hence, in our study, we used TIPI to measure self-perceived personality. The relevant TIPI questions that were employed in the questionnaire are “extraverted, enthusiastic” and “reserved, quiet”. The extent to which the pair of traits applies to the user was rated with the pairs of adjectives. Participants were asked to enter a number from 1 to 7, from strongly disagree to strongly agree. The scale reliability was considered to be sufficient since the Cronbach Alpha value was 0.7 which is compatible with suggested values (Nunnally, 1978).

Measuring User’s Innovativeness

In the literature, innovativeness is used as a personality construct to predict consumer perceived innovativeness as discussed in the literature. The *innovativeness index* (INN) used in this study is a composite score of five innovativeness items which aims to measure users’ openness to new technologies. INN measure was adopted from Yang (2005) with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The scale reliability measured with Cronbach Alpha, was found as acceptable by 0.82 (Nunnally, 1978).

Mobile Phone Use

The mobile phone use survey consisted of three sections; demographic details, mobile phone use and mobile application use data. In the demographics section, participant’s age and gender information were obtained. The mobile phone use section contained questions based on a Likert scale with responses graded from 1 to 7 with 1 being no use to 7 being very frequent/much use. The questions were mainly based on the constructs in the study of (Butt and Phillips, 2008) but were further elaborated. In their study, the authors measured time spent per week on all calls (separating incoming and outgoing calls) and SMS messaging. In

our study, we asked further questions regarding the time spent on all features of daily mobile phone use. More specifically, we represented the time spent for SMS in two variables; time spent for incoming messages and outgoing messages. In addition, the questions added to those of Butt and Phillips (2008) concerned the number of incoming and outgoing calls, frequency of mobile application use, the total time spent using mobile phone and the number of people contacted for incoming and outgoing calls in a day.

Mobile Application Use

The third section contained questions regarding mobile application use patterns based on a Likert scale with responses graded from 1 to 5 with 1 being no use to 5 being very frequent use. Mobile communication apps can be defined as applications to connect and communicate through mobile devices for sharing news, information and content with others (Humphreys, 2013). Mobile applications in communications category were presented in sub categories as VoIP (Skype i.e.), instant messaging (Whatsapp, Viber i.e.), e-mails and photograph sharing (Instagram, flickr i.e.). The following categories were added to the study to provide an aggregate view of what users use their smartphones for and to provide comparative benchmarking results (Humphreys, 2013; Lane & Manner, 2012; Verkasalo, 2010): music/audio (radio, music player i.e.), video (Youtube, Vimeo i.e.), productivity, tools, weather, news, games, finance (banking, stock exchange i.e.), shopping (m-commerce), travel (navigation, maps i.e.), personal life (Health, fitness, lifestyle i.e.), web browsers, books/references. In the current study, application categories were generalized from the mobile application stores for the two most popular smartphone operating systems, namely, Apple Store and Google Play Store. Social networking category is excluded from the analysis to avoid dispersion in context.

3.1.2 Data Analysis and Results

Data were analyzed using SPSS. A total of 343 participants responded to the mobile phone use questions. The questions regarding extraversion and innovativeness were answered by 314 respondents so the data for 29 participants could not be used in the analysis. The questions concerning mobile applications use were answered by 285 respondents who stated that they use mobile applications in their phones. As a result, the analyses regarding mobile phone use comprised the 314 users who own mobile phones whereas the analyses with respect to mobile application use only took into consideration the users using applications on their smartphones which is a total of 285.

For the features that were found to be positively skewed, a log transformation, $\log(\text{feature} + 1)$, was applied. For the features that were negatively skewed, the scale was inverted by subtracting it from its maximum value plus one before applying log transformation. The features that were inversed were negated to ease the interpretation. The assumption of normality was met after the data was transformed.

3.1.2.1 Analysis of the independent variables

Table 1 shows the descriptive statistics for each independent variable, extraversion and INN. The mean for INN is relatively high which indicates that the respondents consider themselves as highly innovative. The mean for the extraversion feature shows that the

respondents consider themselves as slightly more extravert than the established norm (Gosling et al., 2003).

The correlations between the independent variables were computed using Pearson's correlation coefficient. Table 12 shows that innovativeness is significantly correlated with extraversion. Although significant correlations exist between the independent variables, they are all below the selection criteria of 0.99 (Tabachnick & Fidell, 2000). Hence, the assumption of no multicollinearity is met. To further analyze independence assumption, interaction among variables is explored to determine whether one independent variable affects the dependent variable as a function of second independent variable. To explore interaction, centered values of independent variables and the product of the two independent variables are used in multiple regression analysis. Multiple regressions conducted for mobile phone usage ($p=0.131$) and mobile application usage ($p=0.568$) as dependent variables revealed that there is no interaction among variables.

Table 1: Descriptive Statistics for Independent Variables

	N	Mean	SD	Skewness
Extraversion	314	4.941	1.397	-0.380
INN	314	5.717	0.916	-1.707

Table 2: Correlations between Independent Variables

	Extraversion	INN ^{a,b}
Extraversion	1.000	0.333**
INN ^b		1.000

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

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

^a Reverse is taken

^b Log transformation is applied

3.1.2.2 Analysis of the dependent variables

The descriptive statistics for mobile phone and mobile application use are illustrated in Tables 3 and 4, respectively. Table 3 shows that the daily average time for total usage time is relatively higher rated than those found in the other constructs. The daily average time spent on incoming calls is higher than outgoing calls, which is consistent with the findings of Butt and Phillips (2008). Similarly, the daily average time spent on incoming messages is greater than time spent on outgoing messages. When the frequency of use is considered, the mean is higher for the daily number of incoming calls than the number of outgoing calls, and the number of contacts for incoming calls is higher than the number of contacts for outgoing calls. The frequency of using mobile applications is higher than incoming or outgoing calls. Table 4 shows that personal life categories are the least used whereas email, web browsers and instant messaging are the most used categories.

Table 3: Descriptive Statistics for Mobile Phone Use Features

	N	Mean	SD	Skewness
Usage Time ^a	343	4.297	1.770	0.064
Incoming Calls Time ^a	343	2.236	1.134	1.195
Outgoing Calls Time ^a	343	1.971	1.042	1.460
Incoming Messages Time ^a	343	2.294	1.517	1.351
Outgoing Messages Time ^a	343	2.233	1.496	1.430
Mobile App Use ^b	343	3.580	1.904	0.362
Number of Incoming Calls ^b	343	3.076	1.090	0.913
Number of Outgoing Calls ^b	343	2.875	0.988	0.895
Number of Contacts (Incoming Calls) ^b	343	3.000	0.970	0.946
Number of Contacts (Outgoing Calls) ^b	343	2.834	0.970	1.132

^a Likert scale with 1 being no use to 7 being very much use (in terms of duration)

^b Likert scale with 1 being no use to 7 being very frequent use

Table 4: Descriptive Statistics for Mobile Application Use Features^a

	N	Mean	SD	Skewness
VoIP	285	2.270	1.311	0.764
Instant Messaging	285	3.968	1.425	-1.128
E-mail	285	4.274	1.108	-1.622
Web Browsers	285	4.039	1.469	-1.303
Video	285	3.779	1.223	-0.802
Photograph	285	2.649	1.639	0.320
Music	285	2.677	1.647	0.308
Productivity	285	2.804	1.562	0.140
Tools	285	1.898	1.314	1.231
Weather	285	3.551	1.328	-0.560
News	285	3.382	1.493	-0.457
Games	285	2.793	1.509	0.214
Finance	285	1.856	1.221	1.296
Shopping	285	2.137	1.210	0.888
Navigation	285	2.716	1.250	0.203
Personal Life	285	1.825	1.153	1.334
Books & References	285	3.011	1.423	-0.011

^a Likert scale with 1 being no use to 5 being very frequent use

The correlation between the personality features and mobile phone use features is given in **Error! Reference source not found.** Table 5 and Table 6 shows that mobile phone use features are mostly correlated with extraversion, followed by innovativeness.

Table 5: Correlations between Independent Variables and Mobile Phone Use

	Extraversion	INN^{a,b}
Usage Time	0.261**	0.113*
Incoming Calls Time ^b	0.202**	0.020
Outgoing Calls Time ^b	0.144**	0.031
Incoming Messages ^b	0.175**	0.133*
Outgoing Messages ^b	0.148**	0.085
Mobile App Use	0.159**	0.189**
Number of Incoming Calls	0.283**	0.226**
Number of Outgoing Calls	0.256**	0.170**
Number of Contacts (Incoming Calls)	0.274**	0.213**
Number of Contacts (Outgoing Calls) ^b	0.213**	0.193**

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

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

^a Reverse is taken

^b Log transformation is applied

Table 6: Correlations between Independent Variables and Mobile Application Categories

	Extraversion	INN^{a,b}
VoIP	0.101	0.200**
Instant Messaging ^{a,b}	0.181**	0.175**
Email ^{a,b}	0.216**	0.178**
Web Browsers ^{a,b}	0.099	0.198**
Video	0.187**	0.245**
Photograph	0.189**	0.122*
Music	0.191**	0.118*
Productivity	0.075	0.215**
Tools ^b	0.074	0.224**
Weather	-0.022	0.159**
News	0.188**	0.298**
Games	0.072	0.221**
Finance ^b	0.143*	0.252**
Shopping	-0.005	0.137*
Navigation	-0.016	0.242**
Personal Life ^b	0.069	0.050
Books & References	0.038	0.204**

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

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

^a Reverse is taken

^b Log transformation is applied

To test whether the personality features (extraversion and INN) as independent variables can be used to predict each mobile phone usage construct in each row in Table 7, a total of ten

multiple regression models were conducted. The results including R² values and significance levels are given in Table 7. The standardized regression coefficient (β) and t-statistics are illustrated in Table 8. Regression analysis for mobile phone use showed that extraversion as independent variable significantly predicted the features for usage time, time spent on incoming calls, time spent on outgoing calls and messages, number of incoming and outgoing calls, and number of contacts for incoming and outgoing calls. Extraversion as a personality feature was found to be highly related with most of the features for mobile phone usage. Innovativeness significantly predicted mobile application use, number of incoming calls and number of contacts for incoming calls. The personality features in the model predicting number of incoming calls explained 9.8% of the variance ($F=16.984$, $p=0.00^*$) which is the highest among all. Both personality features in the models predicting the frequency and number of contacts in incoming and upcoming calls explained higher variance than the models predicting the call time in incoming and outgoing calls. When the standardized regression coefficients were examined, extraversion trait is significant in predicting the mobile phone use ($\beta=0.251$, $p=0.00^*$) whereas innovativeness trait is significant in predicting the mobile application use ($\beta=0.159$, $p=0.00^*$).

Table 7: Regression Analysis for Mobile Phone Use

	F	p	R²
Usage Time	11.513	0.000**	0.069
Incoming Calls Time ^b	7.037	0.001**	0.043
Outgoing Calls Time ^b	3.342	0.037*	0.021
Incoming Messages ^b	5.947	0.003**	0.031
Outgoing Messages ^b	3.725	0.025*	0.023
Mobile App Use	7.514	0.001**	0.046
Number of Incoming Calls	17.223	0.000**	0.100
Number of Outgoing Calls	11.277	0.000**	0.073
Number of Contacts (Incoming Calls)	15.753	0.000**	0.092
Number of Contacts (Outgoing Calls) ^b	10.323	0.000**	0.062

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

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

^a Reverse is taken

^b Log transformation is applied

Table 8: Standardized Regression Coefficient, T-value and Significance for Mobile Phone Use

	Extraversion			INN ^{a,b}		
	Beta	t	p	Beta	t	p
Usage Time	0.251	4.334	0.000	0.029	0.502	0.616
Incoming Calls Time ^b	0.220	3.734	0.000	-0.053	-0.903	0.367
Outgoing Calls Time ^b	0.150	2.525	0.012	-0.019	-0.314	0.753
Incoming Messages ^b	0.147	2.490	0.013	0.084	1.423	0.156
Outgoing Messages ^b	0.135	2.272	0.024	0.040	0.670	0.503
Mobile App Use	0.109	1.849	0.065	0.153	2.598	0.010
Number of Incoming Calls	0.234	4.104	0.000	0.148	2.591	0.010
Number of Outgoing Calls	0.224	3.868	0.000	0.096	1.656	0.099
Number of Contacts (Incoming Calls)	0.229	3.991	0.000	0.137	2.395	0.017
Number of Contacts (Outgoing Calls) ^b	0.168	2.883	0.004	0.137	2.354	0.019

^a Reverse is taken

^b Log transformation is applied

To test whether the personality features (extraversion and INN) as independent variables can be used to predict each mobile application usage construct in each row in Table 9, a total of seventeen multiple regression models were conducted. The results including R2 values and significance levels are given in Table 9. The standardized regression coefficient (β) and t-statistics are illustrated in Table 10. This analysis showed that the independent variables significantly predicted the features for mobile application categories. As Table 10 depicts, 14 of the 17 mobile application categories are significantly related with INN: VoIP, instant messaging, email, web browsers, video, productivity, tools, weather, news, games, finance, shopping, navigation, books & references and whereas instant messaging, email, video, photograph, music categories are found to be significantly related with extraversion. The personality traits in the model predicting the use of news applications explained 1.03% of the variance ($F=15.728$, $p=0.00^*$) which is the highest among all. We observe that the innovativeness trait is significant in prediction ($\beta =0.201$, $p=0.001$). In addition, the traits in the model predicting the use of video related application accounted for 7.5% of the variance ($F=11.153$, $p=0.00^*$). Although both extraversion ($\beta=0.124$, $p=0.044$) and innovativeness ($\beta=0.210$, $p=0.001$) are significant in this model, the effect of innovativeness feature is higher. The traits in the models predicting VoIP, instant messaging, web browsers, tools, finance, VoIP, photograph, productivity, games, navigation, books/ references, news explained between 4.1% and 6.9% of the variance.

Table 9: Regression Analysis for Mobile Application Use

	F	p	R²
VoIP	6.031	0.003**	0.042
Instant Messaging ^{a,b}	7.053	0.001**	0.049
Email ^{a,b}	8.908	0.000**	0.054
Web Browsers ^{a,b}	5.904	0.003**	0.041
Video	11.064	0.000**	0.074
Photograph	5.771	0.004**	0.040
Music	5.846	0.003**	0.034
Productivity	6.653	0.002**	0.039
Tools ^b	7.247	0.001**	0.043
Weather	4.304	0.014*	0.030
News	15.254	0.000**	0.093
Games	7.052	0.001**	0.049
Finance ^b	9.074	0.000**	0.055
Shopping	2.943	0.054*	0.014
Navigation	9.899	0.000**	0.060
Personal Life ^b	0.756	0,047*	0.005
Books & References	6.083	0.003**	0.035

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

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

^a Reverse is taken

^b Log transformation is applied

Table 10: Standardized Regression Coefficient, T-value and Significance for Mobile Application Use

	Extraversion			INN ^{a,b}		
	Beta	t	p	Beta	t	p
VoIP	0.046	0.740	0.460	0.187	3.021	0.003
Instant Messaging ^{a,b}	0.142	2.301	0.022	0.133	2.153	0.032
Email ^{a,b}	0.179	2.922	0.004	0.125	2.043	0.042
Web Browsers ^{a,b}	0.044	0.713	0.477	0.185	2.999	0.003
Video	0.125	2.065	0.040	0.208	3.424	0.001
Photograph	0.167	2.704	0.007	0.072	1.163	0.246
Music	0.171	2.773	0.006	0.067	1.089	0.277
Productivity	0.012	0.202	0.840	0.211	3.418	0.001
Tools ^b	0.009	0.144	0.885	0.221	3.591	0.000
Weather	-0.075	-1.213	0.226	0.181	2.911	0.004
News	0.109	1.819	0.070	0.266	4.441	0.000
Games	0.008	0.125	0.901	0.218	3.548	0.000
Finance ^b	0.080	1.307	0.192	0.213	3.484	0.001
Shopping	-0.050	-0.799	0.425	0.151	2.425	0.016
Navigation	-0.096	-1.575	0.116	0.271	4.441	0.000
Personal Life ^b	0.061	0.969	0.334	0.028	0.437	0.663
Books & References	0.025	0.402	0.688	0.212	3.428	0.001

^a Reverse is taken

^b Log transformation is applied

3.1.3 Discussion

In this study, we investigated the relationship between personality traits and mobile technology use, traditional communication channels such as voice calls and SMS messaging and various mobile application categories (Unal, Taskaya-Temizel & Eren, 2015a). To our knowledge, this was the first study to investigate the relationship between different personality features and different aspects of mobile technology use. In addition, frequency of mobile application use is analyzed which has not been previously investigated in the literature.

Our results confirmed the results of the previous studies concluding that personality traits can be used to determine the patterns of mobile phone use (Butt & Phillips, 2008). The results that are in line with the literature are as follows: People high in extraversion trait (1) make longer incoming and outgoing calls (2) spend more time using their mobile phones (Butt & Phillips, 2008; Chittaranjan et al., 2011, 2013; de Montjoye, Quoidbach, Robic, & Pentland, 2013) (3) send and receive higher number of messages (Butt & Phillips, 2008; Chittaranjan et al., 2013; Lane & Manner, 2011; Oliveira et al., 2013) as text messaging is an easy and convenient tool for extraverts who are outgoing and sociable and willing to communicate with others (Lane & Manner, 2011) (4) make higher number of incoming and outgoing calls (5) communicate with higher number of different contacts (Chittaranjan et al., 2013) which can be attributed to the finding of the study of (McCrae & John, 1992) where

extraversion was found to be positively correlated with number of friends. (6) spend more time for video and image sharing activities.

In addition to the current studies, our findings offer the following novel contributions: Individuals high in extraversion trait (1) spend more time in using mobile applications, (2) spend more time in applications that provide voice calling and sending messages, the reasons of which can be explained by our aforementioned findings: the extravert people spend more time in mobile phone use and (3) spend more time in using music applications. However in the literature, Chittaranjan et al. (2013) found a slight negative relationship between extraversion and the use of audio/music/video applications. Youtube on the other hand was found to be more likely to be used by extraverts (Chittaranjan et al. (2013). Using visual and audio multimedia may coincide with enthusiasm-seeking, active and energetic nature of extraverts. Previous research found positive relation between extraversion and use of office and calendar mobile applications and with e-mails only for males (Chittaranjan et al., 2013). Internet applications in transaction category (Tan & Yang, 2014) and games (Lane & Manner, 2012) are also found to be positively related with extraversion.

The use of mobile applications is significantly related to the innovativeness trait. People who are high in innovativeness trait spend more time in (3) communicating with others, (4) sharing media including video and photography (5) using music, news, weather, navigation, bookmarking, gaming, shopping, books and references type applications. However, people who are high in innovativeness trait tend to use Tools and Finance applications less frequently.

INN significantly predicted mobile application use, the number of incoming calls and the number of contacts for incoming calls. The results show that innovative people are more open to incoming calls and the number of contacts for incoming calls is higher for more innovative people. This may be due to their open nature to people around them and people may feel comfortable when calling them. According to the results of the regression analysis for mobile application use, the independent variables significantly predicted the features for mobile application categories. As shown in Table 10, of the total 17 mobile application categories, 15 are significantly related with INN. The positive relationship between innovativeness trait and the frequency of mobile application use suggests that innovative people are open to new experiences and they are close to technology. As suggested by Agarwal and Prasad (1997), people who are more innovative in the use of information communication technology could act as important change agents because they show positive perceptions about the technology use (Baek, 2013). It was also found that innovative people shows positive attitudes towards mobile applications (Lewis, Agarwal, & Sambamurthy, 2003) and smartphones are more prevalent for innovative users (Sell, Mezei, & Walden, 2014). Particularly, uses of E-mail, search, timetable and navigation services were reported as significantly higher for innovative individuals. The demographics of the participants in our study also confirmed the assertion made by Jung, Chan-Olmsted, and Kim (2013) that is the smartphone applications are downloaded more by younger and more innovative users. Finally, the analysis of Park and Lee study showed that as users are innovative, they use smartphones compulsively (B. W. Park & Lee, 2011). There is positive relationship between gaming applications and innovativeness. Its reason can be attributed to their personality as they are more open to changes in information technology and applications.

Our results show that innovativeness positively relates to the use of finance applications. In the literature, studies show that more innovative users tend to use mobile financial services more frequently than others (Lee et al., 2012; Sulaiman, Jaafar, & Mohezar, 2006). The participants' demographics is also found to be effective. For example, Y. Kim et al. (2015) found a strong negative correlation between the age and the use of finance applications. On the other hand, there is a positive relationship between innovativeness and shopping applications. Innovative individuals were reported for greater use of the Internet particularly online shopping (Goldsmith, 2001). Moreover, mobile shopping acceptance was investigated with Spanish mobile phone users using technology acceptance model (Aldás-Manzano, Ruiz-Mafe, & Sanz-Blas, 2009) and it was concluded that there is a direct influence of consumer innovativeness in mobile shopping. Finally, Blake et al. (2003) reported that innovativeness is positively associated with frequency of shopping online and the variety of product classes shopped and visited in web sites.

The most significant positive relation was observed between the innovativeness and News applications ($r=0.304$, $p<0.01$) suggesting that innovative people tend to download more News applications. When the usage level of News/Information applications were investigated for young people in South Korea, it was found that there is a positive relationship between these applications and innovativeness trait (Jung et al., 2013). Its reason was attributed to the general tendency of individuals to invest in their human capital by increasingly accessing knowledge and information through news/information type applications. Similar discussions can be made to explain the positive relationship between books & references and innovativeness. Furthermore, this can also be attributed to the education level of the participants since they are all university students. Similar behavior was also observed in Y. Kim et al. (2015) where highly educated individuals were observed to be 13% more likely to use literacy application compared to lower educated individuals.

3.1.4 Conclusion

This research aimed to address whether the extraversion and innovativeness of individuals are effective on mobile phone, mobile application and communication applications use. In our study, mobile phone use features were found to be mostly correlated with extraversion. This is in line with previous research and social and outgoing nature of extraverts. Mobile application use features were mostly correlated with innovativeness. The relation between innovativeness and mobile phone and application use is explored for the first time. It is not surprising to find that innovative people are more open to new experiences and technological innovations represented by mobile applications

3.2 Study II: A Study on User Perception of Mobile Commerce for Android and iOS Device Users

3.2.1 Research Method

3.2.1.1 Sample and Data Collection

The empirical data was collected using the questionnaire given in APPENDIX D:, which was e-mailed to undergraduate and graduate university student lists of the Middle East Technical University. Our target population was university students since the young

generation heavily relies on their mobile phones. The data used in this study were collected from 287 respondents after eliminating outliers from the total of 296 participants who completed the questionnaire. The data that is not complete in terms of questionnaire are marked as outliers and eliminated from the data set

3.2.1.2 Questionnaire

In this study, a survey research methodology was employed. The questionnaire was based on a seven point Likert scale, ranging from 1 being “Totally disagree” to 7 being “Totally agree”. The survey consisted of four parts. In the first part, the respondents were asked questions on their mobile phone usage. The second part contained items measuring the attributes of mobile application usage. In the third part, questions with regard to the usage of mobile applications for commerce purposes were presented. In the last part, the questions were related to demographic information such as gender and education.

