

**T.C.
MARMARA ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
İNGİLİZCE İŞLETME ANABİLİM DALI
İNGİLİZCE YÖNETİM VE ORGANİZASYON BİLİM DALI**

ADOPTION OF MOBILE COMMERCE SERVICES IN TURKEY

Yüksek Lisans Tezi

JYLDYZA SYDYKOVA

İstanbul, 2008

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İstanbul, 2008

Marmara Üniversitesi
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ÖZET

MOBİL TİCARET HİZMETLERİNİN TÜRKİYE’DE KABULLENİLMESİ

Kablosuz iletişim teknolojilerindeki gelişmeler, mobil iletişim araçları kullanıcı sayısını artırmış ve mobil hizmetlerin gelişimini daha da hızlandırmıştır. Ancak bu günlerde çok sayıda firma mobil teknolojilerin yarattığı yeni iş imkânlarından faydalanmak üzere büyük yatırımlar yapmasına rağmen, mobil ticaret üzerine yapılan araştırmalar, potansiyel kullanıcıların bu hizmetlere alışmalarındaki zorluğu ortaya çıkarmıştır. Bu nedenle, kullanıcıların mobil ticaret kullanımına eğilimlerini etkileyen faktörleri belirlemek üzere bir araştırma yapma gereği doğmuştur. Kullanıcıların, bilgi sistemlerini kolaylıkla içselleştirip, istekli şekilde kullanımlarının analizini yapan Teknoloji Kabullenme Modeli (TAM) hakkında önemli araştırmalar yapılmış olsa da bu modelin bir takım sınırlılıkları vardır. Bu sebeple, bu model kullanışlılık, kullanım kolaylığı, ücret seviyesi, Teknolojiye Hazırlık Göstergeleri (TRI), güvenilirlik ve kişisel gizlilik gibi başka faktörler eklenerek geliştirilmiştir.

Teknoloji Kabullenme Modeli üzerine yapılan literatür araştırmasına dayanarak bu tez Türk tüketicilerin mobil ticaret hizmetlerinden yararlanmaya ne kadar hazır olduklarını araştırmaktadır. Bu çalışmayı destekleyen veriler Türkiye’de toplanmış, 227 katılımcı bu çalışmanın örneklemini oluşturmuştur.

Bulgulara göre, mobil ticarete karşı olan tutum, mobil ticaret hizmetleri kullanım eğilimini belirlemede kuvvetli etmen olarak görünmektedir. Araştırmaya göre ayrıca algılanan kullanışlılık seviyesinin, tutum ve eğilimi doğru orantılı olarak etkilediği görülmüştür. Dahası, bulgular, algılanan kullanım kolaylığının, mobil ticaret

hizmetlerinin kullanılmasına karşı tutum ve algılanan kullanılabilirlik üzerinde az seviyede olumlu bir etkisi olduğunu göstermiştir.

Sonuçlar aynı zamanda kullanılabilirlik, kullanım kolaylığı, ücret seviyesi, güvenilirlik ve kişisel gizlilik gibi mobil ticareti etkileyen faktörlerin, kullanıma karşı tutum ve davranışsal eğilim değişkenlerinin, Teknolojiye Hazırlık Göstergelerinden (TRI) daha iyi tahminler verdiğini göstermektedir.

Teknolojiye hazırlık göstergelerine (TRI) göre, katılımcılar dört ana gruba ayrılmıştır; araştırmacılar (%16), öncüler (%12), kuşkuscular (%48) ve teknoloji tembelleri (%23). Sonuç olarak bulgular bize mobil ticaret hizmetlerinin ilk olarak araştırmacılar, ardından öncüler, kuşkuscular ve son olarak da tembeller tarafından alışkanlık haline getirileceğini göstermiştir.

Cinsiyet, gelir düzeyi ve eğitim seviyesi farklılıkları da araştırmaya dahil edilmiştir. Sonuçlar, yüksek eğitim seviyeli ve yüksek gelirli kullanıcıların güvenlik konusuna diğer gruplardan daha fazla önem verdiklerini göstermiştir. Dahası sonuçlar, yaş gruplarının rahatsızlık, güvenlik ve yaratıcılık konularında da farklılık gösterdiğini kanıtlamıştır. Şaşırtıcı şekilde, Türkiye'deki bayanların, erkeklerden daha yaratıcı teknoloji kullanıcıları oldukları anlaşılmıştır.