In our study, we focused on user’s attitudes towards general-purpose mobile applications and m-commerce applications in particular. To investigate user perceptions of mobile applications, we used the following constructs from Bruner and Kumar (2005); Usefulness, Ease of Use (EOU) and Fun to Use (FTU). Information Quality and Attitude Toward Use (AT) constructs were adopted from Siau and Shen (2003). In this study, user perceptions of m-commerce applications were also investigated using constructs that address specific issues in m-commerce. Usefulness, EOU and FTU constructs were taken from Yang (2005), and Security, Advertisement, Actual Use and Intention to Use constructs were adopted from Barutcu (2007).

3.2.2 Results and Discussion

The data was analyzed using the SPSS software. Of the total 287 participants, 156 used Android, 86 used iOS and 45 used other operating systems corresponding to 54%, 30% and 16% of all the participants, respectively. In terms of the demographic information, 140 participants were female and 114 were male, and the remaining 33 did not state their gender.

3.2.2.1 User Perceptions of Mobile Applications

Figure 1 presents the mean scores of user perceptions of mobile applications in terms of two operating systems, namely Android and iOS. The scores of iOS device users concerning mobile applications were found to be higher than Android device users in all constructs. Figure 2 shows the results for user perceptions based on gender distinction. It is observed that the scores of female and male participants were close to each other except for usefulness in which male users scored higher.

To explore whether there is a significant difference, first, normality of data is checked for the user perceptions of mobile applications constructs using Kolmogorov-Smirnov and Shapiro-Wilk Tests. The results revealed that the significance values were lower than 0.05, so the data was not normally distributed. When the data is not normally distributed, based on the rank order of observations, non-parametric tests can be performed by sacrificing some information such as the magnitude of difference.

Since the data was not normally distributed, we used the Mann Whitney U Test as the non-parametric test for the dataset. The results of the Mann Whitney U Tests revealed that there is a significant difference between the scores of iOS and Android device users concerning Mobile Application Usefulness ($U=5403$, $Z=-2.535$, $p=0.011$) whereas there is no significant difference in terms of EOU ($U=5925$, $Z=-1.604$, $p=0.109$), FTU ($U=6156$, $Z=-1.153$, $p=0.249$), AT ($U=6121$, $Z=-1.183$, $p=0.237$) and Information Quality ($U=6251$, $Z=-0.884$, $p=0.377$) constructs. Similarly, the results based on gender distinction show that there is a significant difference between the Usefulness ($U=5979$, $Z=-3.477$, $p=0.001$) scores of females and males while there is no significant difference in EOU ($U=7507$, $Z=-0.862$, $p=0.389$), FTU ($U=7763$, $Z=-0.401$, $p=0.688$), AT ($U=7032$, $Z=-1.704$, $p=0.088$) and Information Quality ($U=7709$, $Z=-0.469$, $p=0.639$).

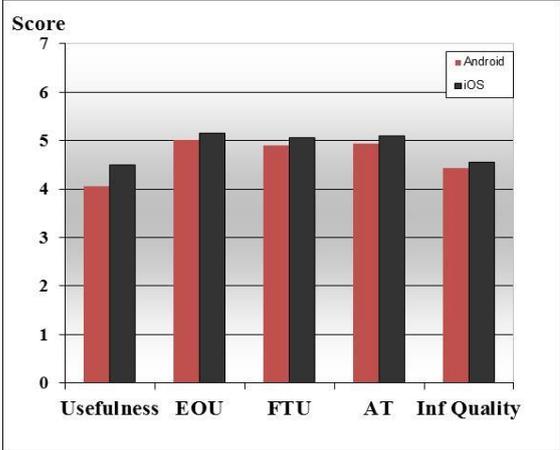


Figure 1: User Perceptions of Mobile Apps Based on OS

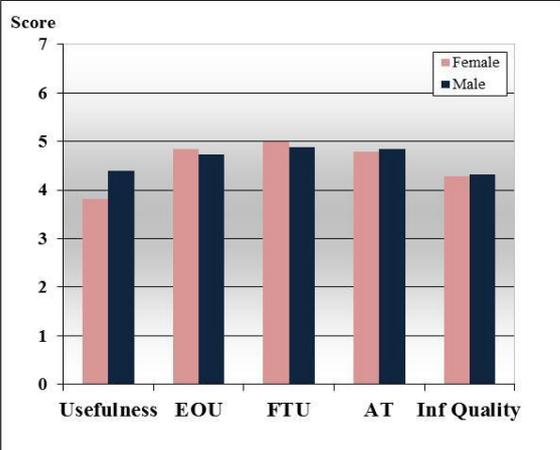


Figure 2: User Perceptions of Mobile Apps Based on Gender

3.2.2.2 User Perceptions of Mobile Commerce Applications

The mean scores for user perceptions of m-commerce applications are shown in Figure 3 and Figure 4 based on OS and gender, respectively. Similar to the results obtained from general-purpose mobile application (Figure 1), iOS device users' scores were found to be higher than Android device users in all constructs. When the results were analyzed with regard to gender, it was seen that the perception scores of male users concerning all constructs were higher than those of female users.

For the study on user perceptions of m-commerce applications, normality of data was checked using the Kolmogorov-Smirnov and Shapiro-Wilk Tests. Since the results revealed that the data was not normally distributed, the Mann Whitney U Test was used. The tests on m-commerce application constructs showed that there is a significant difference between the scores of iOS and Android device users concerning Usefulness ($U=5169$, $Z=-2.979$, $p=0.003$), EOU ($U=5687$, $Z=-1.998$, $p=0.046$), FTU ($U=5431$, $Z=-2.503$, $p=0.012$), Security ($U=5374$, $Z=-2.604$, $p=0.009$), Actual Use ($U=4970$, $Z=-3.403$, $p=0.001$) and Intention to Use ($U=5320$, $Z=-2.678$, $p=0.007$) whereas there is no significant difference in terms of the Advertisement construct ($U=6045$, $Z=-1.291$, $p=0.197$). The results based on a comparison between the genders showed that there is a significant difference between the scores of female and male users in Security ($U=6838$, $Z=-1.995$, $p=0.045$) and Intention to Use ($U=6460$, $Z=-2.624$, $p=0.0087$) whereas other constructs such as Usefulness ($U=7463$, $Z=-2.895$, $p=0.371$), EOU ($U=7024$, $Z=-1.670$, $p=0.095$), FTU ($U=7190$, $Z=-1.384$, $p=0.166$), Advertisement ($U=7954$, $Z=-0.44$, $p=0.965$) and Actual Use ($U=7478$, $Z=-0.884$, $p=0.376$) did not significantly differ.

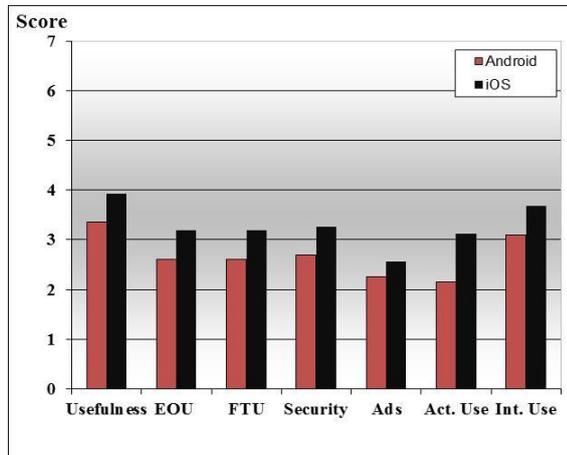


Figure 3: User Perceptions of Mobile Commerce Apps Based on OS

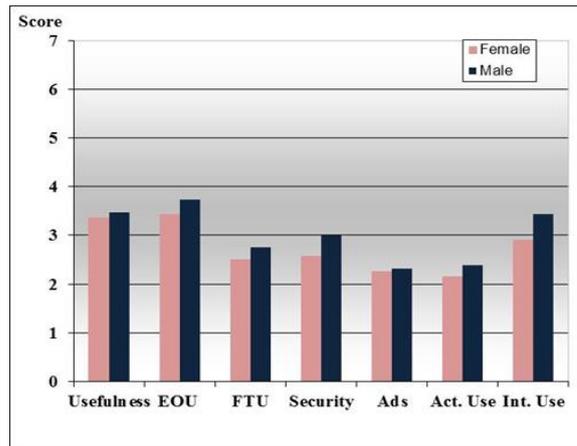


Figure 4: User Perceptions of Mobile Commerce Apps Based on Gender

3.2.3 Conclusion

In this study, user perceptions of m-commerce applications were analyzed based on gender and OS being used (Unal, Taskaya-Temizel, & Eren, 2015c). The results show that there is a significant difference between Android and iOS users' perceptions of m-commerce applications except their perception of advertisements. iOS device owners showed more positive attitudes towards m-commerce applications and scored significantly higher on the constructs compared to Android users. Therefore, we can assume that iOS device owners are more likely to spend money through mobile applications, which concurs with their actual spending in application markets ("The problem facing Android: Users don't want to spend money,"). The attitude of male users towards security issues and their intention to use m-commerce applications are significantly more positive than female users. This is also in agreement with the findings which show that the behaviors of male users reflect a desire for independence and separateness, and they are generally more independent in their purchase decisions ("Smartphone OS Market Share, Q1 2015," 2015).

On the other hand, user perceptions of mobile applications did not exhibit significant differences between the two operating systems except the usefulness construct in terms of both gender and the OS being used. Mobile phone users with devices using the iOS operating systems considered mobile applications to be more useful than Android OS users. This may be due to the iOS device owners being more satisfied with their mobile applications and attaching more importance to usefulness. This tendency was similar in male users. Male users obtained higher scores for all the constructs of user perceptions of mobile applications. The only significant construct was found to be the usefulness construct, where the discrepancy between male and female users was most obvious.

We consider that this research has made three main contributions to the academic literature. First, it has shown how iOS device users are more likely to use mobile applications and spend more money through m-commerce applications, which is a significant contribution given the lack of literature in this area. Second, this study has demonstrated that, when compared to women, men's perceptions of m-commerce applications are more positive and they find security problems to be less threatening. Third, mobile applications are considered more useful by men and iOS device users.

CHAPTER 4

EXPERIMENTAL STUDY ON THE WEB: OUTCOMES OF INFLUENCE STRATEGIES IN MOBILE APPLICATION RECOMMENDATIONS

In Chapter 3, mobile phone and application use are analyzed with respect of the personality features of users. The current chapter discusses the results of the experimental studies on mobile application recommendations conducted on web. The rapid growth in the mobile application market presents a significant challenge for users to find interesting and relevant applications. Recommendation systems deal with ends such as movies and consumer goods that are consumed by users where similarity between consumer tastes is generally taken into account. On the other hand, recommendation systems for mobile applications differ from traditional systems in terms of the characteristics of the ends they recommend. They present applications that are not just the ends for consumption but also means to reach various ends. In almost all application stores mobile applications are grouped under headings that employ consensus or authority influence strategies such as the most popular, most downloaded, editor's choice or applications of the day. However, in the literature there is limited information about the users' perception of such influence strategies and underlying factors that lie beyond the users' preferences. The traditional persuasion literature suggests that people are more likely to accept recommendations when the sources display persuasive messages during the interaction but the effect of visibility modality in the display has not been extensively studied. The effects of visible and semi-visible persuasive messages are analyzed and compared in this study. The users' compliance with persuasive messages in the mobile application recommendation domain is examined. The question of how the persuadability of users affects their compliance is further explored in this chapter. Briefly, the research questions that are addressed in this chapter are:

RQ2: What affects the users' compliance with mobile application recommendations?

To address this question, two experiments were conducted. The first was conducted via experimental sessions on web and the second using a mobile application specifically designed for this thesis to recommend mobile applications to users.

RQ2.1.1: Does the evaluation of mobile applications differ according to personality features and the persuasive messages that are used?

RQ2.1.2: Are users subject to authority persuasive messages equally compliant as those users who are subject to consensus persuasive messages?

RQ2.1.3: Are users subject to visible persuasive messages equally compliant with users who are subject to semi-visible persuasive messages?

4.1 Experiment Design and Methodology

There are two phases in this research (Unal, Taskaya-Temizel, & Eren, 2014); first, employing a questionnaire to determine the user context and their behavior in mobile environment, second conducting experimental surveys in the field with visible and semi-visible persuasive messages (Appendix F).

4.1.1 Measuring Persuadability

In the first part of the research, the participants were invited to complete a persuadability questionnaire. The 8-item persuadability scale (Chaiken, 1980) adapted by Kaptein et al. (2010), namely, Susceptibility to Persuasive Strategies Scale (STPS) was used to assess a participant's persuadability score. The items were scored on a 7-point Likert scale ranging from totally disagree (1) to totally agree (7). The items were as follows:

Authority

- I always follow advice from my general practitioner.
- I am very inclined to listen to authority figures.
- I always obey directions from my superiors.
- I am more inclined to listen to an authority figure than to a peer.

Consensus

- If someone from my social network informs me about a book, I tend to read it.
- When I am in a new situation I look at others to see what I should do.
- I often rely on other people to decide what I should do.
- It is important for me to fit in.

The scale reliability is considered to be sufficient since the Cronbach Alpha value was 0.819 for authority and 0.752 for consensus constructs. We computed the persuadability scores for each of the authority and consensus strategy dimensions. The overall persuadability score was calculated as the average of the 2 dimensions which was in line with the method used by Kaptein et al. (2010): The authors argued that due to multidimensionality of the scale they did not focus on specific strategies instead they focused on overall persuadability of the participants. We followed the same approach because the specific research question was on the overall persuadability of the participant. The averaged persuadability score was used to discriminate users as high, low and moderate persuadables to reveal the differences in persuadability feature of participants. The lowest quartile was addressed as low persuadables and the highest quartile as high persuadables. The participants with scores in between were considered to be moderate persuadables.

4.1.2 Experimental Design

In the second phase of the study, an experimental design was created to test the impact of influence strategies. The participants were assigned to one of two groups based on their overall persuadability scores obtained in the first phase of the study. The high and low persuadables were assigned to two groups in equal proportion. One group was used as the control group with no treatment and the other group was given treatments with persuasive

messages employing authority and consensus influence strategies. After the first experimental study involving the visible persuasive messages, a second study presented semi-visible persuasive messages to the same persuasion group. The control group received no influence strategies in either phase of the study.

Prior to the experiments, the participants were informed that the purpose of the study was to measure their involvement or interest in mobile applications. The participants were asked to judge a total of 8 mobile application introductions against a series of descriptive scales according to how they perceived the introduction. The mobile applications were evaluated online in two sessions each covering 4 applications. The participants were also informed that the names of the applications had been changed in order to eliminate any bias and/or commercial conflict.

Applications which might be of interest to the participants were chosen from the major application categories, such as productivity, shopping, tools, personal life and messaging. A pre-test was conducted to establish content validity in terms of product involvement and to improve the questions, format and scales. A total of 10 people tested the applications and instruments in the field and their feedback was incorporated into the final revision.

The participants were presented with mobile application introductions on separate screens and were expected to proceed one by one. The control group was given the application introduction in 3 or 4 sentences as presented in the summaries of application introductions in application markets such as iTunes App Store or Google Play. The persuasion group was presented with introductions that employ persuasive messages as in the examples given below. The arguments contained in the messages were selected by undertaking a preliminary study on mobile application recommendation systems and mobile application advertisements. For each application introduction, one of the persuasive messages was utilized. In the visible version, the persuasive messages were given separately at the end of the introduction and in semi-visible version the persuasive messages were embedded in the introduction text. An example of one of the applications, a voice recorder, with authority influence strategy is given below as an example. In the visible presentation the authority figure, namely the IT News Magazine, was highlighted as the recommender of the application. In semi-visible presentation, the persuasive message was given in the body of the introduction subtly embedded in the sentence.

Voice Recorder (Visible version)

Voice Recorder is a mobile application to record voices. You can use this application to record your classes, memos, greeting messages or other events. With 14 distinct sound effects, you can add special effects, alter the tempo and convert your recordings to different formats. You can upload your recordings to Dropbox or Google Drive and send/share them whenever you want.

This voice recording application is recommended by IT News.

Voice Recorder (Semi-visible version)

Voice Recorder is a mobile application to record voices that is recommended by IT News magazine. You can use this application to record your classes, memos, greeting messages or other events. With 14 distinct sound effects, you can add special effects, alter the tempo and convert your recordings to different formats. You can upload your recordings to Dropbox or Google Drive and send/share them whenever you want.

The persuasive messages used for other applications in the visible versions were as follows:

- This application is recommended by authorities in the field
- This application is the editor's choice in Google Play.
- This application is a trending popular application.
- This application has been downloaded more than N times.
- This application is most popular in its category in 2013.

The participants were invited to evaluate the introduction to each mobile application. The relevance of the mobile application to the participant, the attitude towards the mobile application introduction and the purchase intention were used as constructs for evaluation purposes. The constructs that are measured by 7-item Likert scale given below were adapted from prior research to ensure that the scales were reliable.

- Product Involvement (Importance); from unimportant to important (Zaichkowsky, 1985)
- Product Involvement (Relevance); from of no concern to me to of concern to me (Zaichkowsky, 1985)
- Attitude towards; from disliked to liked a lot (Batra & Michael, 1986)
- Purchase intention; definitely would not purchase to definitely would purchase (Batra & Michael, 1986)

4.1.3 Participants

The empirical data was collected in December of 2013, using a questionnaire e-mailed to the undergraduate and graduate university student lists of Middle East Technical University. Of the 381 people who completed the questionnaire, only 283 provided a contact e-mail. Therefore, the invitation to participate in the experiment was sent to these 283 participants based on their overall persuadability index. The participants were offered a choice of two gifts for their participation (either an \$8 cinema ticket as a gratis or donation for a sapling to be planted on their behalf). Of the 283 participants who were invited to participate, the number of participants who completed the experiments was 180 after eliminating outliers. The participants were from two groups; 80 were from the persuasion group and 100 were from the control group. The overall persuadability of the participants was distributed as 40 high persuadables, 45 low persuadables and 95 moderate persuadables. The average age of participants was 21.7 and just under half the participants (47%) were female.

4.1.4 Hypotheses

Prior to the experiments the following hypotheses were formulated:

H1: Evaluation of mobile applications does not differ between high, moderate and low persuadables.

H2: Evaluation of mobile applications does not differ according to gender.

H3: Evaluation of mobile applications does not differ with operating system that is used.

H4: Evaluation of mobile applications does not differ between a user group subject to persuasive messages and a user group not subject to persuasive messages.

H5: Users who are subject to authority persuasive messages will comply equally with those users who are subject to consensus persuasive messages.

H6: Users who are subject to consensus persuasive messages will comply equally with those users who are not subject to any persuasive messages.

H7: Low persuadable users who are subject to authority persuasive messages will comply equally with consensus persuasive messages.

H8: High persuadable users who are subject to authority persuasive messages will comply equally with consensus persuasive messages.

H9: Users who are subject to visible persuasive messages will comply equally with users who are subject to semi-visible persuasive messages.

4.2 Results and Discussion

The normality of data was checked for all test variables with the Kolmogorov-Smirnov Test and Shapiro-Wilk Test using SPSS. The results obtained from these tests showed that the data is normally distributed hence the t-test, paired sample t-test and ANOVA test were used for hypothesis testing. The Mahalanobis distance test was used to screen outliers. For independent variables a cut-off of $z \pm 3.29$, $p < 0.001$ was employed in the search for univariate outliers.

4.2.1 Persuadability

Figure 5 shows the mean scores of persuadability measurements in terms of the three different levels of persuadability. One-way ANOVA was used to evaluate the impact of the overall persuadability index on user perception (H1). The ANOVA results indicate significant differences in the participants' perceived importance ($F(2, 177) = 4.027$, $p = 0.019$), perceived relevance ($F(2, 177) = 4.292$, $p = 0.015$) and Likeness ($F(2, 177) = 3.642$, $p = 0.028$). However, purchase intention ($F(2, 177) = 51.866$, $p = 0.128$) does not significantly differ between the high, moderate and low persuadables at the 0.05 alpha value.

To determine which persuadability levels are different from the others, the Bonferroni post hoc test was employed. For the perceived importance and perceived relevance, the high persuadables and low persuadables were significantly different with $p = 0.018$ and $p = 0.012$ respectively. For Likeness, the high persuadables and moderate persuadables' evaluation differ significantly with $p = 0.04$ whereas for Purchase Intention there was no significant difference in participants' perception.

In Figure 6, the average scores of the users' responses to the persuasive messages by gender distinction (H2) are shown. According to the t-test results, females score significantly higher on perceived importance ($t = 2.341$, $p = 0.02$), relevance ($t = 2.437$, $p = 0.016$), likeness ($t = 2.929$, $p = 0.004$) and purchase intention ($t = 3.179$, $p = 0.002$). Similarly, the effects of the operating system (OS) being used (H3) are given in Figure 7. The response from the Android and iOS device users is significantly different for relevance ($t = -2.625$, $p = 0.010$) and purchase intention ($t = -2.701$, $p = 0.008$) whereas the difference between perception on importance and likeness is not significant for importance ($t = -2.625$, $p = 0.085$) and for likeness ($t = -2.625$, $p = 0.667$).

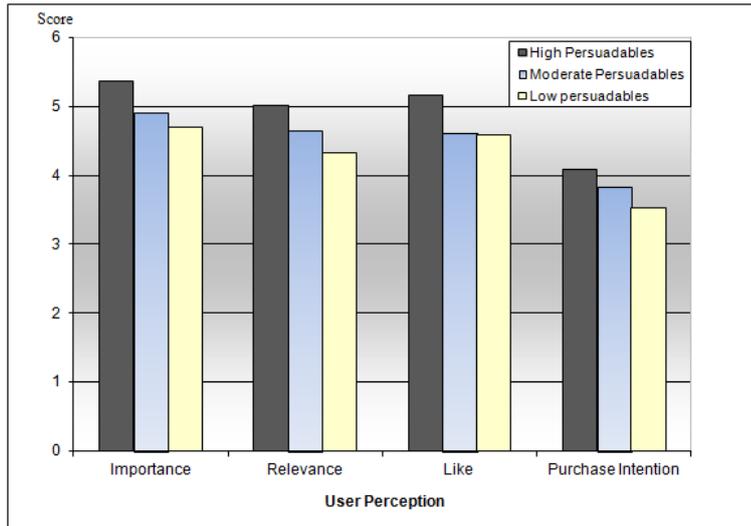


Figure 5: Effects of Persuasion Profiles on User Perception

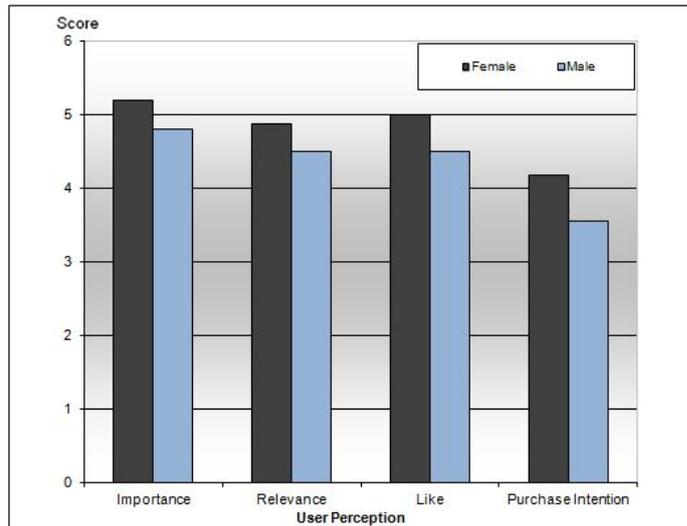


Figure 6: Effects of Gender on User Perception

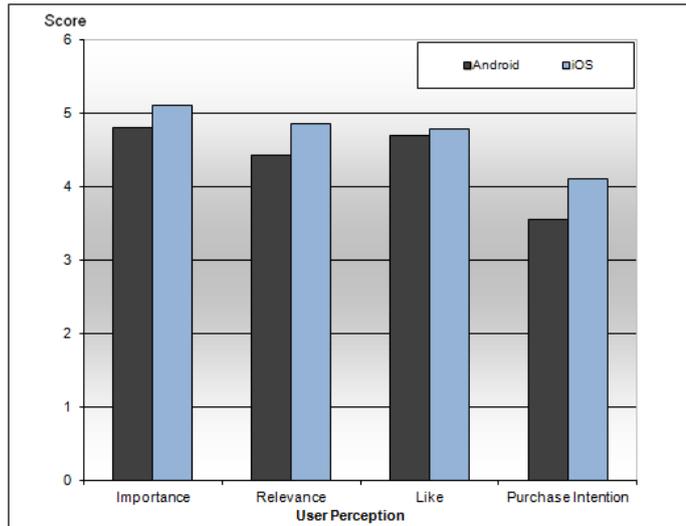


Figure 7: Effects of OS on User Perception

4.2.2 Authority and Consensus Influence Strategies

The mean scores in user perception for authority, consensus and no influence strategies are given in Figure 8.

The hypothesis for evaluation of mobile applications does not differ between the user groups subject to persuasive messages and those not subject to persuasive messages. (H4) is rejected at 0.05 alpha value for purchase intention ($t=-2.037$, $p=0.043$), importance ($t = -2.78$, $p = 0.006$), relevance ($t = -2.951$, $p = 0.004$) and likeness ($t = -3.336$, $p = 0.001$).

The users subject to authority persuasive messages will comply equally with the users who are subject to consensus persuasive messages (H5) is rejected at 0.05 alpha value for importance ($t = -9.316$, $p < 0.001$), relevance ($t = -8.211$, $p < 0.001$), likeness ($t = -6.079$, $p < 0.001$) and purchase intention ($t=-8.225$, $p < 0.001$).

The users subject to the consensus persuasive messages will comply equally with the users who are not subject to any persuasive messages (H6) is rejected for importance ($t = 3.071$, $p = 0.002$) and relevance ($t = 2.133$, $p = 0.034$) but cannot be rejected for likeness ($t = 0.533$, $p = 0.595$) and for purchase intention ($t=-1.305$, $p=0.193$) at 0.05 alpha value.

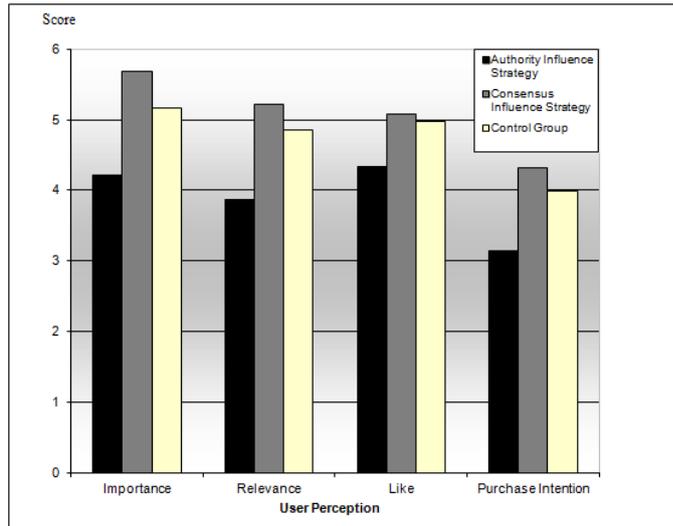


Figure 8: Effects of Authority and Consensus

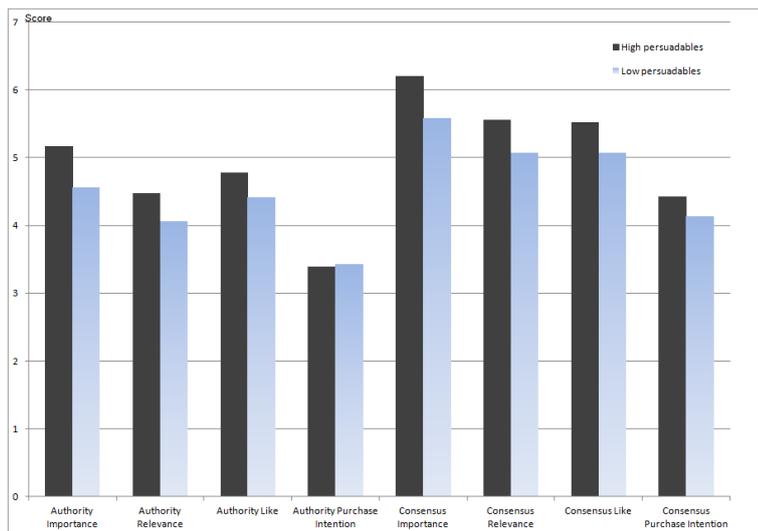


Figure 9: Influence Strategies for High and Low Persuadables

The mean scores in user perception for authority and consensus influence strategies for the high and low persuadables are given in Figure 9. For each of the persuadability groups whether there is a significant difference in the users' perception of consensus and influence strategies is further tested.

The hypothesis (H7) that low persuadable users subject to authority and consensus persuasive messages will comply equally is rejected at 0.05 alpha value for importance ($t=-2.477$, $p=0.018$) and relevance ($t = -2.62$, $p = 0.013$). However, for likeness ($t = -1.621$, $p = 0.114$) and purchase intention ($t = -1.952$, $p = 0.059$) the null hypothesis cannot be rejected.

Similarly, hypothesis (H8) that high persuadable users subject to authority and consensus persuasive messages will comply equally is rejected at 0.05 alpha value for importance ($t=-2.916$, $p=0.006$) and relevance ($t = -2.648$, $p = 0.012$). For likeness ($t = -1.819$, $p = 0.078$) and

purchase intention ($t = -1.878$, $p = 0.069$) null hypothesis cannot be rejected as in the case of low persuadables.

4.2.3 Visible and Semi-Visible Persuasive Messages

Figure 10 shows the pairwise comparison results which revealed that the perception of semi-visible persuasive messages scored significantly higher than the visible messages. The fifth hypothesis (H5) that the users subject to visible persuasive messages will comply as equally as those users subject to semi-visible persuasive messages is rejected at 0.05 alpha value for four of the evaluation factors. The null hypothesis (H9) is rejected for importance ($t = -3.38$, $p = 0.001$), relevance ($t = -3.56$, $p = 0.001$), likeness ($t = -3.775$, $p < 0.001$) and purchase intention ($t = -3.052$, $p = 0.003$).

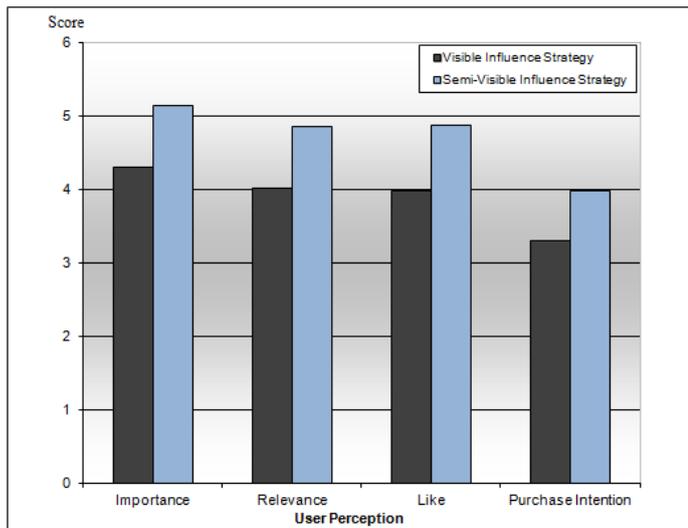


Figure 10: The Effects of the Visibility of the Influence Strategies on User Perception

4.2.4 Discussion and Conclusion

The findings of this study provide an insight into the mechanisms of user perception in the context of mobile application recommendations and multiple conclusions can be drawn from this research. This study has shown that persuadability, gender and operating system used are the features that exhibit significant differences in user perception. First, the overall persuadability index provides a viable instrument for user profiling through its influence on user perceptions. More persuadable individuals who are generally more likely to accept recommendations and who have a tendency to align with authority expressed higher compliance with persuasive messages as expected. In other words, high persuadable individuals are more likely to develop a positive attitude towards persuasive messages whereas low persuadable individuals are more inclined to develop distrust.

Gender and the operating system being used are the other instruments that exhibit significant differences in user perception. It is shown that females scored significantly higher on perceived importance, relevance, likeness and purchase intention with remarkably low significance levels. It can be assumed that females are high persuadables when compared to males. A similar comparison on the effects of operating system being used indicate that iOS

device owners score significantly higher on purchase intention and relevance whereas there is no great difference in terms of importance and likeness dimensions.

The second conclusion reached is that persuasive messages may result in a concern about the frankness and smartness of the system and may lead to a decline in the users' perception of trust of the system and hence the users' compliance with persuasive messages. It was found that persuasive messages that employ any influence strategy yielded different compliance than the control group that received no treatment. However, the influence strategy deployed in the persuasive messages was distinctive in this context. The consensus influence strategy led to higher compliance levels than the authority influence strategy whereas the authority influence strategy actually worsens the compliance level of the members of the control group that were not subject to any persuasive messages. Additionally, when the persuadability levels are considered, it was demonstrated that the consensus influence strategy leads to significantly higher scores for perceived importance and relevance for both high and low persuadables.

The third conclusion is that the compliance level is lower when the persuasive messages were visible to the users compared with the semi-visible persuasive messages. This result is consistent with previous research that noted the users' resistance to persuasion when the persuasion intent was disclosed (Fuegen & Brehm, 2004).

This study has importance in terms of its contribution to the development of a recently established field. There have not been many empirical studies conducted in this field especially in mobile application recommendations. This study has provided results that can be used for future research concerning consumer behavior and the persuasion profiles affecting it. The model and findings may provide a useful framework for business model developers and actors in the mobile application market.

Based on the results reported in this thesis, it appears that the use of persuasive messages should be utilized cautiously. On average persuasive messages may decrease the overall user compliance. According to the framework presented in this thesis, the consensus influence strategy yielded a higher compliance in the persuasion group than the control group that received no treatment. On the contrary, utilizing authority influence strategy decreased user compliance. To achieve user compliance, it is important to consider how the persuasive messages are presented to the user in terms of semi-visible persuasive messages the effects are higher than the visible persuasive messages. Furthermore, the persuadability of the users is an important determinant on users' compliance with recommendations. When designing recommendation systems for users these findings can be used to increase the efficiency of the system.

CHAPTER 5

EXPERIMENTAL STUDY ON MOBILE: INDIVIDUAL DIFFERENCES IN USER PERCEPTION AND DOWNLOAD BEHAVIOR FOR MOBILE APPLICATION RECOMMENDATIONS

In the previous chapter, the results of the first experimental study on mobile application recommendations conducted on the web are given. There were two phases; first, administering a questionnaire to learn about the users' context and behavior in the mobile environment, second, conducting experimental recommendation sessions in the field. In almost all application stores mobile applications are grouped under headings that employ consensus or authority influence strategies such as; the most popular, most downloaded, editor's choice or applications of the day. In the first experiment the users' perception of such influence strategies and underlying factors are analyzed by presenting mobile application introductions to users on separate screens on the web. The effects of visible and semi-visible persuasive messages are analyzed and the users' compliance with persuasive messages in the mobile application recommendation domain is examined.

In the second experimental study the analysis was conducted through the use of the specifically designed mobile application, on users' mobile phones. There were two goals; first, to learn about the users' personality and the applications they downloaded to their mobile phones, second to recommend applications to users via notifications through the use of the mobile application. The participants were presented with mobile application introductions on separate notifications and were expected to review them one by one as soon as they receive the notification. The application introduction is given in 3 or 4 sentences as presented in the summaries of application introductions in application markets such as; iTunes App Store or Google Play. For the introduction of each application, the participants were invited to evaluate their attitude and involvement and were given three links to choose from which reflect the following choices available in application markets; most popular apps, most downloaded apps and editor's choice apps. After examining the application in the Google Play application store, users either download it or pass to the next application.

The research question and breakdown of the relevant questions addressed in the mobile platform are given below:

RQ2: What affects the acceptance of mobile application recommendations by users?

RQ2.2.1: Do attitude, intention and download behavior towards the recommended applications differ with personality features?

RQ2.2.2: Does download behavior for recommended application differ with attitude, intention and download behavior towards the recommended application?

RQ2.2.3: Is there a relation between personality features and number of applications owned by the user in total and in each application category?

RQ2.2.4: Is there a relation between users' acceptance of recommended applications and the composition of the applications owned by the user?

RQ2.2.5: Are people that have more applications in a category, more eager to download new applications due to their interest in the category or do they resist downloading more new applications since they have already downloaded many applications

RQ2.2.6: Does the evaluation of mobile applications differ according to the influence strategy employed by application stores namely the consensus influence strategy (most popular apps, most downloaded apps) and authority influence strategy (editor's choice)?

RQ2.2.7: Is there a significant relation between personality features and influence strategy that is effective on users?

5.1 Experiment Design and Methodology

There are two phases in this study (Unal, Taskaya-Temizel, & Eren, 2015b); first conducting experimental sessions in the field and second employing questionnaires to learn about the user context and behavior in mobile environment.

5.1.1 Measuring STPS

The participants were invited to complete a persuadability questionnaire. STPS was used to assess a participant's persuadability score. The items were scored on a 7-point Likert scale ranging from totally disagree (1) to totally agree (7). The items are given in detail in APPENDIX C:. Descriptive statistics and normality test results are also given in APPENDIX C:. The application of the Kolmogorov-Smirnov test shows that STPS is normally distributed.

The scale reliability is considered to be sufficient since the Cronbach Alpha value was 0.728 for authority and 0.733 for consensus constructs (given in APPENDIX C:). One of the 5 constructs on consensus was found to decrease the Cronbach alpha value, so the item "If someone from my social network notifies me about a book, I tend to read it" was excluded from the tests. The persuadability scores for each of the authority and consensus strategy dimensions were computed giving an overall persuadability score calculated as the average of the 2 dimensions.

5.1.2 Measuring the Big Five Personality Features

In the current study, in the first experimental study, TIPI was used for Big Five personality tests. However, the reliability tests yielded low Alpha scores which are deemed to be unacceptable. The Turkish version of the 44 items BFI was developed for the experimental study to attain reliable test scores. The validity of the Turkish scale is analyzed extensively by Alkis (2015). The English and Turkish versions of BFI test, descriptive statistics, normality, and reliability tests are given in Appendix B. The BFI five constructs are normally distributed.

The test scores of 10 subjects were used in reliability tests and there seems to be significant increase in reliability as shown in Table 11. Cronbach's Alpha values for personality traits were much higher than the 0.7 threshold level. It can be concluded that although time is a

strict constraint in personality tests, in order not to sacrifice reliability and validity, the 44 question BFI should be preferred rather than the TIPI.

Table 11: Reliability Statistics for Personality Tests

Personality Trait	Cronbach's Alpha	
	BFI	TIPI
Extraversion	0.805	0.675
Agreeableness	0.683	-0.262
Conscientiousness	0.909	0.487
Neuroticism	0.92	0.234
Openness to Experience	0.914	0.454

5.1.3 Experimental Design

An experimental design was devised to test the impact of mobile application recommendations and users' choice in headings under which recommendations are presented. Prior to the experiment, the participants were informed by email that the purpose of the study was to recommend mobile application and measure their involvement or interest in mobile applications. In addition, users were informed that they would be required to complete two questionnaires each would take five to six minutes, and the results of the questionnaires would only be used for research and the questions would not require any responses containing personal information. Completing the questionnaires was voluntary and participants were assured that there would be no negative consequences if they decided not to respond to all or some of the questions. The user participants were offered two options to download the application either from the Google Play Store link given or from an attached APK file. The consent of the users was obtained regarding the information that will be accessed by the application that they installed. Although it was not compulsory, permission was requested to access the users' installed apps. The user was informed about how to use the application and a message box would appear through which the user can send their views and suggestions. To increase participation the participant users were offered a choice of two gifts for their participation, either an 8 \$ cinema ticket as a gratis or donation for a sapling to be planted on their behalf. In order to be eligible for the draw, after completing the questionnaires the participants were asked to provide their valid email address via the application. Twenty-five winners were chosen at random using random.org, and announced for each session.

Eight applications which might be of interest to the participants were chosen from the major application categories of productivity, games, music & audio, entertainment, tools, books & references, and health & fitness. Although recommendations can be highly accurate but may be useless, e.g., suggesting bananas to customers in grocery stores (Ziegler, McNee, Konstan, & Lausen, 2005) thus the novelty of the applications and their competency to address the participants' needs and interest were the factors that were considered. Another factor was whether the applications were free or paid. For this study, only free applications were chosen to achieve consistency and comparability between apps. A pre-test was conducted to establish content validity in terms of product involvement and improve the questions, format and scales. For pre-test a total of 10 people tested the applications and instruments in the field and their feedback was incorporated into the final revision of the application.

The participants were presented with mobile application introductions on separate screens and were expected to process them one by one as they received the notifications. The order of the eight applications was the same for all users who downloaded the application. The notifications were sent in 5-minute intervals and succeeding notification was not sent until the user processes the current notification. The application introduction was given in 3 or 4 sentences as presented in the summaries of application introductions in application markets such as iTunes App Store or Google Play. The arguments contained in the messages were selected by undertaking a preliminary study on mobile application recommendation systems and mobile application advertisements. For each application introduction, the participants were invited to evaluate their interest and involvement and the user was presented with three links to choose from which reflected the choices available in the application markets (most popular and downloaded apps and editor's choice apps) are presented to the user in the same order.

The eight applications that were evaluated are as follows:

1) *Voice Recorder*

Voice Recorder is a mobile application to record voices. You can use this application to record your classes, memos, greeting messages or other events. With 14 distinct sound effects, you can add special effects, alter the tempo and convert your recordings to different formats. You can upload your recordings to Dropbox or Google Drive and send/share them whenever you want.

2) *RAM Cleaner*

Cache memory and temporary files take up hundreds of MB and GB in phones. The RAM Cleaner will help you clean the cache and temporary files with one click. Using this application, you can boost the performance of your phone and extend battery life by optimizing the phone memory.

3) *English-Turkish Dictionary*

This is an offline English-Turkish dictionary application that does not require an internet connection. It includes the audio pronunciation of the words.

4) *Quiz Game*

Test your knowledge using this application. There are thousands of up-to-date questions for you to answer in the categories of General Knowledge, History, Geography, Art and Culture, Magazines and Movies. You can have fun increasing your knowledge.

5) *Free E-Books*

This application provides you with the best free e-books and stories in categories such as fiction, fantasy, horror, mystery, romantic, teenage books, thriller, classics, and poetry. For example, you can read the most popular classics; Moby Dick, Alice in Wonderland, Art of War, Pride and Prejudice and many more.

6) *Activity Finder*

With this application, you can search for music, sport and art events, and filter the results by date and location. You can easily purchase a ticket for the event and choose your own seat using the application.

7) Health & Fitness

You can use this application when you are walking, running or exercising to calculate the distance, duration, pace and the number of calories burned. With its step counting technology, this application gives information about the location and route where you exercise. In addition, you can share the information about your fitness routine with your friends on Facebook and Twitter.

8) Productivity

This application allows you to take notes and photos, create to-do lists, record audio reminders, and easily find and access them. It also synchronizes all your notes on your computer and other devices. This application guarantees an increase in your productivity.

The participants were invited to evaluate the introduction to each mobile application. The relevance of the mobile application to the participant, the attitude towards the mobile application introduction and the purchase intention were used as constructs for evaluation purposes. The constructs that are measured by a 7-item Likert scale given below were adapted from prior research to ensure that the scales were reliable.

- Product Involvement (Importance); from unimportant (1) to important (7) (Zaichkowsky, 1985)
- Product Involvement (Relevance); from of no concern to me (1) to of concern to me (7) (Zaichkowsky, 1985)
- Attitude towards; from disliked (1) to liked a lot (7) (Batra & Michael, 1986)

Next, the participants were given the choice to either select one of the recommended applications as given in three hyperlinks or not to download. When the participants chose the first three links they were forwarded to Google Play Store and evaluated the applications that are in live in the market with their real names and introduction pages.

“Below are three recommendations for a voice recorder app:

- From the most popular applications list:
<https://play.google.com/store/apps/details?id=com.andrwq.recorder>
- From the editor’s choice list:
<https://play.google.com/store/apps/details?id=com.coffeebeanventures.easyvoicerecorder>
- From the most downloaded applications list:
<https://play.google.com/store/apps/details?id=com.coffeebeanventures.easyvoicerecorder>
- I do not want to install this application.”

After examining the application in Google Play application store, they either downloaded or ended the evaluation phase for the relevant application. After evaluation ended the participants passed to the next application’s evaluation via the next notification. The screenshots from the application are given in Figure 11.

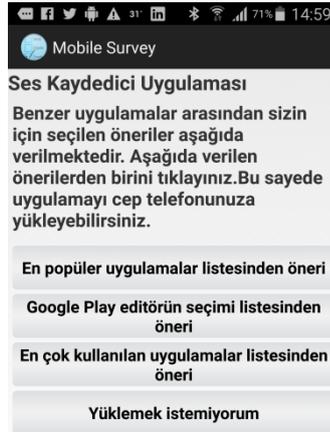
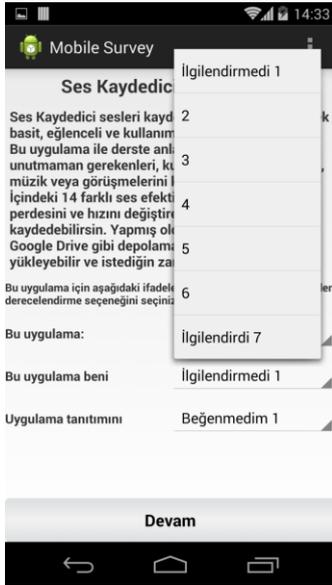
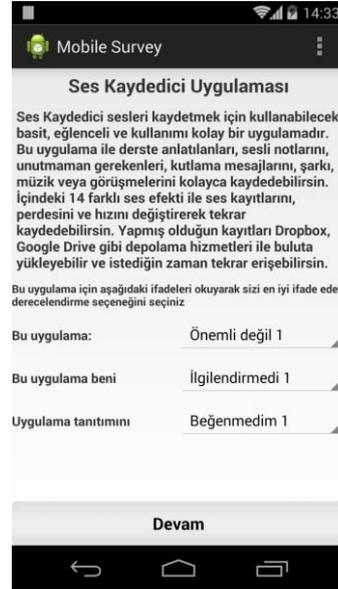
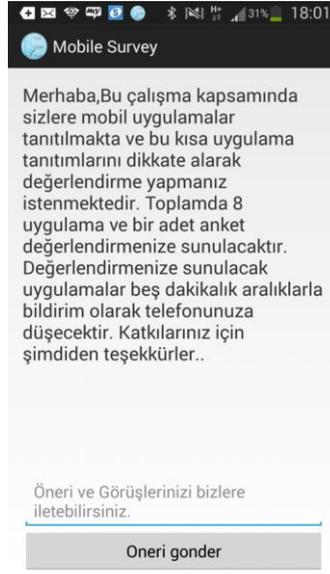
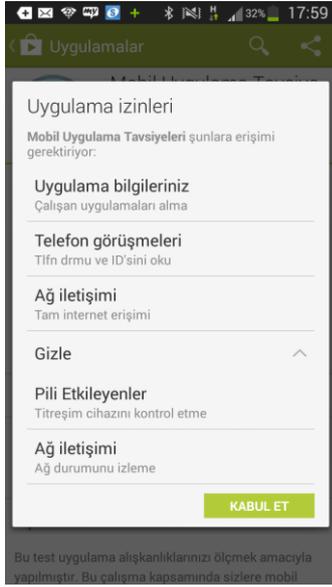


Figure 11 Screenshots of Mobile Application Recommendation App

5.1.4 Participants

The empirical data was collected in three chunks in March 2014, October 2014 and February 2015, using a mobile application which was e-mailed to the undergraduate and graduate university student lists of METU. The mail sent to the participants is given in Appendix E. Of the invited students, 171 participants (91 male and 80 female) completed the experiments.