Buna karşın, kişisel mahremiyet, fiyat seviyesi ve güvenliğin, mobil ticaret hizmetlerinin kullanımına karşı tutum ve davranışsal eğilimler üzerinde olumlu etkisi vardır ve bu faktörler başka bir araştırma konusu olarak önerilmiştir. Bulgular ve yönetimsel etkileri de tartışılmıştır.

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ABSTRACT

ADOPTION OF MOBILE COMMERCE SERVICES IN TURKEY

Advances in wireless technology have increased the number of people using mobile devices and enlarged the fast development of mobile service conducted with these devices. However, although many companies are today making significant investments to take advantage of the new business possibilities offered by wireless technology, research on mobile commerce suggests potential consumers may not adapt to these mobile services despite of their availability. Therefore, there is a need for research to identify the factors that affect consumer intention to use mobile services.

While there has been important research on the technology acceptance model (TAM) that predicts whether individuals will accept and voluntarily use information systems, limitation of this model includes omission of important constructs. Therefore, TAM has been modified by adding additional factors (such as: price level, mobile phone efficacy, perceived credibility, system quality and content quality, and technology readiness index) into the model. Based on the literature review related to the technology acceptance model this thesis explores how consumers in Turkey are influenced to adopt the mobile commerce services and their readiness.

Research was conducted in Turkey. A total of 227 respondents comprise the sample for this study. The findings suggest that attitude toward using mobile commerce is significant factor in predicting the behavioural intention to use mobile commerce services. The study also identifies positive impact of perceived usefulness in developing the attitude as well as intention. Furthermore, findings indicate that there is a low, but

positive impact of perceived ease of use in developing the attitude toward using m-commerce as well as perceived usefulness.

The results also show that mobile commerce constructs (such as: usefulness, ease of use, price level, security and privacy) are the best predictors of attitude towards use and behavioural intention to use, than TRI constructs.

Based on TRI respondents were classified into four categories, explorers (16%), pioneers (12%), sceptics (48%), and technology laggards (23%). Overall, the findings reveal that first mobile commerce will be adopted by explorers then by pioneers, sceptics and finally by laggards

Gender, income level, and education level differences were also highlighted. The results show that consumers with high education level and high income level are more concerned about security issue than other consumer groups. Moreover results reveal that age groups differ in terms of discomfort, security and innovativeness. Surprisingly, females in Turkey appeared to be more technology innovative than male.

On contrary, privacy, price level and security have positive impact on attitude towards use and behavioural intention to use mobile commerce services; therefore these constructs were suggested for further research. The findings and managerial implications were also discussed.

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LIST OF ABBREVIATIONS

TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TRI	Technology Readiness Index
SMS	Short Messaging Services
MMS	Multimedia Messaging Services
GSM	Global System for Mobile Communications
3G	Third Generation of Mobile phone Standards and Technology

1 INTRODUCTION

To give a broad categorizing of the advances in computing, many experts classify the 1980s as the decade of the PCs, the 1990s as the decade of mobile computing and mobile commerce.

A mobile service, or electronic service using mobile devices and wireless telecommunication networks, has become a popular topic in marketing and information field. Siau et al, (2001) defined “mobile services” as services that provide values which are not available to traditional wired electronic commerce such as ubiquity, personalization, flexibility and dissemination

Many researchers and research companies believe the demand for mobile commerce will grow over the next few years. Ankar and D’Incau, (2002) stated that success of mobile services can not be measured by the high penetration or popularity of mobile devices, just as the popularity of electronic commerce can not be measured by the popularity of computers, as has been proven.

In the global market, there is a high competition among the organizations to attract customers. Because of high consumer expectations, sales cycle and time to make decisions are becoming more limited than ever. However, the relationship between business tactics and the value potentiality provided by mobile technology has not been fully understood either by mobile phone operators, or by researchers. Primary to this understanding is perception of the factors influencing consumer intention to use mobile commerce systems.

Despite of the telecommunication firms’ developments, surveys and wide range of mobile service itself, these services were ignored or underused by consumers mostly everywhere.

Thus, this study intends to understand the acceptance of mobile commerce from the consumer perspectives, by identifying main factors that are able to predict intention to use mobile services.

For this purpose, TAM (technology acceptance model) has been employed as the base model for the study and has been modified to reflect the Mobile Commerce context. TAM is often considered as the main research stream of exploring determinants of the behaviour of accepting and using information systems in the last two decades. In addition to TAM other factors such as Credibility, System and Content quality, Mobile Phone Efficacy, Price and Technology Readiness Index were incorporated. In the coming section mobile commerce, global, European and Turkish mobile commerce markets will be discussed. Then models related to technology adoption will be introduced.