5.1.5 Statistical Tests Used

The normality of data was checked with the Kolmogorov-Smirnov Test and Shapiro-Wilk Test using SPSS. If the data is normally distributed parametric tests were used, if not, non-parametric tests are used. The Mahalanobis distance test was used to screen outliers. For independent variables a cut-off of $z \pm 3.29$, $p < 0.001$ was employed in the search for univariate outliers.

Exact Tests are used for analyzing continuous or categorical data by exact methods (Mehta & Patel, 2010). For small data sets, the algorithms ensure a quick computation of exact p values. If a data set is too large for the exact algorithms, Monte Carlo algorithms are substituted in order to estimate the exact p values to any desired level of accuracy (Mehta & Patel, 2010). The Kruskal–Wallis test and Jonckheere-Terpstra tests are exact tests used for k independent samples. The Kruskal–Wallis test and Jonckheere-Terpstra tests are extension of the Mann–Whitney test for more than two independent samples, so when used for two variables it gives the same results as Mann–Whitney test and that is the way it is used for gender tests in this study (Sheskin, 2003). It is the nonparametric alternative to the ANOVA test. The Jonckheere–Terpstra test is a variation of Kruskal–Wallis test that can be used when the variables are ordered. When the alternatives to the null hypothesis of equality of the K populations are ordered it is appropriate to use Jonckheere-Terpstra test.

To use the Pearson r correlation, both variables should be normally distributed and the data must possess the properties of magnitude and equal interval between adjacent units. Kendall's tau-b is a nonparametric measure of association for ordinal data. Ordinal data are categorical variables that have three or more levels with a natural ordering. For convenience of the data set used in the current study Kendall's tau_b Correlation Coefficient was applied to ordinal data.

5.2 Results and Discussion

To identify user characteristics only apps installed by the user were used. The pre-installed applications by device providers were not considered in the current study. This is in line with a previous study (Seneviratne et al., 2014a). The categories of the applications installed by the users were identified one by one, using Google Play Store search. The 27 predefined categories of Google Play Store were used to sort and label applications where games category is an aggregate of subcategories (Table 12). Descriptive statistics and normality tests for category based application numbers is given in Appendix G.

If the application could not be found in Google Play Store, google was searched to find alternative application markets such as bestappsmarket.com, getandroidapp.org, and tamindir.com. If the category could not be found due to the removal of apps from the market, then the instance was eliminated from the sample.

All user owned applications were scanned to find whether the users already had the recommended application. The number of users that already owned the applications in different categories was; 10 in tools category; 3 in reference; 2 in games; 4 in books; 5 in entertainment; for 3 in health & fitness and 5 in productivity. These instances were eliminated from the sample.

A total of 171 participants downloaded the application and completed the experiment. After eliminating all the outliers, a sample size of 158 was used for statistical tests whereas the

total number of participants with valid scores was 147 and 139 for STPS and BFI scores, respectively.

Table 12: Google Play Store Categories Used in English and Turkish

Alışveriş	Shopping
Araçlar	Tools
Canlı Duvar Kağıdı	Live Wallpaper
Eğitim	Education
Eğlence	Entertainment
Finans	Finance
Fotoğrafçılık	Photography
Haberler ve Dergiler	News and Magazines
Haberleşme	Communication
Hava Durumu	Weather
İş	Business
Karikatür	Cartoon
Kişiselleştirme	Personalization
Kitaplar ve Referans	Books & Reference
Kitaplıklar ve Kısa Sunum	Libraries & Demo
Medya ve Video	Media and Video
Müzik ve Ses	Music and Audio
Sağlık ve Fitness	Health and Fitness
Seyahat ve Yerel	Travel & Local
Sosyal	Social
Spor	Sports
Tıp	Medicine
Ulaşım	Transportation
Verimlilik	Productivity
Widget'lar	Widget'lar
Yaşam Tarzı	Life style
Oyunlar	Games
Aile	Family
Aksiyon	Action
Arcade	Arcade
Bulmaca	Puzzle
Eğitici	Educational
Eğlencelik Bilgi Oyunları	Trivia
Kağıt	Paper
Kelime	Word
Klasik	Classical
Kumarhane Oyunları	Casino Games
Macera Oyunları	Adventure Games
Masa Oyunları	Board games
Müzik	Music
Rol Oyunu	Role Playing
Simülasyon	Simulation
Spor	Sports
Strateji Oyunları	Strategy Games
Yarış	Race

5.2.1 Application Recommendation Download and User Responses

User responses refer to the behavior of users when they are recommended mobile applications. They either ignored the recommendation or chose one of the four options, namely most popular, most downloaded, labeled as editor's choice and lastly not to install the application. When a recommendation was clicked, the next behavior of the user was whether to download the application. The descriptive statistics for user responses by recommended application categories are given in Table 13 and normality tests are presented in Table 14. The normality of data was checked for all test variables with the Kolmogorov-Smirnov Test and Shapiro-Wilk Test using SPSS. Since the assumption of normality was not satisfied, non-parametric tests were used.

The Kendall's tau_b correlation tests were conducted to measure the association between user responses and number of recommended application downloads. According to the results, number of apps downloaded is correlated with perceived relevance and likeness. Perceived importance did not have a significant effect on downloading the recommended application. Users were inclined to download the applications that were relevant to themselves and they liked.

Another result that was obtained was that the choice of most popular apps and editor's choice apps were significantly related to the number of apps downloaded. This result shows that people who choose most popular apps and editor's choice apps are more likely to comply with recommended mobile applications. However, the most downloaded link option was not found to be significant for application downloads. This result is important since the same application was accessible through the most downloaded link and editor's choice link. This indicates that in addition to the decision to visit the introduction page, the link click label is important for download decision. Another important result was that there is a negative correlation between choosing the most popular app link and the editor's choice link. We can therefore conclude that users who prefer most popular applications are less likely to prefer editor's choice applications, which further indicates that people complying consensus authority strategies are less likely to comply authority influence strategies.

Table 13: Descriptive Statistics for User Responses and Number of Apps Downloaded

	N	Min	Max	Mean	Std. Dev.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std.Error
No of User Owned Apps	158	8	118	41.367	24.040	.960	.193
Avg Importance Value	158	1	6.875	4.553	1.154	-.590	.193
Avg Relevance Value	158	1	7	4.381	1.156	-.477	.193
Avg Likeness Value	158	1	7	4.820	1.211	-.820	.193
No of Most Popular Links	158	0	8	1.614	2.273	1.627	.193
No of Editor's Choice Links	158	0	8	1.228	2.044	2.063	.193
No of Most Downloaded Links	158	0	8	1.127	1.758	1.947	.193
No of Apps Downloaded	158	0	8	1.810	2.069	1.201	.193

No of Apps Downloaded	Frequency	Percent	Valid Percent	Cumul. Percent
0	56	35.4	35.4	35.4
1	36	22.8	22.8	58.2
2	21	13.3	13.3	71.5
3	15	9.5	9.5	81.0
4	11	7.0	7.0	88.0
5	4	2.5	2.5	90.5
6	7	4.4	4.4	94.9
7	7	4.4	4.4	99.4
8	1	.6	.6	100.0
Total	158	100,0	100,0	

No of Most Popular Links	Frequency	Percent	Valid Percent	Cumul. Percent
0	72	45.6	45.6	45.6
1	34	21.5	21.5	67.1
2	15	9.5	9.5	76.6
3	10	6.3	6.3	82.9
4	10	6.3	6.3	89.2
5	2	1.3	1.3	90.5
6	2	1.3	1.3	91.8
7	5	3.2	3.2	94.9
8	8	5.1	5.1	100.0
Total	158	100.0	100.0	

No of Editor's Choice Links	Frequency	Percent	Valid Percent	Cumul. Percent
0	88	55.7	55.7	55.7
1	30	19.0	19.0	74.7
2	13	8.2	8.2	82.9
3	10	6.3	6.3	89.2
4	2	1.3	1.3	90.5
5	4	2.5	2.5	93.0
6	3	1.9	1.9	94.9
7	2	1.3	1.3	96.2
8	6	3.8	3.8	100.0
Total	158	100.0	100.0	

No of Most Downloaded Links	Frequency	Percent	Valid Percent	Cumul. Percent
0	86	54.4	54,4	54.4
1	32	20.3	20,3	74.7
2	15	9.5	9,5	84.2
3	5	3.2	3.2	87.3
4	11	7.0	7.0	94.3
5	3	1.9	1.9	96.2
6	2	1.3	1.3	97.5
7	2	1.3	1.3	98.7
8	2	1.3	1.3	100.0
Total	158	100.0	100.0	

Table 14: Tests of Normality for User Responses and Number of Apps Downloaded

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
No of User Owned Apps	.116	157	.000	.904	157	.000
Avg Importance Value	.047	157	.200	.979	157	.016
Avg Relevance Value	.064	157	.200	.980	157	.025
Avg Likeness Value	.069	157	.063	.968	157	.001
No of Most Popular Links	.274	157	.000	.736	157	.000
No of Editor's Choice Links	.290	157	.000	.650	157	.000
No of Most Downloaded Links	.281	157	.000	.691	157	.000
No of Apps Downloaded	.243	157	.000	.800	157	.000

Table 15: Correlations between User Responses and Number of Apps Downloaded

Kendall's tau_b Correlations		2	3	4	5	6	7	8
No of Apps Downloaded (1)	Cor.	.040	.104	.205	.170	.248	.227	.093
	Sig.	.499	.079	.001	.004	.000	.001	.158
No of User Owned Apps (2)	Cor.		-.060	-.027	.045	-.021	.098	.128
	Sig.		.277	.624	.409	.726	.107	.036
Avg Importance Value (3)	Cor.			.668	.490	.121	.046	.026
	Sig.			.000	.000	.045	.457	.673
Avg Relevance Value (4)	Cor.				.432	.155	.100	.015
	Sig.				.000	.010	.102	.803
Avg Likeness Value (5)	Cor.					.086	.090	-.034
	Sig.					.153	.142	.584
No of Most Popular Links (6)	Cor.						-.134	-.072
	Sig.						.045	.280
No of Editor's Choice Links (7)	Cor.							-.016
	Sig.							.809
No of Most Downl. Links (8)	Cor.							
	Sig.							

5.2.2 Application Recommendation Download and Personality Features

The descriptive statistics for personality features are given in

Table 16 with their pre-processed values and normality tests are presented in Table 17. Normality tests for personality traits and the number of apps downloaded show that the data is not normally distributed. Since the assumption of normality was not satisfied, non-parametric tests were used.

To determine the convenience of the data set, the Kendall's tau_b Correlation Coefficient was performed and the Jonckheere-Terpstra Test was used in the statistical analysis. There were 8 recommended apps; therefore, the maximum value was 8 and minimum value was 0. For intention variables (most popular link click, editor's choice link click, most downloaded link click), since they may take values between 0 and 8, the Jonckheere-Terpstra test was conducted. In order to use the test, the categorical values of personality features were used. For the BFI and STPS variables, 1 was considered Low and is composed of first quartile of the sample, 3 High with fourth quartile and 2 Moderate with second and third quartiles.

As Table 18 depicts, conscientiousness is significantly correlated with the number of apps downloaded. Conscientious people are described by competence, achievement, self-discipline and dutifulness (Anastasi & Urbina, 1997), and these characteristics may be effective on their compliance with recommended applications. High persuadable individuals are also more likely to download recommended apps with a significant correlation. This is an expectable result since persuadability complies with accepting recommended applications.

Table 16: Descriptive Statistics for Personality Features and Number of Apps Downloaded

	N	Min	Max	Mean	Std. Dev.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std.Error
STPS	147	3	7	4.97	.640	-.209	.200
Extraversion	139	2	7	4.53	1.040	-.124	.206
Agreeableness	139	3	7	5.02	.770	-.087	.206
Conscientiousness	139	2	7	4.68	.837	-.046	.206
Neuroticism	139	2	6	3.68	1.012	.254	.206
Openness	139	3	7	5.10	.825	-.102	.206
No of Apps Downloaded	158	0	8	1.81	2.069	1.201	.193

Table 17: Tests of Normality for Personality Features and Number of Apps Downloaded

Tests of Normality	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gender	.361	135	.000	.634	135	.000
STPS	.257	135	.000	.806	135	.000
Extraversion	.258	135	.000	.806	135	.000
Agreeableness	.268	135	.000	.802	135	.000
Conscientiousness	.245	135	.000	.808	135	.000
Neuroticism	.247	135	.000	.808	135	.000
Openness	.237	135	.000	.809	135	.000
No of Apps Downloaded	.240	135	.000	.819	135	.000

Table 18: Correlations between Personality Traits and Number of Apps Downloaded

Kendall's tau_b Correlations		2	3	4	5	6	7	8
Gender (1)	Cor. Coeff.	-.068	.009	-.047	-.202	.260	.169	.065
	Sig. (2-tailed)	.387	.910	.560	.012	.001	.036	.362
STPS (2)	Cor. Coeff.		.028	.179	.160	-.070	.027	.154
	Sig. (2-tailed)		.721	.021	.040	.366	.726	.029
Extraversion (3)	Cor. Coeff.			.205	.115	-.335	.238	-.017
	Sig. (2-tailed)			.008	.132	.000	.002	.817
Agreeableness (4)	Cor. Coeff.				.395	-.328	.256	.108
	Sig. (2-tailed)				.000	.000	.001	.134
Conscientious. (5)	Cor. Coeff.					-.304	.048	.144
	Sig. (2-tailed)					.000	.530	.045
Neuroticism (6)	Cor. Coeff.						-.138	-.067
	Sig. (2-tailed)						.072	.353
Openness (7)	Cor. Coeff.							.068
	Sig. (2-tailed)							.346
No of Apps Downloaded (8)	Cor. Coeff.							
	Sig. (2-tailed)							

5.2.3 The Relation between Personality Features and the User Attitudes and Responses

The females evaluated the applications as more important (Kendall's tau b = 0.202, p = 0.002) and relevant (Kendall's tau b = 0.207, p = 0.002) than males do. This is in line with the previous research (Unal et al., 2014): According to test results conducted on web environment it was also found that females score significantly higher on perceived importance, relevance, likeness and purchase intention. No difference could be found between the men and women in terms of their link click choices.

More agreeable, open and conscientious people find application recommendations more relevant (Kendall's tau_b = 0.215, p = 0.001; Kendall's tau_b = 0.238, p < 0.000; Kendall's tau_b = 0.161, p = 0.017 respectively). Openness is also found to be significantly related with perceived importance (Kendall's tau_b = 0.245, p < 0.000). For extraversion and neuroticism no significant results could be found. Furthermore being agreeable is found to be significantly correlated with editor's choice link preference (Kendall's tau_b = 0.225 and p = 0.003). This may be an indication of the effect of authority figures on more agreeable individuals. This finding is in line with the characteristics of agreeable people that addresses individuals who have cooperative values (Zhao & Seibert, 2006) and who complies with authority (Karim, Zamzuri, & Nor, 2009).

High persuadable individuals with high STPS score, find application recommendations more important (Kendall's tau_b = 0.215, p = 0.006) and more relevant (Kendall's tau_b = 0.238, p = 0.015). This finding is compatible with characteristics of persuadable people as similar results are observed in e-commerce domain for persuadability trait (Kaptein, 2011).

5.2.4 The Relation between Personality Features and the Number of User Owned Applications

Number of user owned apps is significantly related to gender and higher for males (Table 19). The mean scores for the number of user owned applications were 31 for females and 47 for males. This coincides with previous research by Anckar and D’Incau (2002) who found that male users tend to purchase more apps than female users and they are more likely to spend more money through mobile commerce applications. The number of user owned mobile applications does not significantly differ for other personality features, namely, STPS and the Big Five personality features. Furthermore, those having more apps are found to be more likely to choose the most downloaded app recommendation (Table 19). It is found that the most downloaded link option is more preferable for users that have higher number of applications.

Table 19: Jonckheere–Terpstra Test Results between User Features and User Owned App Numbers Having $p < 0.05$, Ranked by Absolute Value of Kendall's Tau Coefficient

	JT	Kendall's	p
No of User Owned Apps			
Gender	-4.094	-.269	.000
No of Most Downloaded Links	2.101	.128	.036

5.2.5 The Relation between Personality Features and the Number of User Owned Applications in Each Category

The Jonckheere–Terpstra test was implemented to analyze the personality features and the number of category based applications owned by users. In Table 20, significant values having $p < 0.05$ are ranked by absolute value of Kendall's Tau coefficient.

The photography category was positively correlated with female users. Media and video, sports, finance, tools, business, productivity, entertainment, travel & local, shopping, transportation, and communication categories were positively correlated with male users in descending order of magnitude. Since men had a significantly higher number of apps than women, it can be concluded that men are more prone to download mobile apps. As Y. Kim et al. (2015) demonstrated sociodemographics such as gender were major predictors of smartphone and application use followed by personality traits.

Extraversion is negatively correlated with education which is in line with previous study by Gerpott and Thomas (2014), who found that extraverts were associated with the decreased use of literacy applications. Agreeableness is positively correlated with sports. Conscientiousness is correlated with books & reference and news & magazines categories. Similarly, Chittaranjan et al. (2013) found that office and mail apps were more likely to be used by conscientious participants. Neuroticism is negatively correlated with entertainment and media & video in our study. Chittaranjan et al. (2013) found that neuroticism was positively correlated with the use of office and calendar apps. Having negative relation with entertainment and media & video may imply positive relation with literacy applications. In our study, openness was found to be positively correlated with the social application category and negatively with sports, media & video and books & reference categories. The

openness trait was found to be negatively correlated with the use of office and calendar applications (Chittaranjan et al. (2013). Tan and Yang (2014) found that entertainment applications are more likely to be used by users who score high in openness. Therefore, the findings of previous research are in line with our findings.

Table 20: Jonckheere–Terpstra Test Results between Personality Features and Category Based App Numbers Having $p < 0.05$, Ranked by Absolute Value of Kendall's Tau Coefficient

	JT	Kendall's	p
Gender			
Media and Video	-5.303	-.392	.000
Sports	-4.716	-.355	.000
Finance	-3.841	-.278	.000
Tools	-4.050	-.277	.000
Business	-3.635	-.266	.000
Productivity	-3.608	-.248	.000
Entertainment	-2.589	-.183	.010
Travel & Local	-2.366	-.171	.018
Photography	2.339	.171	.019
Shopping	-2.177	-.161	.030
Transportation	-2.147	-.161	.032
Communication	-2.010	-.141	.044
Extraversion			
Education	-2.076	-.150	.038
Agreeableness			
Sports	2.064	.158	.039
Conscientiousness			
Books & Reference	2.098	.151	.036
News and Magazines	1.878	.141	.060
Neuroticism			
Entertainment	-2.025	-.145	.043
Media and Video	-1.925	-.144	.054
Openness			
Sports	-2.330	-.178	.020
Media and Video	-2.292	-.171	.022
Books & Reference	-2.020	-.145	.043
Social	1.984	.139	.047

5.2.6 The Relation between the Download of Recommended Applications and the Number of User Owned Applications in Each Category

Figure 12 presents the categories of applications in the sample of the current study. Tools, games, social, communication and productivity categories were found to be the most downloaded categories in a descending order. In Google Play Store, the most downloaded categories were games, communication, tools, entertainment and social in a descending order ("App Annie Index," 2015), which is similar to our sample.

The Jonckheere–Terpstra test was applied to analyze the download behavior and number of category based apps owned by users. In Table 20, significant values having $p < 0.05$ are ranked by absolute value of Kendall's Tau coefficient.

User with apps in the recommended category are more likely to download the recommended application: Table 21 reveals that for health and fitness, books & references, music & audio, entertainment and games categories, recommended application downloads are significantly related with owning apps in the same category. For health and fitness and books & reference categories, the correlation coefficients were 0.46 and 0.293, respectively. This indicates that having an app in a category increases the probability of having other apps in the same category. This is in line with the observation made by Yin et al. (2013) that some users download multiple similar applications.

The number of recommended applications downloaded is positively correlated with having apps in books & reference, education, health and fitness and games categories as can be seen in Table 22. It was found that books & reference is the key category for the users' download behavior with a correlation coefficient of 0.328. Since conscientiousness is related with the number of app downloads, it is not surprising that having apps in categories such as education and books & reference, which reflect the characteristics of conscientious people (Costa & McCrae, 1992), is significantly related with the download behavior.

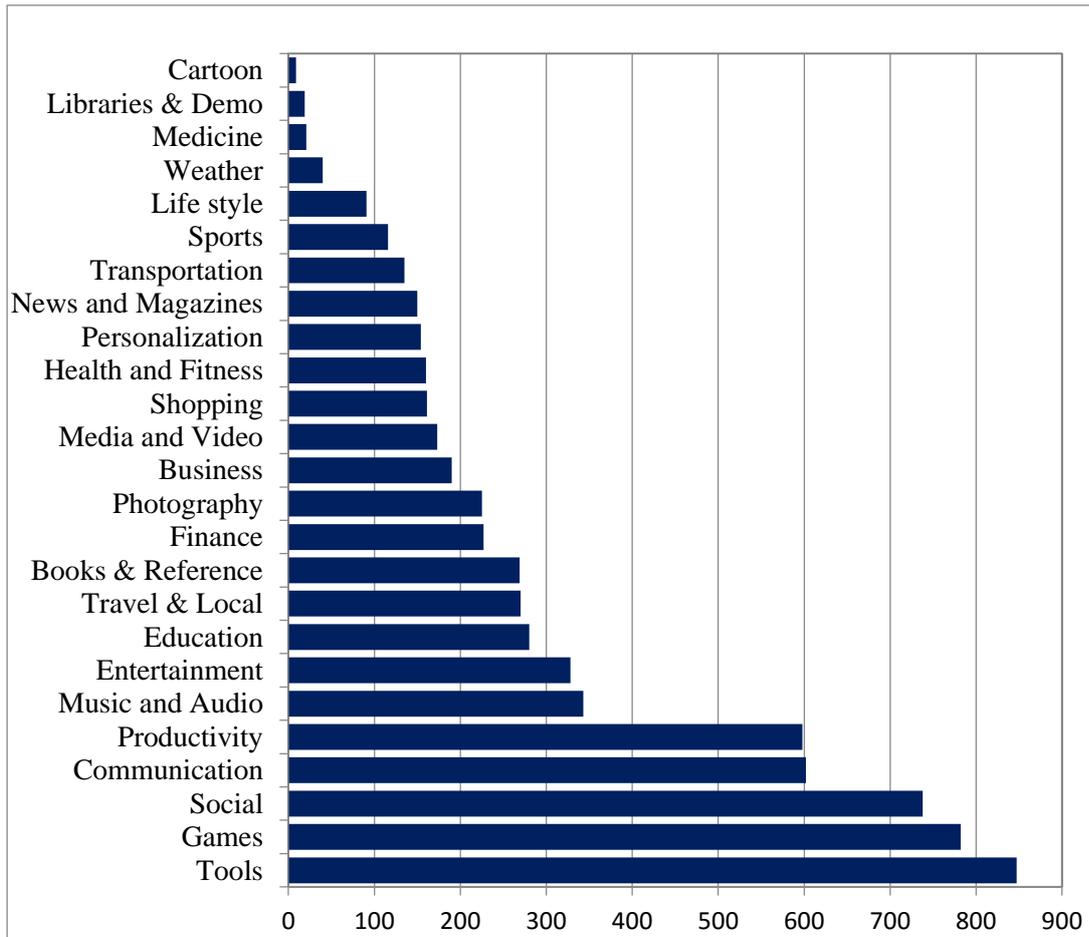


Figure 12: Number of Apps Downloaded for Google Play Store Categories

Table 21: Jonckheere–Terpstra Test Results Between Download Behavior and App Numbers Present in the Same Category Having $P < 0.05$, Ranked By Absolute Value of Kendall's Tau_b Coefficient

Number of Apps Present in the Same Category	JT	Kendall's	p
Health and Fitness	6,175	.460	.000
Books & Reference (Reference)	4,116	.293	.000
Music and Audio	2,714	.192	.007
Entertainment	2,670	.189	.008
Games	2,409	.164	.016

Table 22: Jonckheere–Terpstra Test Results Between Number of Apps Downloaded and App Numbers Present in the Same Category having $p < 0.05$, Ranked by Absolute Value of Kendall's Tau_b Coefficient

	JT	Kendall's	p
No of Apps Downloaded			
Books & Reference	5,157	.328	.000
Education	3,600	.231	.000
Health and Fitness	3,452	.229	.001
Games	2,170	.132	.030

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 Conclusion

The focus of this thesis has been to investigate the relationship between personality features and mobile technology use, specifically those traditional communication channels such as voice calls and SMS messaging and rapidly evolving use of mobile applications, explicitly in the communication domain. This was the first study to investigate the relationship between different personality features and different aspects of mobile technology use. Furthermore, the influence strategies used in mobile application recommendations and users' compliance to recommendations are investigated in an experimental context. The major contributions of the thesis to the research in its area and possible extensions to current scope are discussed in this chapter.

The relation between mobile phone and application use and personality features is extensively analyzed in this study. The frequency of mobile application use is analyzed for the first time in literature. This study explores mobile applications as a means for communication these applications are further analyzed in terms of the subcategories of voice over IP communication (VoIP), instant messaging, emails and photograph sharing.

To measure personality traits, the BFI which consists of 44 questions and the STPS are, for the first time, translated to Turkish and used in academic research in Turkey. This research aimed to address whether the extraversion and innovativeness of individuals are effective on mobile phone, mobile application and communication applications use. In line with previous research and the accepted social and outgoing nature of extraverts, mobile phone use features were found to be mostly correlated with extraversion. Innovativeness and mobile phone and application use relation is explored for the first time. It is shown that innovative people are more open to new experiences and technological innovations represented by mobile applications.

Whether the gender factor and operating system (OS) being used on a user's mobile device has any correlation with that user's perception of the applications in general and commerce applications in particular is investigated as an issue that has not been explored in previous studies. It is considered that this research has made three main contributions to the academic literature. First, it has shown that iOS device users are more likely to use mobile applications and spend more money through mobile commerce applications, which is a significant contribution, given the lack of literature in this area. Second, this study has demonstrated that, when compared to women, men's perceptions of m-commerce applications are more positive and they consider security problems to be less threatening. Third, mobile applications are considered more useful by men and iOS device users compared to women.

Mobile application recommendations and the underlying influence strategies were used as the research framework in this study. To explore users' context and behavior in the mobile environment, experimental recommendation sessions were conducted in the field. Individual differences are shown to be effective on users' compliance with application recommendations. It is shown that the persuadability of the users is an important determinant and more persuadable individuals have higher compliance with persuasive messages. Females scored significantly higher on the perception of recommended mobile applications. The analysis of the operating system being used revealed that iOS device owners score significantly higher on purchase intention and relevance of applications compared to the owners of devices using Android.

The effects of influence strategies were explored and then a comparison was undertaken with no influence strategies in the mobile application recommendations domain. The findings showed that the use of persuasive messages should be tackled cautiously; consensus influence strategy yielded a higher compliance than no treatment, whereas the authority influence strategy decreased user compliance. The effects of visible and semi-visible influence strategies were compared and examined in terms of user compliance in an experimental context. It is shown that it does matter how the persuasive messages are presented to the user; the effects of semi-visible persuasive messages are higher than the visible persuasive messages.

In almost all application stores the mobile applications are grouped under headings that employ consensus or authority influence strategies such as the most popular, most downloaded, editor's choice or applications of the day. Users' perceptions of such influence strategies and underlying factors that lie beyond the users' preferences are examined in this thesis. Moreover, individual differences and the effects of the Big Five personality features on the users' compliance within the mobile application recommendation domain were explored. It is found that for openness and agreeableness, user perceptions were significantly more positive. Moreover, attitude, intention and download behavior towards the recommended applications differed with personality features. Female participants evaluated the applications as more important and relevant than the males. Agreeable, open and conscientious people had more positive compliance with recommendations whereas extraverts and neurotics did not exhibit a significant relation.

Download behavior for recommended applications differed with attitude, intention and download behavior towards recommended application. The most important variables were the perceived relevance and likeness to the user. It is found that users were inclined to download the applications that were relevant to themselves and they liked. Further, it was found that the choice of most popular apps and editor's choice apps were significantly related to the number of apps downloaded. Another important result was that there is a negative correlation between choosing the most popular app link and the editor's choice link.

For the first time in the literature, it is shown that there was a relation between personality features and number of applications owned by the user in total and in each application category. The number of user owned applications was significantly higher for males. The number of applications owned in the photography category was positively correlated with females whereas the numbers of apps in the categories of media & video, sports, finance, tools, business, productivity, entertainment, travel & local, shopping, transportation, and communication were positively correlated in descending order of magnitude with male. The Big Five personality features and number of applications owned by the user in the application categories are shown to be related. Extraversion was negatively correlated with number of applications owned in the education category and agreeableness was positively

correlated with sports. Conscientiousness was correlated with the categories of books & reference and news & magazines s. Neuroticism was negatively correlated with entertainment and media & video. Openness was positively correlated with social application category and negatively with sports, media & video and books & reference categories.

The number of apps downloaded was positively correlated with having apps in books & references, education, health and fitness and games categories. Another generalization that can be made is that having apps in the same category increases the probability of accepting more app recommendations in the same category. It was also shown that people having more apps are more likely to choose most downloaded app recommendation. Most popular apps and editor's choice apps were significantly related to number of apps downloaded to the user's mobile phone and being agreeable was significantly related with a preference for the editor's Choice link.

6.2 Limitations and Future Work

The major limitation of the study reported in this thesis was the use of a convenience sample from graduate and undergraduate university students since it does not completely represent the general consumer population who are likely to be less familiar with mobile applications. The students were from Middle East Technical University, one of the top universities in Turkey, which implies that the participant group has a high level of literacy and innovativeness. One advantage of employing this sample is that they may reflect the future level of general consumers. The current sample was demographically diverse in terms of gender, but uniform in terms of age and income. This composition of participants is useful for analyzing the effects of personality features with all other variables being held constant. A further study could be conducted on a broader consumer population from different age groups and across cultures thus the results could be generalized to mobile users in general. Social/technical background of the participants is another demographical factor that can be explored in future work.

Another limitation of the study was the use of self-reporting of the mobile phone and application use of individuals. In the questionnaires, the participants were required to submit estimates of their past behavior. However, as reported in the literature, this can result in bias and the use of log data would be more reliable (Boase & Linge, 2013). There may be individual differences in participants' recall, hence there may be over or under estimations. Future studies can resolve this issue by employing log data.

In the experimental study on a mobile platform, log data was used to extract user profiles through the list of installed apps; however, this was only a snapshot of the applications the participants owned. This was not longitudinal research following users after downloading and during their use of the recommended applications over time. Therefore, the usage time of applications, the frequency of application use and uninstall behavior that occurred after the download of the applications, was not fully analyzed in the current research. Further work can be undertaken and an application could be developed to track the application usage data of participant users. However, tracking users for a long period of time may burden the users with excessive battery usage and memory allocation furthermore, due to security and privacy problems users may be reluctant to participate. Our simpler approach provides a quick user profiling which may address cold start problems. Exploring the relation between personality traits and mobile application usage can help in addressing individual needs. Personality features such as age, ethnicity, language, gender, religion can be used as classifiers in machine learning algorithms and the information gained can foster targeted mobile marketing. Although in its early stages, information on users' tastes, preferences,

attitudes and possible actions will provide great opportunities for the delivery of personalized mobile advertising.

In the current research, a single snapshot of the list of installed apps was used by obtaining user permission although this was not necessary from the user to acquire a list of installed apps. To protect user privacy, further studies can be conducted which shows that this set of information can reveal significant features pertaining to user which may be open to misuse. In this current study, as opposed to personally identifiable information such as users' name or phone numbers, unique identifiers such as the device IMEI were used to ensure anonymity. Although, IMEI, as the key unique identifier, is fundamental for recommender systems to address personalized recommendations, it may still possess potential treat for security. Further studies may handle implications of perceived privacy concerns for personalized mobile services and elaborate on the issue from the perspectives of different stakeholders.

Another limitation of our study is that, due to novel extensions in scope, the findings of our studies could not directly be compared with the findings in the literature. It will be beneficial to conduct qualitative research to explore the findings of this study.

Despite the limitations, this study provides unique empirical quantitative research on the user evaluations regarding mobile application recommendations with respect to personality features. These features are related to intrinsic characteristics that are used by the user while processing and evaluating the information regarding to the recommended application. The information presented in mobile application introductions such as application features, number of downloads and ratings have significant impact on users' evaluations. A paper, which is an extension of this thesis, explored the relation between application features, and number of downloads and ratings for mobile physical activity applications and its subcategories. Further similar research can be conducted to determine the effectiveness of features for applications in various domains and categories. A combination of application features and personality features and their effectiveness is another area that can be investigated.

The main contribution of this thesis is to ground the recommending systems' designs in an understanding of users' needs and to provide personalization means to better address users' individual differences. Understanding the patterns of mobile phone use is significant to reveal user preferences to improve the features of mobile phones and personalized mobile services. Particularly for phone operators and service providers, It can also be used to tailor for specific needs and specific populations needs in phone use. The SMS, voice call and mobile internet baskets, tariffs and pricing mechanism may be adjusted to the needs of user groups. For example for extraverts voice calls and SMS could be more attractive when compared to mobile internet usage whereas for introverts it could be vice versa.

It is obvious that the mobile platform will continue to be the dominant mode of interaction between suppliers and consumers in many industries. To explore users' preferences in mobile environment not only the "who" questions but also "why" and "how" questions should also be addressed. Besides identifying the users, understanding their attitude, intention and behavior towards mobile applications and m-commerce needs exploring characteristic manners of users, their styles and how their behavior relate with demographic and personality features. This information would be valuable to understand what features of mobile applications attract users and particular user groups, such as innovative shoppers, females, introverts and so on. Extracting the knowledge that i.e. range of product line attracts

innovative users and high security measures attract female users has significant implications on product designers and marketers.

Practitioners would be interested in the implications of this thesis for the design of personalized mobile applications and application recommendations that are offering high-quality personalized content. Business actors that contemplate using personalized mobile services for their current and prospective customers may use the findings of this study to map mobile services with user preferences and needs. By understanding and mapping the preferences and needs of the users, a commercial enterprise is more likely to influence users in its promotion and sales efforts. The findings are also applicable to strategies on targeted marketing and brand building. To implant a brand on the minds of female, high persuadable individuals, need different strategies than male low persuadable individuals.

Mobile technology products should avoid the one-size-fits-all approach to meet different needs of individuals. The findings of this study provide valuable information to improve personalization and recommendation services of mobile applications. People with similar personality features may be used for identifying and clustering people with similar tastes and preferences. Understanding the patterns of mobile phone use is significant in revealing user preferences in order to improve features of mobile phones and personalized mobile services. It can also help tailor specific needs and particular populations and make predictions based on the available data. For example, conscientious users were found to be more likely to use books & reference applications whereas extraverts were found to be less likely to use those applications. To target relevant customers, advertisements regarding books & reference applications should be presented to conscientious users rather than extraverts.

The findings in this study provide useful insights for mobile technology designers, especially those planning for specific populations. The identification of users who are innovators, early-adopters, leader users who have a large number of friends is also important to determine the primary segment that should be targeted by marketing practitioners. The users that have higher number of user owned applications are more likely to be males and the users that are more likely to download recommended applications are more likely to be conscientious and have applications in books & reference, education, health and fitness and games categories. So, the market segment that should be targeted in mobile application recommendations should be male, conscientious users having more applications in books & reference, education, health and fitness and games categories. Stakeholders including phone operators, service providers, application developers and advertising companies can benefit from the results to further explore the behaviors of mobile technology users from the perspective of consumers as well as other providers and advertisers. Although the findings of this study are interesting and significant, there are still other areas for future exploration. Different personality features such as trust and privacy concerns, well-being, mood and social network characteristics can be further analyzed that may contribute to an understanding of user preferences regarding the use of mobile phones and applications. It is shown that mobile application usage is denominated by contextual factors such as location, time of the day, activity and people around which is usually determined by the Bluetooth feature. Most probably, the users' acceptance of mobile application recommendations depends on the contextual environment. Further research can tackle the effects of contextual factors on mobile phone and application use and mobile application recommendations acceptance. Using contextual information like time and location has the potential to be used in offering recommendations to new users who do not yet have a profile or history, hence addressing the cold-start problem.

6.3 Research Questions and Findings

To provide a clear overview of the contributions made by the thesis, research questions and findings are summarized in Table 23.

Table 23: Research Questions and Findings

Research Question	Findings
RQ1: What are the individual differences for the use of mobile phones and applications?	The question is addressed with the following sub questions.
RQ1.1: Are the extraversion and innovativeness traits of individuals effective on their use of mobile phones?	Mobile phone use features were found to be mostly correlated with extraversion.
RQ1.2: Are the extraversion and innovativeness traits of individuals effective on their use of mobile applications?	Mobile application use features were mostly correlated with innovativeness.
RQ1.3: Are the extraversion and innovativeness traits of individuals effective on their use of communication applications?	Extraversion and innovativeness are positively correlated with VoIP, instant messaging, e-mail and photograph sharing application categories.
RQ1.4: Do the user's evaluation of general purpose mobile applications and mobile commerce applications differ in relation to their personality features?	It is found that iOS device users are more likely to use mobile applications and spend more money through mobile commerce applications. When compared to women, men's perceptions of m-commerce applications are more positive and they find security problems to be less threatening. Mobile applications are considered more useful by men and iOS device users.
RQ2: What affects the users' compliance with mobile application recommendations?	The question is addressed with the following sub questions.
RQ2.1.1: Does the evaluation of mobile applications differ according to personality features and the persuasive messages that are used?	More persuadable individuals expressed higher compliance with persuasive messages. Females scored significantly higher on perceived importance, relevance, likeness and purchase intention. iOS device owners score significantly higher on purchase intention and relevance compared to Android device owners.

Table 23 continued

<p>RQ2.1.2: Are users subject to authority persuasive messages equally compliant as those users who are subject to consensus persuasive messages?</p>	<p>The consensus influence strategy led to higher compliance levels than the authority influence strategy whereas the authority influence strategy actually worsens the compliance level of the members of the control group that were not subject to any persuasive messages.</p>
<p>RQ2.1.3: Are users subject to visible persuasive messages equally compliant with users who are subject to semi-visible persuasive messages?</p>	<p>The compliance level was lower when the persuasive messages were visible to the users compared with the semi-visible persuasive messages.</p>
<p>RQ2.2.1: Do attitude, intention and download behaviors towards the recommended applications differ with personality features?</p>	<p>It was found that attitude, intention and download behavior towards recommended applications differ with personality features. Females evaluated the applications as more important and relevant than male do. Agreeable, open and conscientious people have more positive attitude to recommendations whereas extraverts and neurotics did not exhibit significant relation. Conscientiousness and persuadability are significantly related with the number of applications downloaded.</p>
<p>RQ2.2.2: Do attitude and intention to download for recommended application affect download behavior of recommended application?</p>	<p>Download behavior for recommended application differs with attitude, intention and download behavior towards recommended application. The number of apps downloaded is correlated with perceived relevance and likeness and with the choice of most popular applications and editor's choice applications.</p>

Table 23 continued

<p>RQ2.2.4: Is there a relation between personality features and number of applications owned by the user in total and in each application category?</p>	<p>It is shown that there is a relation between personality features and number of applications owned by the user in total and in each application category. Number of user owned apps is significantly higher for male. Number of applications owned in photography category is positively correlated with female whereas media & video, sports, finance, tools, business, productivity, entertainment, travel & local, shopping, transportation, communication app numbers are positively correlated in descending order of magnitude with male. Big Five personality features and number of applications owned by the user in application categories are shown to be related: Extraversion is negatively correlated with number of applications owned in education category and agreeableness is positively correlated with sports. Conscientiousness is correlated with books & reference and news & magazines categories. Neuroticism is negatively correlated with entertainment and media & video. Openness is positively correlated with social application category and negatively with sports, media & video and books & reference app categories.</p>
<p>RQ2.2.5: Is there a relation between users' acceptance of recommended applications and the categories of applications owned by the user?</p>	<p>Number of apps downloaded is positively correlated with having apps in books & references, education, health and fitness and games categories.</p>
<p>RQ2.2.6: Are people, having more applications in a category, more eager to download new applications due to their interest in the category or do they resist downloading more new applications since they have already downloaded many applications</p>	<p>Having applications in the same category increases the probability of accepting more application recommendations in the same category. For health and fitness, books & references, music & audio, entertainment and games categories, recommended application downloads are significantly related with owning applications in the same category.</p>

Table 23 continued

<p>RQ2.2.7: Does the evaluation of mobile applications differ according to the influence strategy employed by application stores namely the consensus influence strategy (most popular apps, most downloaded app) and authority influence strategy (editor's choice)?</p>	<p>The choice of most popular applications and editor's choice applications were significantly related to the number of applications downloaded. There was a negative correlation between choosing the most popular application link and the editor's choice link.</p>
<p>RQ2.2.8: Is there a significant relation between personality features and influence strategy that is effective?</p>	<p>Being agreeable was found to be significantly correlated with editor's choice link preference, hence authority influence strategy.</p>

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APPENDIX A: TEN-ITEM PERSONALITY INVENTORY (TIPI)

Ten-Item Personality Inventory-(TIPI) (English)

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

Disagree Strongly 1	Disagree moderately 2	Disagree a little 3	Neither agree nor disagree 4	Agree a little 5	Agree moderately 6	Agree strongly 7
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I see myself as:

1. ____ Extraverted, enthusiastic.
2. ____ Critical, quarrelsome.
3. ____ Dependable, self-disciplined.
4. ____ Anxious, easily upset.
5. ____ Open to new experiences, complex.
6. ____ Reserved, quiet.
7. ____ Sympathetic, warm.
8. ____ Disorganized, careless.
9. ____ Calm, emotionally stable.
10. ____ Conventional, uncreative.

TIPI scale scoring (“R” denotes reverse-scored items):

Extraversion: 1, 6R; Agreeableness: 2R, 7; Conscientiousness: 3, 8R; Emotional Stability: 4R, 9;

Openness to Experiences: 5, 10R

Turkish Version of TIPI

On-Maddelik Kişilik Ölçeği-(OMKÖ)

Aşağıda sizi tanımlayan ya da tanımlamayan birçok kişilik özelliği bulunmaktadır. Lütfen her bir ifadenin yanına, o ifadenin size tanımlama düzeyini dikkate alarak, o ifadeye katılıp katılmadığınızı belirtmek için 1 ile 7 arasında bir rakam yazın. İfadelerde size en çok tanımlayan özelliği dikkate alarak, uygun gördüğünüz rakamı yazın.

- 1 = Tamamen katılmıyorum
- 2 = Kısmen katılmıyorum
- 3 = Biraz katılmıyorum
- 4 = Kararsızım
- 5 = Biraz Katılıyorum
- 6 = Kısmen katılıyorum
- 7 = Tamamen katılıyorum

Kendimi olarak görürüm:

1. _____ Dışa dönük, istekli
2. _____ Eleştirel, kavgacı
3. _____ Güvenilir, öz-disiplinli
4. _____ Kaygılı, kolaylıkla hayal kırıklığına uğrayan
5. _____ Yeni yaşantılara açık, karmaşık
6. _____ Çekingen, sessiz
7. _____ Sempatik, sıcak
8. _____ Altüst olmuş, dikkatsiz
9. _____ Sakin, duygusal olarak dengeli
10. _____ Geleneksel, yaratıcı olmayan

APPENDIX B: BIG FIVE INVENTORY PERSONALITY TEST (BFI)

Directions: The following statements relate to your perception about yourself in a variety of situations. Your task is to indicate the strength of your agreement with each statement, utilizing a scale in which 1 denotes strong disagreement, 5 denotes strong agreement, and 2, 3, and 4 represent intermediate judgments. In the boxes after each statement, click a number from 1 to 5 from the following scale:

Strongly disagree
Disagree a little
Neither disagree nor agree
Agree a little
Strongly agree

There are no "right" or "wrong" answers, so select the number that most closely reflects what you think about each statement. These results are being used in scientific research, so please try to give accurate answers. Take your time and consider each statement carefully. Once you have completed all questions click "Submit" at the bottom.

I see Myself as Someone Who...

- 1. Is talkative
- 2. Tends to find fault with others
- 3. Does a thorough job
- 4. Is depressed, blue
- 5. Is original, comes up with new ideas
- 6. Is reserved
- 7. Is helpful and unselfish with others
- 8. Can be somewhat careless
- 9. Is relaxed, handles stress well
- 10. Is curious about many different things
- 11. Is full of energy
- 12. Starts quarrels with others
- 13. Is a reliable worker
- 14. Can be tense
- 15. Is ingenious, a deep thinker
- 16. Generates a lot of enthusiasm
- 17. Has a forgiving nature
- 18. Tends to be disorganized
- 19. Worries a lot
- 20. Has an active imagination
- 21. Tends to be quiet
- 22. Is generally trusting
- 23. Tends to be lazy

- 24. Is emotionally stable, not easily upset
- 25. Is inventive
- 26. Has an assertive personality
- 27. Can be cold and aloof
- 28. Perseveres until the task is finished
- 29. Can be moody
- 30. Values artistic, aesthetic experiences
- 31. Is sometimes shy, inhibited
- 32. Is considerate and kind to almost everyone
- 33. Does things efficiently
- 34. Remains calm in tense situations
- 35. Prefers work that is routine
- 36. Is outgoing, sociable
- 37. Is sometimes rude to others
- 38. Makes plans and follows through with them
- 39. Gets nervous easily
- 40. Likes to reflect, play with ideas
- 41. Has few artistic interests
- 42. Likes to cooperate with others
- 43. Is easily distracted
- 44. Is sophisticated in art, music, or literature

Please check: Did you write a number in front of each statement?