2 MOBILE COMMERCE

Even though mobile commerce is a new research field there are already many different definitions for the main terms related to this field. The following section outlines these definitions.

“M-commerce can be a transaction that takes place via wireless internet-enabled technology (through handheld computers, cellular phones, personal digital assistants (PDAs), or palmtop computers) and that allows for freedom of movement for the end user. Wireless Fidelity (Wi-Fi), the transmission of short-ranged radio signals between a fixed-based station and an end-user’s mobile device, is the driving technology that simplifies m-commerce”. (Wireless Computing, 2003).

Kini and Thanarathi (2004) defined mobile commerce as, “a subfield of e-commerce, conducted through mobile devices using wireless telecommunications network is poised to change the market place globally”.

Camponovo and Pigneur, (2003) defined as, "any transaction with a monetary value that is conducted via mobile telecommunication network".

Turban et al., (2004) defined m-commerce as a monetary transaction for goods and services conducted by a mobile device, an operating system specific to mobile devices, and a mobile-dedicated network.

M-commerce can be described as “natural extensions of classical PC-based e-commerce into the wireless and mobile arenas. However there have been modest disagreements in the definition of m-commerce and its difference from classic e-commerce” (May, 2002). Since electronic data transmission is the base in e-commerce and m-commerce transactions, m-commerce can be defined as a mobile branch of e-commerce.

The literature review and discussion above shows that researchers hold different understanding about the mobile commerce concept. However, in this thesis, m-commerce refers to a monetary transaction for goods and services conducted via

wireless internet-enabled technologies, such as wireless network, mobile devices, and operating systems specific to mobile devices.

3 MOBILE COMMERCE MARKET

According to a recent study from Juniper Research, the global m-commerce market will be a US\$88 billion industry by 2009 (See Table 1). Juniper believes that digital goods such as mobile entertainment - ring tones, games, wallpaper, gambling etc - will continue to be the largest application for buying and selling via mobile phone, but that ticket purchases will also emerge as a major application area by 2007, and make up over 44% of the \$88 billion global m-commerce market (<http://www.gsmworld.com>).

Such growth is likely to be driven by the fact that there are now more mobile phones in use than wire line PCs, as well as the availability of 3G SMS with faster access speeds and more transaction-friendly terminals.

Table 1: Global m-Commerce Revenue Projections For 2009

Category	Value (USD)
Global revenues	88 billion
Ticket purchases	39 billion
Phone-based retail POS sales	299 million

Source: Juniper Research, August 2004(<http://www.gsmworld.com/services/mcommerce.shtml>)

As reflected in the Figure 1, on a global level the basic services like SMS and voice are the most commonly used services, while entertainment functions are aspiring. On a total level of usage, calendar function and camera function are the next most used functions after voice and SMS. As the result of Ericsson survey downloading the ring tones, browsing the internet and use search engine were registered as a non optimized services. A non optimized mobile website was noted as a barrier for the adoption of those services.