BFI scale scoring ("R" denotes reverse-scored items):

Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36

Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42

Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R

Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39

Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

(John & Srivastava, 1999)

Turkish Version of BFI

44 Soruluk Kişilik Testi

Aşağıda birçok kişilik özelliği bulunmaktadır. İfadelerin sizi tanımlama düzeyini dikkate alarak, her bir ifadeye katılıp katılmadığınızı belirtmek için 1 ile 5 (1 Hiç Katılmıyorum, 5 Tamamen Katılıyorum) arasında oylayınız.

1. Konuşkan
2. Başkalarının kusurlarını bulmaya eğilimli
3. Mükemmel iş çıkaran
4. Depresif, hüzünlü
5. Orjinal, yeni fikirler üreten
6. Çekingen
7. Yardımsever, bencil olmayan
8. Biraz dikkatsiz
9. Rahat, stresle başa çıkabilen
10. Pek çok farklı şeyi merak eden
11. Enerji dolu
12. Başkalarıyla tartışma başlatan
13. Güvenilir bir çalışan
14. Gergin olabilen
15. Zeki, engin fikirleri olan
16. Pek çok etkinlik organize eden
17. Affedici bir doğası olan
18. Dağınık olmaya eğilimli
19. Sıkça endişelenen
20. Hayal gücü yüksek
21. Sessiz olmaya eğilimli
22. Genel olarak güven duyan
23. Tembel olmaya eğilimli
24. Duygusal olarak dengeli, kolay üzülmeyen
25. Yaratıcı, yenilikçi
26. İddialı bir kişiliğe sahip
27. Soğuk ve uzak olabilen
28. İşini tamamlayana kadar azimle çalışan
29. Karamsar, ruhsal durumu çabuk değişen
30. Estetikle, sanatla ilgili etkinlikleri önemseyen
31. Bazen utangaç, tutuk
32. Düşünceli ve hemen herkese karşı nazik
33. Verimli çalışan
34. Gergin durumlarda sakin kalmayı başaran
35. Rutin işleri tercih eden
36. Cana yakın, arkadaş canlısı
37. Bazen başkalarına karşı kaba
38. Planlar yapan ve o planları takip eden

39. abuk sinirlenen
40. Fikirlerle ilgilenmeyi, paylařmayı seven
41. Sanatsal konulara ilgisi az
42. Bařkalarıyla iřbirlięi yapmaktan hořlanan
43. Kolaylıkla dikkati daęılan
44. Resim, mzık veya edebiyat alanlarında donanımlı

Table 24: Descriptive Statistics for BFI

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
E1	147	1	7	4.73	1.367	-.488	.200
A2R	147	1	7	4.93	1.629	-.583	.200
C3	147	2	7	4.86	1.174	-.118	.200
N4	147	1	7	3.14	1.446	.296	.200
O5	147	2	7	5.05	1.137	-.350	.200
E6R	147	1	7	4.49	1.710	-.153	.200
A7	147	1	7	5.42	1.249	-.760	.200
C8R	147	1	7	4.23	1.395	-.299	.200
N9R	147	1	7	3.62	1.681	.242	.200
O10	147	2	7	5.88	1.260	-.974	.200
E11	147	2	7	5.10	1.259	-.237	.200
A12R	147	1	7	4.89	1.544	-.460	.200
C13	147	3	7	5.80	1.104	-.856	.200
N14	147	1	7	4.17	1.478	.077	.200
O15	147	3	7	5.08	1.089	-.035	.200
E16	147	1	7	3.87	1.623	.134	.200
A17	147	1	7	5.13	1.444	-.838	.200
C18R	147	1	7	3.75	1.954	.147	.200
N19	147	1	7	3.91	1.708	.106	.200
O20	147	1	7	5.44	1.282	-.565	.200
E21R	147	1	7	4.22	1.690	-.158	.200
A22	147	2	7	5.05	1.181	-.385	.200
C23R	147	1	7	4.52	1.673	-.279	.200
N24R	147	1	7	4.16	1.516	-.078	.200
O25	147	1	7	5.15	1.178	-.371	.200
E26	147	1	7	4.55	1.522	-.352	.200
A27R	147	1	7	4.14	1.624	-.048	.200
C28	147	2	7	5.43	1.250	-.497	.200
N29	147	1	7	3.78	1.805	.178	.200
O30	147	1	7	4.70	1.730	-.357	.200
E31R	147	1	7	4.04	1.600	-.159	.200
A32	147	2	7	5.39	1.258	-.601	.200
C33	147	2	7	5.12	1.191	-.226	.200
N34R	147	1	7	3.32	1.553	.454	.200
O35R	147	1	7	4.85	1.514	-.331	.200
E36	147	1	7	5.20	1.373	-.571	.200
A37R	147	1	7	5.05	1.411	-.441	.200
C38	147	1	7	4.66	1.537	-.444	.200

Table 24 continued

N39	147	1	7	3.50	1.554	.184	.200
O40	147	2	7	5.68	1.104	-.699	.200
O41R	147	1	7	5.15	1.726	-.656	.200
A42	147	1	7	5.18	1.211	-.500	.200
C43R	147	1	7	3.93	1.556	-.206	.200
O44	147	1	7	4.22	1.687	-.151	.200
Extraversion	147	2.125	6.875	4.52551	1.031081	-.123	.200
Agreeableness	147	3.0000	6.8889	5.020408	.7895414	-.029	.200
Conscientiousness	147	2.3333	6.7778	4.696599	.8351473	-.046	.200
Neuroticism	147	1.5000	6.3750	3.698615	1.0058339	.194	.200
Openness	147	3.1000	6.9000	5.119728	.8225952	-.120	.200
V51	0						
Valid N (listwise)	0						

Table 25: Tests of Normality BFI

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
E1	.196	147	.000	.932	147	.000
A2R	.166	147	.000	.916	147	.000
C3	.164	147	.000	.924	147	.000
N4	.151	147	.000	.932	147	.000
O5	.232	147	.000	.906	147	.000
E6R	.158	147	.000	.933	147	.000
A7	.177	147	.000	.896	147	.000
C8R	.142	147	.000	.937	147	.000
N9R	.161	147	.000	.936	147	.000
O10	.242	147	.000	.819	147	.000
E11	.162	147	.000	.926	147	.000
A12R	.192	147	.000	.922	147	.000
C13	.260	147	.000	.852	147	.000
N14	.162	147	.000	.935	147	.000
O15	.197	147	.000	.914	147	.000
E16	.140	147	.000	.948	147	.000
A17	.206	147	.000	.899	147	.000
C18R	.146	147	.000	.920	147	.000
N19	.133	147	.000	.943	147	.000
O20	.180	147	.000	.901	147	.000
E21R	.175	147	.000	.930	147	.000
A22	.203	147	.000	.914	147	.000

Table 24 continued

C23R	.152	147	.000	.936	147	.000
N24R	.153	147	.000	.948	147	.000
O25	.177	147	.000	.920	147	.000
E26	.194	147	.000	.935	147	.000
A27R	.131	147	.000	.950	147	.000
C28	.180	147	.000	.903	147	.000
N29	.136	147	.000	.937	147	.000
O30	.148	147	.000	.926	147	.000
E31R	.154	147	.000	.943	147	.000
A32	.190	147	.000	.904	147	.000
C33	.179	147	.000	.922	147	.000
N34R	.170	147	.000	.928	147	.000
O35R	.152	147	.000	.930	147	.000
E36	.190	147	.000	.915	147	.000
A37R	.160	147	.000	.926	147	.000
C38	.193	147	.000	.932	147	.000
N39	.156	147	.000	.933	147	.000
O40	.219	147	.000	.882	147	.000
O41R	.192	147	.000	.880	147	.000
A42	.181	147	.000	.920	147	.000
C43R	.142	147	.000	.944	147	.000
O44	.160	147	.000	.940	147	.000
Extraversion	.068	147	.095	.986	147	.129
Agreeableness	.060	147	.200	.992	147	.557
Conscientiousness	.057	147	.200	.992	147	.580
Neuroticism	.049	147	.200	.990	147	.345
Openness	.042	147	.200	.990	147	.395

Table 26: Reliability Tests for BFI

Reliability Statistics for Extraversion

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.830	.833	8

Item Statistics

	Mean	Std. Deviation	N
E1	4.73	1.367	147
E6R	4.49	1.710	147
E11	5.10	1.259	147
E16	3.87	1.623	147
E21R	4.22	1.690	147
E26	4.55	1.522	147
E31R	4.04	1.600	147
E36	5.20	1.373	147

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
E1	31.47	54.086	.601	.413	.805
E6R	31.71	52.411	.513	.468	.817
E11	31.10	55.394	.590	.434	.808
E16	32.33	53.977	.479	.278	.821
E21R	31.99	49.082	.680	.513	.792
E26	31.65	56.023	.426	.241	.827
E31R	32.16	51.110	.628	.500	.800
E36	31.01	54.788	.559	.441	.810

Reliability Statistics for Agreeableness

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.729	.736	9

Item Statistics

	Mean	Std. Deviation	N
A2R	4.93	1.629	147
A7	5.42	1.249	147
A12R	4.89	1.544	147
A17	5.13	1.444	147
A37R	5.05	1.411	147
A42	5.18	1.211	147
A32	5.39	1.258	147
A27R	4.14	1.624	147
A22	5.05	1.181	147

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
A2R	40.25	38.738	.449	.308	.697
A7	39.76	41.142	.486	.271	.693
A12R	40.29	41.112	.353	.172	.716
A17	40.05	40.202	.448	.294	.697
A37R	40.14	41.694	.374	.211	.711
A42	40.00	42.918	.385	.228	.709
A32	39.80	41.616	.450	.269	.699
A27R	41.05	40.950	.332	.142	.721
A22	40.13	42.839	.405	.292	.706

Reliability Statistics for Conscientiousness

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.746	.749	9

Item Statistics

	Mean	Std. Deviation	N
C3	4.86	1.174	147
C8R	4.23	1.395	147
C13	5.80	1.104	147
C18R	3.75	1.954	147
C23R	4.52	1.673	147
C28	5.43	1.250	147
C33	5.12	1.191	147
C38	4.66	1.537	147
C43R	3.93	1.556	147

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
C3	37.43	49.329	.335	.207	.736
C8R	38.06	46.880	.388	.246	.729
C13	36.50	49.183	.377	.230	.731
C18R	38.54	40.044	.500	.416	.712
C23R	37.78	41.545	.551	.408	.699
C28	36.86	48.351	.364	.274	.732
C33	37.18	47.051	.475	.325	.718
C38	37.63	45.275	.416	.195	.725
C43R	38.36	44.917	.427	.229	.723

Reliability Statistics for Neuroticism

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.783	.780	8

Item Statistics

	Mean	Std. Deviation	N
N4	3.14	1.446	147
N9R	3.62	1.681	147
N14	4.17	1.478	147
N19	3.91	1.708	147
N24R	4.16	1.516	147
N29	3.78	1.805	147
N34R	3.32	1.553	147
N39	3.50	1.554	147

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
N4	26.45	53.372	.437	.266	.766
N9R	25.97	48.266	.582	.406	.742
N14	25.41	51.491	.520	.368	.754
N19	25.67	48.290	.568	.407	.744
N24R	25.43	51.384	.507	.302	.756
N29	25.81	46.909	.588	.387	.740
N34R	26.27	52.895	.416	.260	.770
N39	26.09	55.972	.271	.185	.792

Reliability Statistics for Openness to Experience

Cronbach's Alpha	N of Items
.792	10

Item Statistics

	Mean	Std. Deviation	N
O5	5.05	1.137	147
O10	5.88	1.260	147
O15	5.08	1.089	147
O20	5.44	1.282	147
O25	5.15	1.178	147
O30	4.70	1.730	147
O35R	4.85	1.514	147
O40	5.68	1.104	147
O41R	5.15	1.726	147
O44	4.22	1.687	147

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
O5	46.15	56.813	.558	.766
O10	45.32	56.931	.481	.773
O15	46.12	59.034	.445	.777
O20	45.76	55.128	.572	.762
O25	46.05	56.580	.547	.766
O30	46.50	51.416	.534	.765
O35R	46.35	61.132	.179	.810
O40	45.52	59.416	.413	.780
O41R	46.05	49.826	.610	.754
O44	46.97	54.479	.415	.783

APPENDIX C: SUSCEPTIBILITY TO PERSUASIVE STRATEGIES SCALE (STPS)

Susceptibility to Persuasive Strategies Scale (STPS) was used to assess a participant's persuadability score. The items were scored on a 7-point Likert scale ranging from totally disagree (1) to totally agree (7). The items were as follows:

Authority

- I always follow advice from my general practitioner.
- I am very inclined to listen to authority figures.
- I always obey directions from my superiors.
- I am more inclined to listen to an authority figure than to a peer.

Consensus

- I will do something as long as I know there are others doing it too.
- If someone from my social network notifies me about a book, I tend to read it.
- When I am in a new situation I look at others to see what I should do.
- I often rely on other people to decide what I should do.
- It is important for me to fit in.

Turkish Version of STPS

İkna Testi Soruları

1. Doktorumun tavsiyelerine kesinlikle uyarım.
2. Otoritelerin ve konunun uzmanlarının görüşlerine çok değer veririm.
3. Üstlerimin verdiği talimatlara her zaman uyarım.
4. Otoritelerin ve konunun uzmanlarının görüşlerini arkadaşlarımdan daha çok dikkate alırım.
5. Başkalarının da aynı şeyi yaptığını biliyorsa, aynı şeyi yapmaya devam ederim.
6. Sosyal çevremden birisi bir kitabın güzel olduğunu söylerse, o kitabı okumaya eğilimli olurum.
7. Yeni bir durumla karşılaştığımda karar verebilmek için diğerlerinin ne yaptığını bakarım.
8. Aykırı düşmemek benim için önemlidir.
9. Ne yapacağımı belirlemek için çoğu kez diğerlerinin ne yaptığını dikkate alırım.

Table 27: Descriptive Statistics for STPS

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Authority	157	3.500	7.000	5.608	.679	-.623	.194
Consensus	157	1.600	6.200	4.303	.918	-.474	.194
STPS	157	2.925	6.600	4.955	.656	-.309	.194
Valid N (listwise)	157						

Table 28: Tests of Normality for STPS

Tests of Normality for STPS						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Authority	.142	156	.000	.959	156	.000
Consensus	.095	156	.002	.981	156	.027
STPS	.069	156	.064	.985	156	.082

Table 29: Reliability Tests for STPS

Reliability Statistics for Authority

Cronbach's Alpha	N of Items
,728	4

Item Statistics

	Mean	Std. Deviation	N
Doktorumun tavsiyelerine kesinlikle uyarım.	6.06	.746	160
Otoritelerin ve konunun uzmanlarının görüşlerine çok değer veririm.	5.69	.946	160
Üstlerimin verdiği talimatlara her zaman uyarım.	5.39	.978	160
Otoritelerin ve konunun uzm.larının görüşlerini arkadaşlarımdan görüşlerinden daha çok dikkate alırım.	5.14	1.307	160

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Doktorumun tavsiyelerine kesinlikle uyarım.	16.22	6.952	.397	.732
Otoritelerin ve konunun uzmanlarının görüşlerine çok değer veririm.	16.59	5.426	.623	.610
Üstlerimin verdiği talimatlara her zaman uyarım.	16.89	5.622	.537	.657
Otoritelerin ve konunun uzm.larının görüşlerini arkadaşlarımdan görüşlerinden daha çok dikkate alırım.	17.13	4.253	.576	.651

Reliability Statistics for Consensus

Cronbach's Alpha	N of Items
.715	5

Item Statistics

	Mean	Std. Deviation	N
Başkalarının da aynı şeyi yaptığını biliyorsam, aynı şeyi yapmaya devam ederim.	3.23	1.497	160
Sosyal çevremden birisi bir kitabın güzel olduğunu söylerse, o kitabı okumaya eğilimli olurum.	5.10	1.318	160
Yeni bir durumla karşılaştığımda karar verebilmek için diğerlerinin ne yaptığına bakarım.	5.08	1.298	160
Aykırı düşmemek benim için önemlidir.	3.44	1.435	160
Ne yapacağımı belirlemek için çoğu kez diğerlerinin ne yaptığını dikkate alırım.	4.58	1.394	160

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Başkalarının da aynı şeyi yaptığını biliyorsam, aynı şeyi yapmaya devam ederim.	18.20	14.790	.483	.664
Sosyal çevremden birisi bir kitabın güzel olduğunu söylerse, o kitabı okumaya eğilimli olurum.	16.33	17.607	.294	.733
Yeni bir durumla karşılaştığımda karar verebilmek için diğerlerinin ne yaptığına bakarım.	16.35	15.147	.571	.631
Aykırı düşmemek benim için önemlidir.	17.99	14.717	.529	.644
Ne yapacağımı belirlemek için çoğu kez diğerlerinin ne yaptığını dikkate alırım.	16.86	15.206	.501	.656

**APPENDIX D: SCALES USED IN STUDY II: A STUDY ON USER PERCEPTION
OF MOBILE COMMERCE FOR ANDROID AND IOS DEVICE USERS**

Mobile Applications

Usefulness

1. It helped me be more effective
2. It helped me be more productive

Ease of Use (EOU)

1. It was easy to use
2. I learned to use it quickly

Fun to Use (FTU)

1. I have fun using it
2. I find using it to be enjoyable

Attitude toward Use (AT)

1. My general opinion is favorable
2. It is good for me

Information Quality (IQ)

1. Finding of applications is easy for me
2. I can find more interesting applications
3. There are many interesting applications that I haven't downloaded

Mobile Shopping Applications

Usefulness

1. It saves time
2. It creates value

Ease of Use (EOU)

1. It was easy to use

Fun to Use (FTU)

1. I have fun using it

Security

1. There is not a security problem with using

Advertisement

1. Advertisement placement is acceptable for me

Actual Use

1. I use mobile shopping applications

Intention to Use

1. I will shop via mobile phone in the future
2. I recommend mobile shopping

APPENDIX E: APPLICATION USED FOR MOBILE APPLICATION RECOMMENDATIONS IN EXPERIMENT II

The email sent and the application used in our research is given below.

Merhaba

Hem bir doktora tezine destek olmak hem de 25 TL'lik Starbucks Card kazanmak ister misiniz?

Aşağıdaki linkte ODTÜ Bilisim Sistemlerinde yürütülmekte olan bir doktora tezi kapsamında hazırlanmış bir mobil uygulama linki verilmektedir. Bu uygulamanın amacı katılımcıların cep telefonlarını ve cep telefonu uygulamalarını nasıl kullandıklarını anlamaktır.

Android işletim sistemine sahip bir cep telefonuna (LG, Samsung, Sony, HTC, Motorola gibi telefonlar) yükleyebileceğiniz bu uygulama ile sizlere mobil uygulamalar tanıtılmakta ve uygulama tanıtımlarını dikkate alarak değerlendirme yapmanız beklenmektedir. Toplamda 8 uygulama ve iki adet anket değerlendirmenize sunulacaktır. Değerlendirmenize sunulacak uygulamalar beş dakikalık aralarla bildirim olarak telefonunuza gelecek ve her bir uygulama değerlendirmesi 2-3 dakikanızı, anketler ise 4-7 dakikanızı alacaktır.

Deneği tamamladıktan sonra uygulamayı silebilirsiniz. Anket sonuçları sadece araştırma kapsamında kullanılacak ve kişiyi tanımlayıcı özel herhangi bir bilgi toplanmayacaktır. Ankete katılmak gönüllü olup katılmamaktan ötürü ya da katılımdan vazgeçme sonunda olumsuz hiçbir sonuç olmayacaktır. Ancak uygulamalar ve sonrasında sunulan 2 adet anketin tümü tamamlandıktan sonra değerlendirmelerinizin veritabanına yükleneceğini lütfen dikkate alınız.

Uygulamayı 14 Nisan 2014 tarihine kadar eksiksiz ve düzgün olarak tamamlayan 25 kişiye 25 TL değerinde Starbucks Card hediye edilecektir. Çekilişe katılmak için uygulamanın Öneri alanına size ulaşabileceğimiz bir e-mail adresinizi girerek (aşağıda ekranı verilmektedir) "Öneri Gönder" butonuna basınız. Hediye kartını kazananlar 20 nisan 2014 tarihinde random.org kullanılarak belirlenecek ve duyurulacaktır.

Çalışmaya yapacağınız değerli katkılar için şimdiden teşekkür ederiz.

Yrd. Doç. Dr. Tuğba Taskaya Temizel (ttemizel@metu.edu.tr)

Yrd. Doç. Dr. Erhan Eren (ereren@metu.edu.tr)

Perin UNAL (perinunal@gmail.com)

“Bu uygulama için aşağıdaki ifadeleri okuyarak sizi en iyi ifade eden derecelendirme seçeneğini seçiniz.”

Bu uygulama	Önemli değil	1	2	3	4	5	6	Önemli	7
Bu uygulama beni	İlgilendirmedim	1	2	3	4	5	6	İlgilendirdi	7
Yukarıdaki uygulamayı	Beğenmedim	1	2	3	4	5	5	Çok beğendim	7

Uygulamalar

Yukarıda verilen formatta değerlendirilecek uygulamalar aşağıda verilmektedir.

1) Ses Kaydedici Uygulaması

Ses Kaydedici sesleri kaydetmek için kullanılabilecek basit, eğlenceli ve kullanımı kolay bir uygulamadır. Bu uygulama ile derste anlatılanları, sesli notlarını, unutmaman gerekenleri, kutlama mesajlarını, şarkı, müzik veya görüşmelerini kolayca kaydedebilirsiniz. Yapmış olduğun kayıtları Dropbox, Google Drive gibi depolama hizmetleri ile buluta yükleyebilir ve istediğin zaman tekrar erişebilirsiniz.

En popüler uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.andrwq.recorder>

Editörün Seçimi listesinden öneri

<https://play.google.com/store/apps/details?id=com.coffeebeanventures.easyvoicerecorder>

En çok kullanılan uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.coffeebeanventures.easyvoicerecorder>

Yüklemek istemiyorum

2) Hafıza Temizleyici

Cep telefonlarında önbellek ve kalıntı dosyalar genellikle yüzlerce MB veya GB yer tutmaktadır. Hafıza Temizleyici size önbellekleri ve kalıntı dosyaları tek dokunma ile kolayca temizlemek için yardımcı olacaktır. Bu uygulama ile telefonunuzun performansını artırabilir, daha fazla RAM 'i serbest bırakarak pil ömründen tasarruf edebilirsiniz.

En popüler uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.cleanmaster.mguard&hl=en>

Editörün Seçimi listesinden öneri

<https://play.google.com/store/apps/details?id=mobi.infolife.cache&hl=en>

En çok kullanılan uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=mobi.infolife.cache&hl=en>

Yüklemek istemiyorum

3) İngilizce Türkçe Sözlük

İnternet Bağlantısı gerektirmeyen, offline kullanılabilen İngilizce-Türkçe sözlük uygulamasıdır. Telaffuz özelliği vardır. Kullanıcılar sözcüklerin sesli okunuşunu dinleyebilmektedirler.

En popüler uygulamalar listesinden öneri
<https://play.google.com/store/apps/details?id=paket.bolum2>

Editörün Seçimi listesinden öneri
<https://play.google.com/store/apps/details?id=com.recai.sozluk>

En çok kullanılan uygulamalar listesinden öneri
<https://play.google.com/store/apps/details?id=com.recai.sozluk>

Yüklemek istemiyorum

4) Bilgi Yarışması

Bu bilgi yarışmasıyla bilginizi test edebilirsiniz. Bu oyun sayesinde hem genel kültürünüzü artıracak hem de çok eğleneceksiniz. Genel Kültür, Tarih, Coğrafya, Kültür Sanat, Spor, Edebiyat, Müzik, Magazin ve Sinema kategorilerinde onbinlerce güncel soru çözmeniz için sizi bekliyor.

En popüler uygulamalar listesinden öneri
<https://play.google.com/store/apps/details?id=net.mobilecraft.bilgiyarisi>

Editörün Seçimi listesinden öneri
<https://play.google.com/store/apps/details?id=net.peakgames.Trivia>

En çok kullanılan uygulamalar listesinden öneri
<https://play.google.com/store/apps/details?id=net.peakgames.Trivia>

Yüklemek istemiyorum

5) Ücretsiz Kitaplar

Bilim kurgu, fantastik, korku, polisiye, romantik, gençlik, heyecan, klasik, şiir ve çok daha fazlasının en iyi örneklerini okumak için ücretsiz e-kitap ve hikayeler sizi bekliyor. Klasik yazarların popüler kitaplarını ücretsiz okuyabilirsiniz; Moby Dick, Alis Harikalar Diyarında, Savaş Sanatı / Sun Tzu, Gurur ve Önyargı ve daha niceisi.

En popüler uygulamalar listesinden öneri
<https://play.google.com/store/apps/details?id=wp.wattpad>

Editörün seçimi listesinden öneri
<https://play.google.com/store/apps/details?id=com.kobobooks.android>

En çok kullanılan uygulamalar listesinden öneri
<https://play.google.com/store/apps/details?id=com.kobobooks.android>

Yüklemek istemiyorum

6) Etkinlik Bul

Bu uygulama ile müzik, spor, sahne sanatları vb etkinlikler için tarih veya mekana göre filtreleme yapıp aradığın etkinliği bulabilirsin. İstedğin koltukları seçebilir, etkinlikleri istediğiniz yerden izlersiniz. Uygulamadan çıkmadan kolayca bilet satın alabilirsiniz.

En popüler uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.pozitron.biletix>

Editörün Seçimi listesinden öneri

<https://play.google.com/store/apps/details?id=com.mybilet.android16>

En çok kullanılan uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.mybilet.android16>

Yüklemek istemiyorum

7) Koşu/Yürüme

Bu uygulama ile koşu yürüme ve egzersiz süresince katledilen mesafe, süre, hız ve yakılan kalori miktarını ölçebiliyorsunuz. Uygulama adım sayma teknolojisi sayesinde egzersiz yaptığınız alana ve güzergaha dair bilgiler veriyor. Ayrıca uygulama ile Facebook, Twitter üzerinden egzersiz bilgilerinizi arkadaşlarınızla paylaşabilirsiniz.

En popüler uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.nike.plusgps>

Editörün Seçimi listesinden öneri

<https://play.google.com/store/apps/details?id=com.runtastic.android>

En çok kullanılan uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.runtastic.android>

Yüklemek istemiyorum

8) Verimlilik

Bu uygulama,, ister evde ister işte isterseniz yolda olun size, not tutma, fotoğraf çekme, yapılacaklar listesi oluşturma, sesli hatırlatıcılar kaydetme ve bu notları tamamen aranabilir hale getirme imkanı verir. Bilgisayarlardaki ve kullandığınız aygıtlardaki tüm notlarınızı senkronize eder. Verimliliğini artırmanın garantili yolu bu uygulamayı kullanmaktır.

En popüler uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.google.android.keep>

Editörün Seçimi listesinden öneri

<https://play.google.com/store/apps/details?id=com.evernote>

En çok kullanılan uygulamalar listesinden öneri

<https://play.google.com/store/apps/details?id=com.evernote>

Yüklemek istemiyorum

Uygulamaların değerlendirilmesinden sonra aşağıdaki demografi soruları ile 44 soruluk Kişilik Testi ve İkna Testi kullanıcılara sunulmaktadır.

Cinsiyetiniz

- Kadın
- Erkek

Lisans Bölümünüz

- İktisadi ve İdari Bilimler Fakültesi
- Mühendislik Fakültesi
- Fen Edebiyat Fakültesi
- Mimarlık Fakültesi
- Eğitim Fakültesi

APPENDIX F: ETHICS COMMITTEE APPROVAL FOR EMPIRICAL STUDIES

ENFORMATİK ENSTİTÜSÜ
GRADUATE SCHOOL OF INFORMATICS

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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Sayı : 59473358 / 1138-7551 13.12.2013

GÖNDERİLEN: Prof.Dr.Belgin Ayvaşık
Rektör Danışmanı

GÖNDEREN: Prof.Dr.Deniz Zeyrek Bozşahin
Enformatik Enstitüsü Müdür Yrd. *Deniz Zeyrek*

KONU: Perin Ünal

Bilişim Sistemleri Anabilim Dalı Doktora programı öğrencisi 710152 no.lu Perin Ünal'ın, 15 Aralık 2013 – 15 Ocak 2014 tarihleri arasında "MOBİL TİCARETTE İKNA PROFİLLERİ" başlıklı araştırmasına ilişkin "orü Öğrencileri, ODTÜ Mezun Grupları ve Forumlar"da uygulama yapmak için görevlendirme başvurusu incelenmiş, ilgili EABD Başkanlığı'nın görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine Etik Komite onayı koşulu ile uygun görülmüştür.

Saygılarımla,

Ek: YKK
EABD

Etik Komite Onayı

Uygundur
18.12.2013

EABD
Bilgi ve gereği ricasıyla
24/12

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

674
24/12

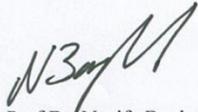
Asıllarını Teslim aldım
26.12.2013
pu

INFORMATICS
INSTITUTE

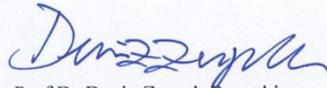
**ODTÜ
ENFORMATİK ENSTİTÜSÜ
YÖNETİM KURULU KARARI**

Toplantı Tarihi: 13.12.2013
Toplantı No: 2013/28
Karar No: 899

Enstitümüz "Bilişim Sistemleri Anabilim Dalı" Doktora Programı öğrencilerinden 710152 no.lu Perin Ünal'ın "Mobil Ticarete İkna Profilleri" başlıklı araştırmasına ilişkin 15 Aralık 2013 – 15 Ocak 2014 tarihleri arasında "ODTÜ Öğrencileri, ODTÜ Mezun Grupları ve Forumlar"da uygulama yapmak için görevlendirme başvurusu incelenmiş, ilgili EABD Başkanlığı'nın görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine karar verilmiştir.



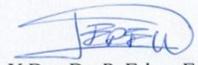
Prof.Dr. Nazife Baykal



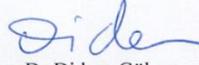
Prof.Dr.Deniz Zeyrek Bozşahin



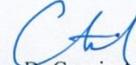
Dr.Ali Arifoğlu



Y.Doç.Dr. P. Erhan Eren



Y.Doç.Dr.Didem Gökçay



Y.Doç.Dr.Cengiz Acartürk

Orta Doğu Teknik Üniversitesi İnsan Araştırmaları

Etik Kurulu Başvuru Formu Proje Bilgi Formu

1. Çalışmanızın ayrıntılı açıklamasını, hipotezlerinizi de içerecek şekilde yazınız.

Bu çalışmanın amacı katılımcıların cep telefonlarını ve cep telefonu uygulamalarını nasıl kullandıkları ile kişilik özellikleri arasındaki ilişkiyi anlamaktır. Bu amaç doğrultusunda çalışmada cep telefonu kullanım alışkanlıkları, kullanılan uygulamalar, kullanım süreleri, sıklıkları ve kullanıcıların tutumları ile ilgili sorular sorulmaktadır. Çalışmanın ikinci bölümünde kişilerin sosyal medya kullanımı, kişilik özellikleri, teknolojiye yatkınlıkları gibi kişisel özelliklerine ilişkin sorular sorulmaktadır. Çalışmanın üçüncü ve son bölümünde ise demografik sorular yer almaktadır. Çalışmada kullanılan araştırma modelleri, bağımsız (independent variables) ve bağımlı (dependent variables) değişkenlerin şemasal gösterimi Ek'te verilmektedir.

Kişilik özelliklerinin tespiti için (Big Five Personality Traits) yöntemi (John ve Srivastava, 1999) kullanılacaktır. Literatürde kişilik özelliklerinin çıkarılmasında Büyük Beş yöntemini kullanan birçok çalışma bulunmaktadır. Kalimeri (2010) "Büyük Beş Kişilik Özellikleri" yönteminin son 50 yılda psikoloji dalında bir standart haline geldiğini söylemektedir. "Büyük Beş Kişilik Özellikleri" yönteminin 44 soruluk bir uygulaması (44-item Big-Five Inventory, BFI) ve 10 soruluk bir uygulaması (Ten Item Personality Inventory, TIPI) bulunmaktadır. TIPI uygulaması zaman ve kullanım kolaylığı açısından tercih edilmektedir. Ayrıca TIPI'nin sonuçlarının, kabul edilebilir (reliable) olduğu literatürde gösterilmektedir (Gosling et al., 2003).

Bu çalışmada kişilerin "İkna Profili" (persuasion profile)'nin tespit edilmesi için Cialdini (2001) tarafından tanımlanan sosyal etki stratejilerinden (social influence strategies) yararlanılmaktadır. Stanford üniversitesinde, B. J. Fogg tarafından 1997'den günümüze dek yürütülen çalışmalarda ise bilgisayarların kişiler üzerindeki ikna etkisi üzerinde çalışılmaktadır. Kaptein (2012) Stanford Üniversitesinde yürüttüğü doktora çalışmasında, sosyal etki stratejilerinden yola çıkarak "İkna Stratejileri"ne Yatkinlik Anketi (Susceptibility to Persuasive Strategies scale, STPS) geliştirmiştir. Bu anketin versiyonları çeşitli yayınlarda kullanılmıştır (Kaptein et al). Bu çalışmadaki ilgili sorular bu anketten alınmıştır.

"Büyük Beş Kişilik Özellikleri" ve "İkna Profili"nin yanı sıra kullanıcının Facebook sosyal paylaşım sitesini ne amaçla ve sıklıkla kullandığı sorgulanmıştır. Bu veriye kişinin dışa dönüklük, içe kapanıklık vb. özelliklerinin yansımaları beklenmektedir. Bu kapsamda sorulan sorular Alkis (2013) tarafından hazırlanan çalışmadan alınmıştır.

Bu çalışmada ayrıca kişilerin teknolojiye yatkınlık verileri sorgulanmaktadır. Bu amaçla Yang (2005) tarafından geliştirilen "İnovasyona Yatkinlik" (Innovativeness index),

“Teknolojiye Uyum” (Ownership (adoption) of Technological Innovations), “Teknoloji Bilgisi” (Knowledge of Technological Innovations) ölçekleri bu çalışmada kullanılmaktadır.

Mobil uygulamaların erişilebilirliği ve kullanım kolaylığı gibi sistem özellikleri daha önce bu kapsamda yapılmış olan çalışmalardan alınmıştır (Davis, 1993; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000).

Mobil telefon kullanım özellikleri Butt vd. (2008) tarafından geliştirilen soru setinden alınmıştır. Ortalama olarak günde ne kadar konuşma yapıldığı, mesaj atıldığı, telefon özelliklerinin kullanıldığına ilişkin soru seti kişinin kendi kullanımı hakkında bilgi verdiği bir soru setidir.

Mobil uygulamaların kullanım kolaylığı, eğlenceli oluşu ve kullanışlı oluşu ile ilgili sorular Bruner ve Kumar (2005) tarafından geliştirilen anketten alınmıştır . Mobil uygulamalarla alışverişe yönelik sorular ise Barutçu (2007)'nun çalışmalarından alınmıştır.

“Cep telefonunuza mobil uygulama indirirken aşağıdaki yöntemlerden hangilerini kullanırsınız?” ve “Yeni çıkan mobil uygulamaları genellikle nereden öğreniyorsunuz?”soruları Verkasalo (2010) dan alınmış ancak cevap şıkları araştırmacı tarafından geliştirilmiştir.

“Yeni bir mobil uygulamayı kullanmaya karar vermenizde aşağıdakilerden hangisi ne kadar etkilidir? Lütfen her bir madde için uygun olan kutuyu işaretleyin” sorusu Çelik vd (2013) tarafından geliştirilen Sosyal Medya Kullanım Anketinden alınmıştır.

Bu kapsamda sorgulanacak olan hipotezler aşağıda verilmektedir:

H1. “Büyük Beş Kişilik Özellikleri” mobil uygulamaların kullanımında ayırt edicidir.

H2. “İkna Profili” mobil uygulamaların kullanımında ayırt edicidir.

H3. Facebook kullanım özellikleri mobil uygulamaların kullanımında ayırt edicidir.

H4. İnovasyona yatkınlık uygulamaların kullanımında ayırt edicidir.

H5. Teknoloji bilgisi mobil uygulamaların kullanımında ayırt edicidir.

H6. Teknolojiye uyum mobil uygulamaların kullanımında ayırt edicidir.

H7. Yaş mobil uygulamaların kullanımında ayırt edicidir.

H8. Cinsiyet mobil uygulamaların kullanımında ayırt edicidir.

H9. Eğitim mobil uygulamaların kullanımında ayırt edicidir.

H10. Kullanım kolaylığı mobil uygulamaların kullanımında ayırt edicidir.

H11. Erişilebilirlik mobil uygulamaların kullanımında ayırt edicidir.

H12. “Büyük Beş Kişilik Özellikleri” “İkna profilinin” belirlenmesinde kullanılabilir.

H13. “Facebook kullanım özellikleri” “İkna profilinin” belirlenmesinde kullanılabilir.

H14. Mobil Uygulama kullanımı “İkna profilinin” belirlenmesinde kullanılabilir.

2. Veri toplama sürecinizi, kullanılacak, yöntem, ölçek, araç ve teknikleri de içerecek şekilde yazınız. (Araştırmada kullanılan her türlü ölçek ya da anketin bir kopyasını bu dökümanla birlikte teslim ediniz.)

Veri toplama sürecinde ekte belirtilmiş olan anket sorularından oluşacak anket uygulanacaktır. Anket öğrenci ve mezun listelerine e-posta ile gönderilecektir. Anket, survemonkey web sitesinde hazırlanarak katılımcılara sunulacaktır.

3. Çalışmanızın beklenen sonuçlarını yazınız.

Bu çalışma sonucunda kişilerin kişisel özelliklerinin mobil uygulamaların kullanımında belirleyici olduğunun ortaya çıkması beklenmektedir. Bu çalışma kapsamında kişilere ait pek çok kişilik özelliği ve davranış verileri sorgulanmakta olup bu özelliklerden yola çıkarak “ikna profillerinin (persuasion profile)” belirlenebiliyor olması öngörülmektedir. Mevcut mobil uygulama kullanım verilerinin kişilerin ileriye yönelik mobil uygulama kullanım davranışlarında belirleyici olduğunun ortaya çıkması beklenmektedir.

4. Çalışmanız, katılımcıların fiziksel ve / ve ya ruhsal sağlığını tehdit edici ya da onlar için stres kaynağı olabilecek unsurları içermekte midir? Evet ise, açıklayınız. Bu unsurların etkilerini ortadan kaldırmak ya da en aza indirmek için alınacak önlemleri açıklayınız.

Hayır

5. Çalışmanın amacının, tamamen ya da kısmen katılımcılardan saklanması söz konusu mu? Evet ise, nedenlerini açıklayınız. Bu durumun veri toplanmasının sonunda katılımcılara nasıl açıklanacağını belirtiniz.

Hayır.

6. Bu çalışmanın, alanınıza ve / ve ya topluma yapacağı olası katkıları yazınız.

Bu çalışma kişilerin “persuasion profile”ları ile mobil ortamdaki davranış ve tutumları arasındaki ilişkiyi ortaya koyacaktır. Bu konuda literatürde daha önce bir çalışma yapılmamıştır. “İkna profil”lerinin belirlenmesi mobil ortamda kişiselleştirme (personalization) için önemli bir girdi sağlayacaktır. “İkna profilleri” ve diğer kişi profil bilgileri (“Büyük Beş Kişilik Özellikleri”, “Facebook kullanım özellikleri”, demografik özellikler vd.); sosyal medya siteleri, e-ticaret siteleri ve reklam siteleri gibi çeşitli sektörlerde kullanıcıya özel arayüzlerin tasarlanmasında kullanılabilir.

Tavsiye sistemleri (recommender systems) bu bilgiden yararlanabilir. Tavsiye sistemlerinde benzer özellikler gösteren kişilerin değerlendirmeleri (seçim veya beğeni) dikkate alınır. Kişiler arasında benzerlik ilişkisinin kurulmasında “İkna profilleri” ve diğer kişi profil bilgilerinin kullanılması mümkündür ve henüz literatürde ve uygulamada bu yönde bir çalışma yoktur.

7. Daha önce yürüttüğünüz ya da yer aldığınız araştırmaların başlıkları, tarihleri ve (varsa) destek sağlayan kurumun/ kurumların adını yazınız.

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Arařtırmacının: Adı-Soyadı _____

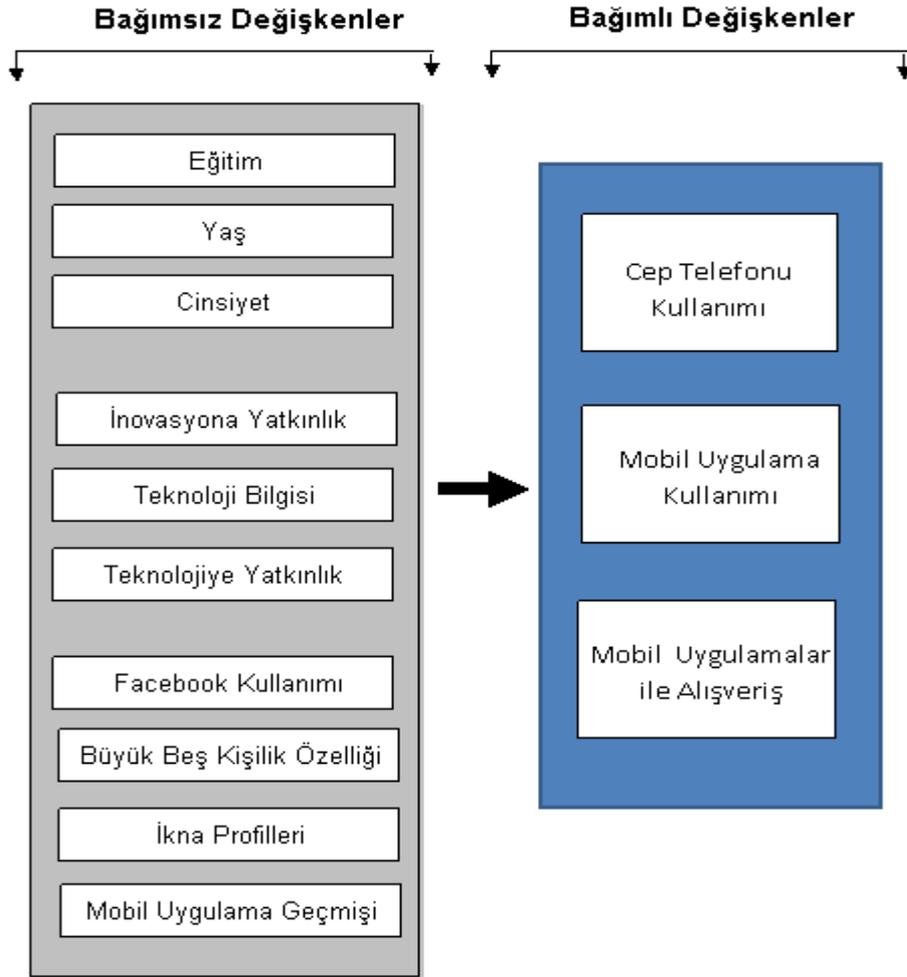
İmzası _____

Danıřmanın : Adı-Soyadı _____

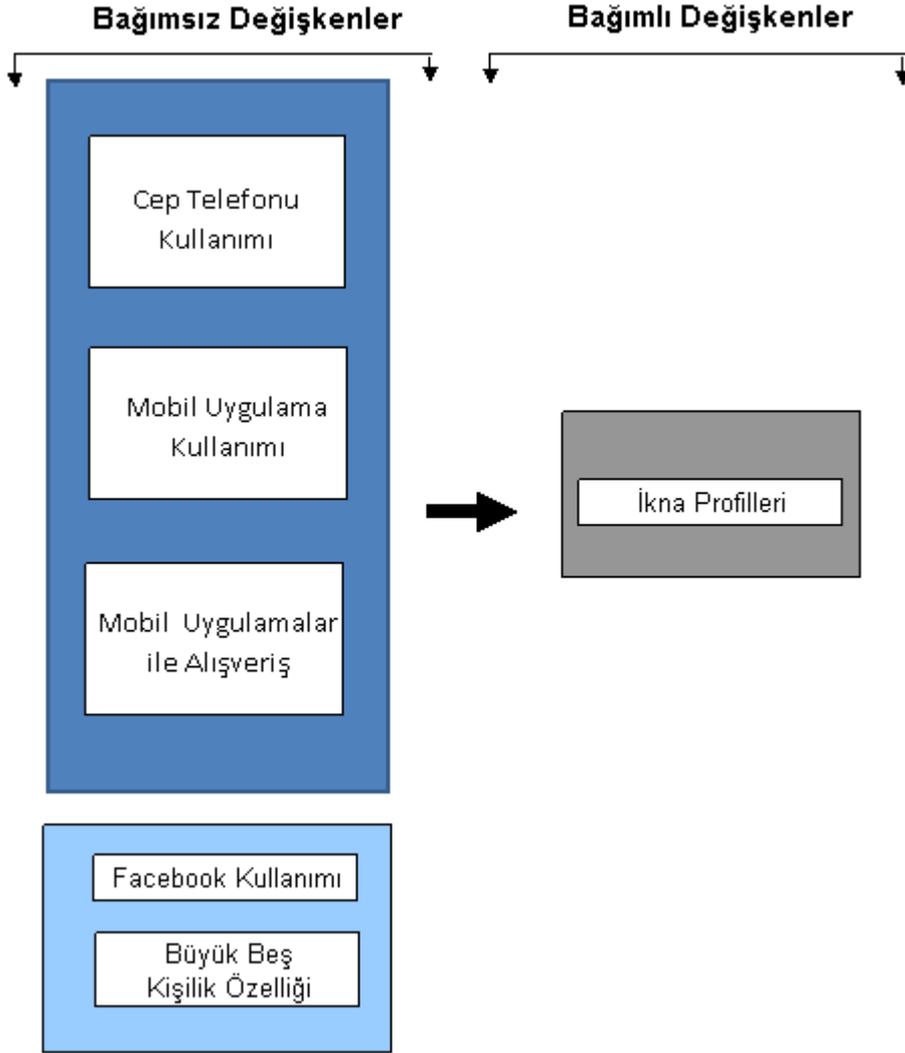
İmzası _____

Ek- Araştırma Modelleri

Şema 1. Araştırma Modeli 1



Şema 2. Araştırma Modeli 2



Anket

Merhaba,

Bu çalışma ODTÜ Bilişim Sistemleri bölümünde yürütülmekte olan bir doktora tezi kapsamında hazırlanmıştır. Çalışmanın amacı katılımcıların cep telefonlarını ve cep telefonu uygulamalarını nasıl kullandıklarını anlamaktır. Bu amaç doğrultusunda çalışmanın ilk bölümünde cep telefonu kullanım alışkanlıklarınız, kullandığınız uygulamalar, kullanım süreleri, sıklıkları ve tutumunuz ile ilgili bazı sorular sorulacaktır. Çalışmanın ikinci bölümünde sosyal medya kullanımınız, kişilik özellikleriniz ve teknolojiye yatkınlığınız ile ilgili sorular sorulacaktır. Çalışmanın üçüncü ve son bölümünde ise demografik sorular yer alacaktır.