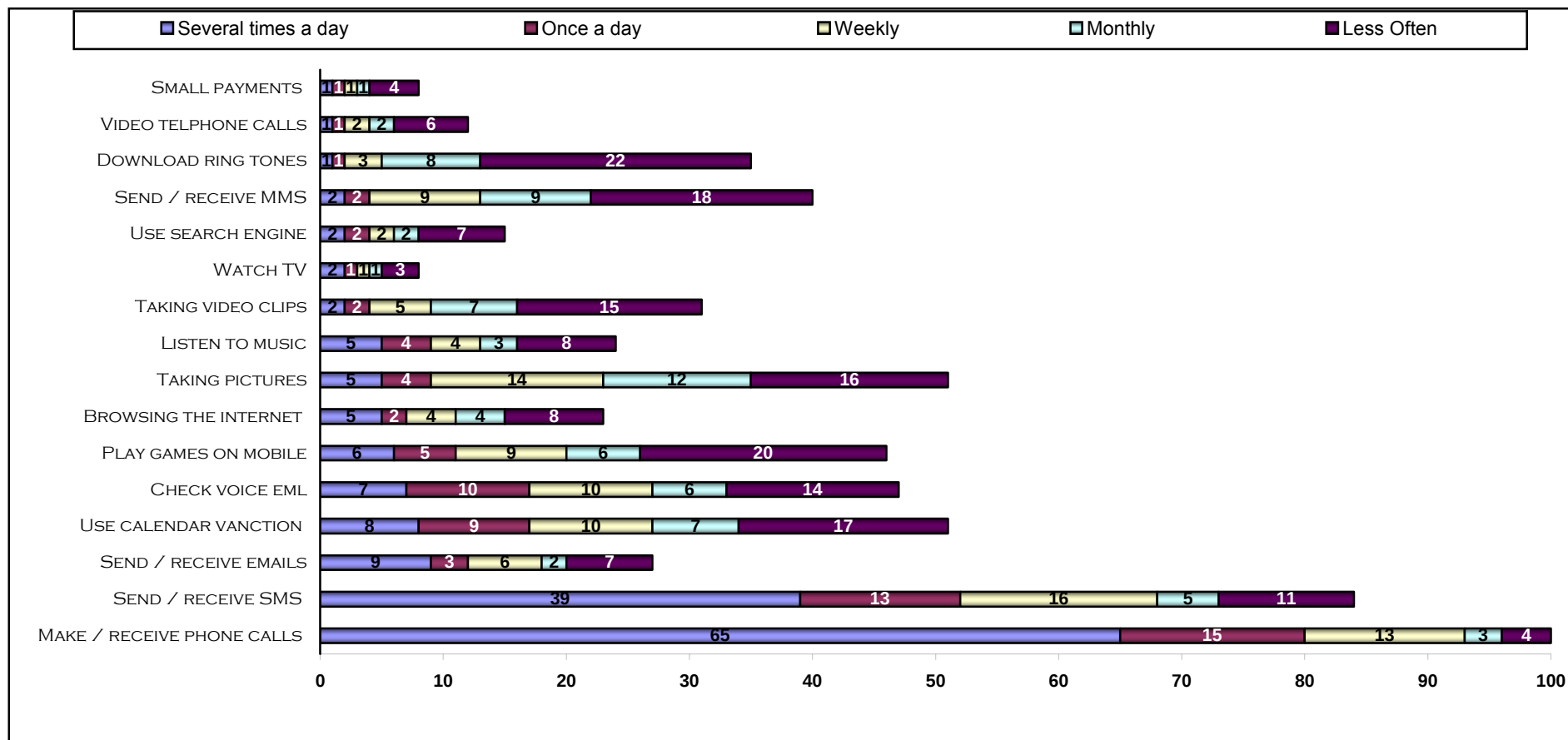


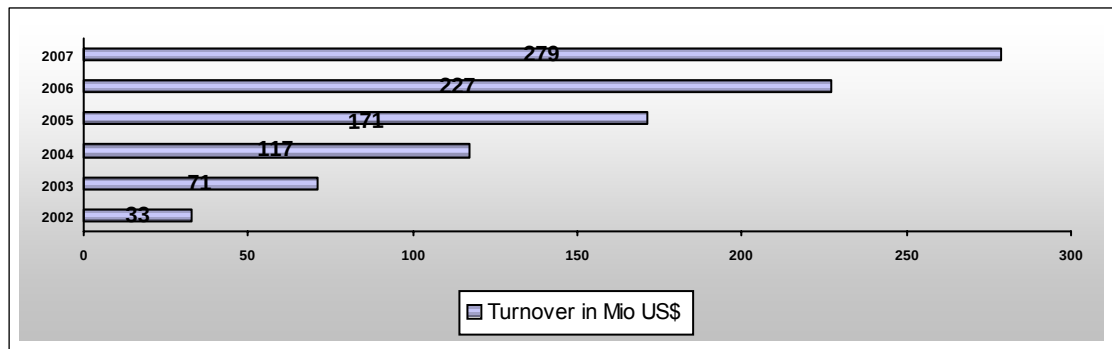
Figure 1: Mobile Phone Usage

Source: Global Infocom Study 2007. Ericsson Consumer Lab

3.1 Mobile Commerce Market in Europe

Figure 2 predicts the estimated turnover for mobile content in Europe (including Eastern Europe) from 2002 to 2007.

Figure 2: Turnover with Mobile Commerce in Europe



Source : Graumann S., Köhne B., Kahre S., 'Monitoring Informationswirtschaft –6.Faktenbericht 2003', Report, March 2003

The largest market in Europe is Germany, with a share of 25.6%. In comparison, the smallest market is Belgium, with 2.9% of Europe's revenues.

There are over 540 million GSM subscribers in Europe, plus another 18 million Europeans using 3GSM networks. Market penetration across GSM and 3GSM networks in Europe is 85%, with 15 countries having penetration figures of over 100%, and only 8 with less than 60%.

The large and growing young population and the presence of a comparatively large SME segment would create opportunities for the growth of mobile phone industry in Europe. Relocation of people from rural areas to urban areas would also affect the growth positively. Emergence of 3G Technology and other high-end technological applications would be the key to the market's growth and mobile collaborative technologies would further consolidate the mobile industry ([/www.palowireless.com](http://www.palowireless.com)).

Europe has a long way to go to catch up to Japan's mobile commerce success according to Jupiter Communications. They say it will take the European and US markets two years to reach the \$400 million of mobile commerce revenues generated in Japan today (<http://www.enterprise-ireland.com>).

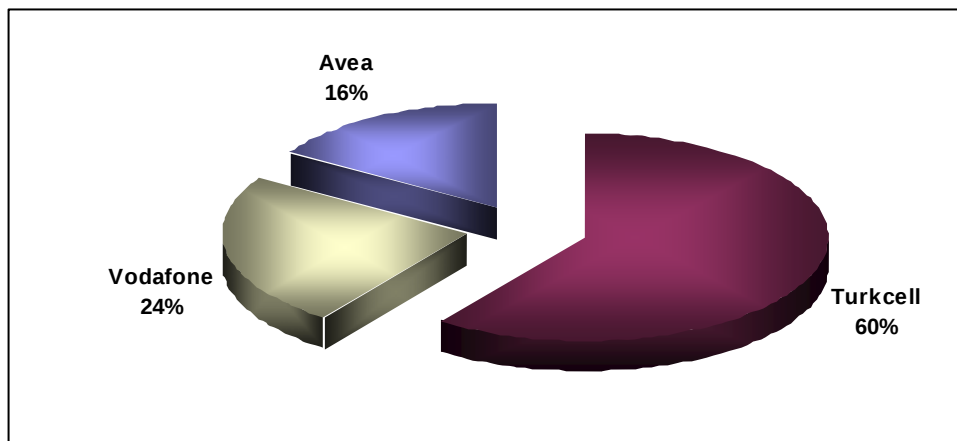
3.2 Mobile Commerce in Turkey

Turkey is an exciting place for mobile application development and the launch of services. The country's young population has led to a mobile phone penetration greater than that of the fixed Internet. This is evident in the figures reported by TURKSTAT (Turkish Statistical Institute). Numbers of mobile users in Turkey grow rapidly from 19.5 million users in year 2001 to 52.7 million by the end of 2007. However, even though the usage of mobile phone is high, mobile commerce is still relatively new compared to European, American and other Asia Pacific countries such as Japan (*Based on <http://www.turkcell.com.tr/turkcellhakkinda/yatirimciilis>*).

The Turkish population is young with an estimated average age of 29, which is lower than elsewhere in Western Europe, and the majority of the population lives in urban areas. These factors indicate growth potential for the mobile communications market in Turkey.

The market share of three mobile communication operators in Turkey is distributed as follows according to Telecom Authority announcements Turkcell, Vodafone and Avea with total estimated GSM lines of 52.7 million have 60 percent, 24 percent and 16 percent of market share respectively, as shown in Figure 3 (*Based on <http://www.turkcell.com.tr/turkcellhakkinda/yatirimciilis>*).

Figure 3: Market Share Distribution



Source: (<http://www.turkcell.com.tr/turkcellhakkinda/yatirimciiliskileri/turkiyegsmpazari>)

3.2.1 Histories of Mobile Operators in Turkey

This part provides a short history of mobile communication companies.

3.2.1.1 Turkcell:

GSM-based mobile communication started in Turkey when Turkcell started its operations in February 1994. Turkcell signed a 25-year GSM license agreement on April 27, 1998 with the Ministry of Transportation of Turkey. As of September 30, 2007, Turkcell has made 7.6 billion US dollars worth of investment, which doesn't include the price of the license. As of September 30, 2007, with its 34.8 million subscribers, Turkcell is the leading operator in Turkey, and is also the second biggest GSM operator in Europe in terms of subscriber numbers. Turkcell is the first and only Turkish company listed on NYSE (<http://www.turkcell.com.tr/turkcellhakkinda>).

3.2.1.2 Vodafone (Telsim):

The company was founded by the Uzan group in 1994 as Telsim, and remained the only alternative to the powerful Turkcell until well into the 2000s. On December 13, 2005, it was announced that British-based mobile operator Vodafone had won a public auction to purchase Telsim, for a price of \$4.5 billion. The old Telsim brand was phased out on 31 March 2007 in favour of Vodafone, in line with usual practice.

Vodafone Turkey is a mobile phone operator in Turkey; currently the country's second largest. Vodafone Turkey has roaming agreements with more than 500 GSM operators. (http://en.wikipedia.org/wiki/Vodafone_Turkey)

3.2.1.3 Avea:

Avea is Turkey's fast growing mobile communications company, which has a customer base of 10 million and represents 16 % of the total market, offering innovative services tailored for the usage of both individual and corporate customers. TT&TIM İletişim Hizmetleri A.Ş. was officially founded on February 19th, 2004 with the merger of Turk Telekom's GSM operator Aycell with Is-TIM, joint venture of Is Bank (51 %) and TIM (49 %). There was a short period just after the merger in which Aria and Aycell brands were sustained under the umbrella of TT&TIM. As of June 23rd, 2004,

the new "Avea" brand, expressing the synergy born after the merger, was introduced to the market (<http://www.avea.com.tr/en/sta/hakkinda/hakkinda/>).

A web site review of Turkish mobile communications operators shows that Avea and Turkcell offer a wider range of mobile commerce services than Vodafone. The services range from basic communication services such as messaging, picture messaging, and dictionary to more sophisticated services such as mobile banking, mobile payment, requesting statistical information, betting, gaming, downloading videos and music, e-government, and other services. The Table 2 summarizes the list of services currently provided by mobile communication operators in Turkey.

Table 2: Summary of mobile phone services offered in Turkey

Service providers	Services
TURKCELL	Calls, Messaging, Unit and Invoice, Internet access, Information, E-mail services, Support services, Disabled services. <i>(msn messenger ,news , weather, finance, cinema ,traffic jam info ,downloading music, mms, games , video clips , sport news ,e-government , dictionary , mobile payment ,bet, etc)</i>
AVEA	Fun, Music, Message, M-government, Television, Transactions, Internet, Bank Shopping, Solution partners. <i>(music, logo ,colored logo , game , chat , cinema, karaoke , video, picture message, mobile market , SSK information , Private school exam, billing information , video mms, statistical information from TUIK, IDO mobile information services, mobilvision, TV guide, mobile banking, bet etc)</i>
VODAFON	Fun, Game, Music, Sport, News & weather, Information, Video, Internet. <i>(sport news , UEFA news, bet, music , cinema , astrology , name analyses, game , dictionary , currency information , pharmacy ,milliyet news package)</i>

Source: Based on information provided on www.turkcell.com.tr; www.avea.com.tr www.vodafone.com.tr

3.2.2 Statistical Information on Mobile Commerce in Turkey

This part of the thesis provides some statistical information regarding the mobile commerce market in Turkey.

Ericsson's Consumer & Enterprise Lab examined some key markets such as Japan, Italy, Sweden and the US from the customer perspective to understand the unique needs and expectations of markets (See Table 3).

According to Ericsson Consumer Lab survey in Turkey, 16% of consumers are using mobile phones only and 61% of users in Turkey have both landline and mobile phones. Four out of ten persons in Turkey want to have internet access at home.

This survey provides key reasons for not purchasing a mobile phone by Turkish consumers. According to this survey 41% of non users of mobile phone feel it is unnecessary, 25% of non users feel it is enough having the landline for purpose, 23% of non users feel it is very expensive to use:

Table 3: Global mobile trend map

Country name	Monthly internet usage	Users with mobile phone only	Users with mobile and landline phones	Non phone users	Mobile phone renewal rate	Users planning to buy mobile phone	SMS usage minimum once a month
America	%56	%8	%59	%3	%60	%40	
Brazil	% 22	% 14	% 39	%14	%54	%46	
China	%31	%19	%57	%2	%83	%17	
Spain	%37	%24	%62	%2	%93	% 7	%68
UK	% 69	% 8	%84	%1	%95	%5	%72
France	%43	%23	%54	%1	%86	%14	%65
Germany	%53	%8	%74	%1	%84	%16	%64
Turkey	%32	%16	%61	%3	%78	%22	%81
Switzerland	%78	% 9	%88		%96	%4	%68
Italy	%46	%15	%79		%93	%7	%73
Japan	%70	%3	%85		%94	%6	

Source: Based on Ericsson Consume Lab survey (<http://www.hedef3g.com/consumer/index9.html>)

3.2.3 Comprehensive Information on Mobile Commerce

The following section provides the current