Anketteki soruların doğru ya da yanlış cevabı yoktur, sizin için geçerli cevabı işaretlemeniz yeterlidir. Çalışmada vereceğiniz yanıtlar tamamen gizli tutulacak olup, sadece araştırmacılar tarafından değerlendirilecek ve bilimsel amaçlarla kullanılacaktır. Ankete katılmak gönüllü olup katılmamaktan ötürü ya da katılımdan vazgeçme sonunda olumsuz hiçbir sonuç olmayacaktır.

Toplamda yalnızca 10-12 dakikanızı alacak anketi doldurursanız araştırmamıza büyük katkıda bulunmuş olacaksınız. Doldurulan anket sayısı ile orantılı olarak TEMA Vakfına bağışta bulunulacaktır.

Çalışmaya yapacağınız değerli katkılar için şimdiden teşekkür ederiz.

Yrd. Doç. Dr. Tuğba Taşkaya Temizel (ttemizel@metu.rdu.tr)

Yrd. Doç. Dr. Erhan Eren (ereren@metu.edu.tr)

Perin ÜNAL (perinunal@gmail.com)

Dear All,

This is a call for participation in an online survey (in Turkish only)

Kind regards

[Gönüllü Katılım Formunu](#) okudum ve kabul ediyorum.

1. BÖLÜM Cep Telefonu Kullanım Alışkanlıkları

Cep telefonu kullanıyorsanız aşağıdaki soruları cevaplayınız. Kullanmıyorsanız 2. bölüme geçebilirsiniz.

1. Cep telefonunuzda kullanılan işletim sistemi nedir?

- Android iOS Microsoft Windows Phone Diğer

2. Cep telefonu operatörünüzü lütfen seçiniz:

- Turkcell Vodafone Avea Diğer:

3. Günlük cep telefonu kullanımınızı dikkate alarak aşağıdaki soruları cevaplayınız.

Ortalama olarak günde

	10 dakikadan az	10 – 30 dakika	31 – 60 dakika	1 – 2 saat	2 – 3 saat	3 – 5 saat	5 saatten fazla
Cep telefonunuzu ne kadar süre aktif olarak kullanıyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zamanınızın yaklaşık ne kadarını gelen aramalarla konuşarak geçiriyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zamanınızın yaklaşık ne kadarını sizin arama yaptığınız konuşmalarla geçiriyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zamanınızın yaklaşık ne kadarını gelen mesajları (SMS, Whatsapp,instagram, line, tango vb.) okuyarak geçiriyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zamanınızın yaklaşık ne kadarını mesaj (SMS, Whatsapp, instagram, line tango vb.) yazarak geçiriyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zamanınızın ne kadarını oyun oynayarak geçiriyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zamanınızın yaklaşık ne kadarını zil sesini, duvar kağıdını vb. telefon özelliklerini değiştirerek geçiriyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Günlük cep telefonu kullanımınızı dikkate alarak aşağıdaki soruları cevaplayınız.

Ortalama olarak günde

	Hiç	1 - 2	2 - 4	4 - 8	8 - 12	12 - 20	20 den fazla
Kaç defa mobil uygulamaları kullanıyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaç telefon görüşmesi yapıyorsunuz? (sizi arayanlarla)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaç telefon görüşmesi yapıyorsunuz? (sizin aradıklarınızla)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaç kişi sizi arıyor?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Siz kaç kişiyi arıyorsunuz?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Sizin arama yaptığınız telefon görüşmelerinin yüzde kaçını iş/okul/ders amaçlı görüşmelerdir? %

6. Size gelen telefon görüşmelerinin yüzde kaçını görüşmek istediğiniz kişilerden gelmektedir? %

7. Cep telefonlarının yeni özellikleri ile ilgili misiniz?

Evet Hayır

8. Cep telefonunuza mobil uygulamalar yükler misiniz?

Evet, sık sık Evet, bazen Hayır

9. Cep telefonunuza mobil uygulama indirirken aşağıdaki yöntemlerden hangilerini kullanırsınız?

(Birden fazla seçeneği işaretleyebilirsiniz)

Mobil Uygulama Satıcılarından (App Stores, Google Play, Android Market vb.)

Bilgisayar web tarayıcısından cep telefonuna indirerek

- Cep telefonu web tarayısından cep telefonuna indirerek
- USB veya Bluetooth ile
- QR code ile
- Diğer

10. Yeni çıkan mobil uygulamaları genellikle nereden öğreniyorsunuz?

(Birden fazla seçeneği işaretleyebilirsiniz)

- Arkadaş/ Yakın Tavsiyesi
- Önerilenler (App Store, web siteleri vb.)
- En Çok Satanlar (App Store, web siteleri vb.)
- En Çok Beğenilenler (App Store, web siteleri vb.)
- Mashable, TechCrunch, Chip gibi sektör uzmanlarının tavsiyeleri
- Yeni Çıkanlar (App Store, web siteleri vb.)
- Trend Olanlar (App Store, web siteleri vb.)
- Editörün Seçimi (App Store, web siteleri vb.)

11. Yeni bir mobil uygulamayı kullanmaya karar vermenizde aşağıdakilerden hangisi ne kadar etkilidir

	Çok önemli	Önemli	Önemsiz	Tamamen önemsiz
Popüler olması	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kullanışlı olması	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arkadaşlarımın da o platformu kullanması	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sunduğu güvenlik ve gizlilik seçenekleri	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Merak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Mobil uygulamalar ile ilgili aşağıda verilen yargılara katılıp katılmadığınızı belirtiniz.

	Tamamen Katılıyorum	Katılıyorum	Biraz Katılıyorum	Kararsızım	Pek Katılmıyorum	Katılmıyorum	Hiç Katılmıyorum
	1	2	3	4	5	6	7
Mobil Uygulamalar							
Daha verimli olmamı sağladı.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Daha üretken olmamı sağladı.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kullanırken eğlenmemi sağladı.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kullanımı zevklidir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Kullanımı kolaydır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kullanımı hızlıca öğrenilebilir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kullanımı benim için iyidir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hakkında genel görüşüm olumludur.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
İstediğim mobil uygulamalara kolaylıkla ulaşabilirim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yüklemek benim için kolaydır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Çok fazla seçenek içinden bana uygun mobil uygulamaları rahatlıkla seçebiliyorum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Henüz yüklediğim ilgimi çeken pek çok mobil uygulama var.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobil uygulamalarla							
Alışveriş yapıyorum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş yapmak kolaydır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş yapmak zaman kazandırıcıdır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş yapmak daha ekonomiktir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş yapmak daha eğlencelidir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş yapmak güvenlik sorunu yaratmaz.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş yapmayı tavsiye ederim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
İleride alışveriş yapmayı düşünüyorum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reklama yer verilmesi benim için uygundur	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
İndirim kuponlarına yer verilmesi benim için uygundur.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Aşağıda verilen mobil uygulama kategorilerini hangi sıklıkla kullanıyorsunuz?

	Günde bir çok kez	Günde bir-iki kez	Haftada birkaç kez	Ayda birkaç kez	Hiç Kullanmıyorum
	1	2	3	4	5
İletişim (Skype, Tango vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mesajlaşma (Whatsapp, Viber vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-posta (Gmail vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video (Youtube, Vimeo, Vine vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fotoğraf (Flickr, Instagram vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Müzik (LastFm, Tunein vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yer İmi (bookmark) (Pinterest, Delicious, Reddit vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bloglar (Tumblr, Blogger vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verimlilik (Evernote, calendar vd)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Web Tarayıcılar (Opera, Safari vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yardımcı Programlar (Lock, Torch .vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arama Servisleri (Google, Yandex vb.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hava Durumu (Weather vd)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haberler (Milliyet, CNN vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oyunlar (Bulmacalar, Aksiyon, Strateji Oyunları vb.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finans (Borsa, Döviz vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alışveriş (Gittigidiyor, Yemek Sepeti vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Seyahat (Haritalar, Navigasyon vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kişisel Hayat (Burçlar, egzersiz vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kitap ve Referanslar (eBook, Sözlük vd.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sosyal Medya					
Facebook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google +	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LinkedIn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. BÖLÜM Teknolojiye Yatkınlık, Sosyal Medya Kullanımı, Kişilik Özellikleri

1. Aşağıda birçok kişilik özelliği bulunmaktadır. İfadelerin sizi tanımlama düzeyini dikkate alarak, her bir ifadeye katılıp katılmadığınızı belirtmek için 1 ile 7 arasında oylayınız.

“Kendimi olarak görürüm.”

	Tamamen Katılıyorum	Katılıyorum	Biraz Katılıyorum	Kararsızım	Pek Katılmıyorum	Katılmıyorum	Hiç Katılmıyorum
	1	2	3	4	5	6	7
Dışa dönük, istekli	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eleştirel, tartışmayı seven (Kavgacı, sürekli kişileri eleştiren)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Güvenilir, öz-disiplinli (Sorumluluk sahibi)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaygılı (Endişeli), kolaylıkla hayal kırıklığına uğrayan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Yeni deneyimlere açık, karmaşık	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Çekingen, sessiz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sempatik, sıcak (İnsanlara yardımcı olmayı seven)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Düzensiz, dikkatsiz (Kolaylıkla dikkati dağılan)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sakin, duygusal olarak dengeli (Sorunlar karşısında soğukkanlı, stresle başa çıkabilen)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Geleneksel, yaratıcı olmayan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Aşağıda verilen İfadeleri okuyarak, her bir ifadeye katılıp katılmadığınızı belirtmek için 1 ile 7 arasında oylayınız.

	Tamamen Katılıyorum	Katılıyorum	Biraz Katılıyorum	Kararsızım	Pek Katılmıyorum	Katılmıyorum	Hiç Katılmıyorum
	1	2	3	4	5	6	7
İşlerin nasıl yürüdüğünü merak ederim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aynı şeyleri farklı yöntemlerle yapabileceğim yollar bulmaya çalışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Şansımı kullanmayı tercih ederim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yeni şeyler denemeye cesareti olan insanları desteklerim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yeni ürünlerle ilgili bilgileri öğrenmeye çalışırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Aşağıda verilen İfadeleri okuyarak, her bir ifadeye katılıp katılmadığınızı belirtmek için 1 ile 7 arasında oylayınız.

	Tamamen Katılıyorum	Katılıyorum	Biraz Katılıyorum	Kararsızım	Pek Katılmıyorum	Katılmıyorum	Hiç Katılmıyorum
	1	2	3	4	5	6	7
Zor elde edilen ürünler özel bir değer taşır.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Az bulunan ürünlerin harcı alem ürünlere göre daha değerli olduğuna inanıyorum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
İstediğim bir ürünü alabilen son insan olmak beni mutlu eder.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doktorumun tavsiyelerine kesinlikle uyarım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Otoritelerin ve konunun uzmanlarının görüşlerine çok değer veririm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Üstlerimin verdiği talimatlara her zaman uyarım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Otoritelerin ve konunun uzmanlarının görüşlerini arkadaşlarımla görüşlerinden daha çok dikkate alırım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Başkalarının da aynı şeyi yaptığını biliyorsam, aynı şeyi yapmaya devam ederim.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sosyal çevremden birisi bir kitabın güzel olduğunu söylerse, o kitabı okumaya eğilimli olurum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Yeni bir durumla karşılaştığımda karar verebilmek için diğerlerinin ne yaptığını bakarım.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aykırı düşmemek benim için önemlidir.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diğerleri tarafından beğenilen ürünleri genellikle beğenmem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ne yapacağımı belirlemek için çoğu kez	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

diğerlerinin ne yaptığını dikkate alırım.

4. Facebook'u ne amaçla ve ne kadar sıklıkla kullanıyorsunuz?

	Sık Sık	Ara sıra	Nadiren	Hiçbir zaman
İletişim kurma	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fotoğraflar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eğlence (oyun veya uygulamalar)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Etkinlikler-davetler	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gruplar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mesajlar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zaman tüneli duvarında paylaşım (durum güncellemeleri ve diğer içeriklerin paylaşımı)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sohbet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
İnsanları daha iyi tanıma (profillere bakarak)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
İletişim bilgilerini edinme (e-posta, telefon numarası gibi)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Profil düzenleme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Yaklaşık olarak Facebook'taki arkadaş listenizde kaç kişi var?

6. Aşağıda verilen ürünlerin kullanımına ilişkin soruları cevaplayınız.

	Kullanabilirim	Sahibim	Sahipseniz, kaç yıldır sahipsiniz?
Bilgisayar	<input type="checkbox"/>	<input type="checkbox"/>	
Cep Telefonu	<input type="checkbox"/>	<input type="checkbox"/>	
Yazıcı (printer vd.)	<input type="checkbox"/>	<input type="checkbox"/>	
Tablet (İpad vd.)	<input type="checkbox"/>	<input type="checkbox"/>	
Oyun Konsolu (Xbox 360, playstation vd.)	<input type="checkbox"/>	<input type="checkbox"/>	
İnternet TV (Smart TV vd.)	<input type="checkbox"/>	<input type="checkbox"/>	
E-kitap Okuyucu (Kindle vd.)	<input type="checkbox"/>	<input type="checkbox"/>	
Taşınabilir Müzik Çalar (İpod, mp3 vd.)	<input type="checkbox"/>	<input type="checkbox"/>	
DVD Player	<input type="checkbox"/>	<input type="checkbox"/>	

3. BÖLÜM Kişisel Bilgiler

Anketin bu son bölümünde sizden bazı kişisel bilgileriniz istenilecektir. Lütfen tüm soruları cevaplayınız.

1. Cinsiyetiniz : Kadın Erkek

2. Yaşınız :

3. Eğitim durumunuz :

Lise Mezunu Üniversite Mezunu MSc/PhD Mezunu

Lisans Öğrencisi MSc/PhD Öğrencisi Diğer

4. Lisans Bölümünüz (Lisans/ MSc/PhD öğrencileri ve mezunları tarafından doldurulacaktır):

İktisadi ve İdari Bilimler Fakültesi Mühendislik Fakültesi

Mimarlık Fakültesi Fen Edebiyat Fakültesi

Eğitim Fakültesi

5. Öğrenci No:

Anketi tamamladığınız için teşekkür ederiz!

**APPENDIX G: DESCRIPTIVE STATISTICS AND NORMALITY TESTS FOR
EXPERIMENT II**

Table 30: Descriptive Statistics for Application Categories

Descriptive Statistics							
	N	Min	Max	Mean	Std. Dev.	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std.Error
Alışveriş	158	0	6	.98	1.439	1.659	.193
Araçlar	158	0	27	5.03	4.518	2.253	.193
Canlı Duvar Kağıdı	158	0	0	.00	.000	.	.
Eğitim	158	0	13	1.74	2.300	2.184	.193
Eğlence	158	0	13	1.99	2.084	1.526	.193
Finans	158	0	7	1.37	1.393	1.109	.193
Fotoğrafçılık	158	0	12	1.34	1.996	2.570	.193
Haberler ve Dergiler	158	0	7	.94	1.446	1.802	.193
Haberleşme	158	0	12	3.65	2.266	1.333	.193
Hava Durumu	158	0	2	.24	.485	1.883	.193
İş	158	0	12	1.14	1.491	2.959	.193
Karikatür	158	0	1	.06	.233	3.860	.193
Kişiselleştirme	158	0	11	.95	1.700	3.178	.193
Kitaplar ve Referans	158	0	9	1.84	1.832	1.502	.193
Kitaplıklar ve Kısa Sunum	158	0	3	.11	.367	4.426	.193
Medya ve Video	158	0	8	1.02	1.421	2.193	.193
Müzik ve Ses	158	0	19	2.30	2.219	3.264	.193
Sağlık ve Fitness	158	0	15	1.00	1.727	4.242	.193
Seyahat ve Yerel	157	0	14	1.66	2.212	2.826	.194
Sosyal	158	0	11	3.51	2.307	.733	.193
Spor	158	0	7	.72	1.281	2.229	.193
Tıp	158	0	10	.13	.838	10.669	.193
Ulaşım	158	0	5	.80	1.000	1.334	.193
Verimlilik	158	0	21	3.45	3.053	1.703	.193
Widget'lar	158	0	0	.00	.000	.	.
Yaşam Tarzı	158	0	9	.56	1.137	3.953	.193
Oyun Toplam	158	0	21	4.65	4.393	1.350	.193

Table 31: Tests of Normality for Application Categories

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Alışveriş	.299	157	.000	.716	157	.000
Araçlar	.203	157	.000	.803	157	.000
Eğitim	.274	157	.000	.727	157	.000
Eğlence	.202	157	.000	.835	157	.000
Finans	.189	157	.000	.852	157	.000
Fotoğrafçılık	.269	157	.000	.680	157	.000
Haberler ve Dergiler	.320	157	.000	.692	157	.000
Haberleşme	.218	157	.000	.878	157	.000
Hava Durumu	.474	157	.000	.531	157	.000
İş	.249	157	.000	.706	157	.000
Karikatür	.540	157	.000	.227	157	.000
Kişiselleştirme	.291	157	.000	.585	157	.000
Kitaplar ve Referans	.213	157	.000	.831	157	.000
Kitaplıklar ve Kısa Sunum	.522	157	.000	.302	157	.000
Medya ve Video	.265	157	.000	.726	157	.000
Müzik ve Ses	.231	157	.000	.732	157	.000
Sağlık ve Fitness	.295	157	.000	.567	157	.000
Seyahat ve Yerel	.241	157	.000	.700	157	.000
Sosyal	.162	157	.000	.943	157	.000
Spor	.364	157	.000	.632	157	.000
Tıp	.497	157	.000	.133	157	.000
Ulaşım	.287	157	.000	.773	157	.000
Verimlilik	.146	157	.000	.861	157	.000
Yaşam Tarzı	.373	157	.000	.603	157	.000
Oyun Toplam	.157	157	.000	.871	157	.000

APPENDIX H: CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Ünal, Perin
Nationality: Turkish (TC)
Marital Status: Married
Phone: +90 532 4155783
email: perinunal@gmail.com

EDUCATION

Degree	Institution	Year of Graduation
PhD	METU Information Systems	2015
Visiting PhD	University of Texas at Houston	2015
Certificate	MIT System Engineering Programme	2014
MS	METU Economics	1995
BS	Bilkent University Industrial Engineering	1991
High School	Kdz. Ereğli Anatolian High School	1987

WORK EXPERIENCE

Year	Place	Enrollment
2015-	Teknopar	Vice President
2015-	EC HORIZON 2020	Project Evaluation Expert
2015-	EC EUREKA/Eurostars	Project Evaluation Expert
2015-	Innovation Fund Denmark	Project Evaluation Expert
2014-2015	Aselsan ICT Division	IT Program Manager
2009-2014	Aselsan ICT Division	R&D Center Coordinator
2006-2014	Aselsan ICT Division	IS, Planning & FA Manager
2013-2014	Turkish Ministry of Science, Technology and Industry	Mentor for Start-ups
2014-2014	Turkish Ministry of Science, Technology and Industry	Productivity Awards Committee Member
2014-2014	Turkish Ministry of Science, Technology and Industry	Project Evaluation Expert
2007-2009	Aselsan ICT Division	FP7 ICT Contact Point
2003-2009	Aselsan ICT Division	SAP Project Leader
2000-2003	Aselsan ICT Division	MIS Manager
1996-2000	Aselsan	Quality Vice Manager
1991-1996	Aselsan	ERP Project Coordinator

FOREIGN LANGUAGES

Advanced English

PUBLICATIONS

1. Thesis

1. P.Unal, Economic Impact of Military Expenditures, MSc Thesis, METU, 1995

2. Journal Articles

2. P. Unal, S. Kucukozer-Cavdar, T. Taskaya-Temizel, P.E. Eren & M.S. Iyengar “Exploring Behavior Change Features in Physical Activity Related Mobile Applications”, International Journal of Medical Informatics, 2015 (SCI journal, submitted)
3. P.Unal, T.Taskaya-Temizel, P.E.Eren, “The Impact of Individual Differences on the Use of Mobile Phones and Applications: Extraversion versus Innovativeness”, Telematics and Informatics, 2015 (SCI journal, to be submitted)
4. P.Unal, T.Taskaya-Temizel, P.E.Eren, “Individual differences in user perception and download behavior for mobile application recommendations”, International Journal of Medical Informatics, 2015 (SCI journal, to be submitted)

3. Conference Papers

5. P.Unal, Boynukisa, B., “Quality Matters in Colaboration of industrial and educational institutions: model of ASELSAN”, IVETA Conference, 1998
6. P.Unal, Quality System in ASELSAN, European Organization for Quality (EOQ) Conference,1998
7. P.Unal, “Causality Relationship Between R&D Expenditures and Economic Growth: Empirical Study for Turkey”, 13th Annual ENBIS Conference, 2013
8. P.Unal, T.Taskaya-Temizel, P.E.Eren, “An Exploratory Study on the Outcomes of Influence Strategies in Mobile Application Recommendations”, accepted in 2nd International Workshop on Behaviour Change Support Systems, 9th International Conference on Persuasive Technology, 2014, Padova, Italy
9. P.Unal, T.Taskaya-Temizel, P.E.Eren, “A study on user perception of mobile commerce for android and ios device users, accepted in 12th International Conference on Mobile Web and Intelligent Information Systems, MOBIWIS, 2015, Rome, Italy
10. P.Unal, S. Kucukozer-Cavdar, T.Taskaya-Temizel, P.E.Eren, “Effects of Behavior Change Features on Ratings and Number of Downloads for Workout Applications”, 2015 (manuscript to be submitted)

HONOURS AND AWARDS

- METU Most Successful PhD Student Award 2009-2010
- First in Degree in High School and Secondary School
- Honoured with Full Scholarship at Bilkent University
- High Honour for MSc and PhD degrees, honour degree for BSc
- Project Management Professional, PMP

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü

Sosyal Bilimler Enstitüsü

Uygulamalı Matematik Enstitüsü

Enformatik Enstitüsü

Deniz Bilimleri Enstitüsü

YAZARIN

Soyadı : TÜZÜN
Adı : ERAY
Bölümü : BİLİŞİM SİSTEMLERİ

TEZİN ADI (İngilizce): AN ANALYSIS ON USER PROFILES AND
USAGE PREFERENCES FOR MOBILE
APPLICATION RECOMMENDATIONS

TEZİN TÜRÜ : Yüksek Lisans 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.

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: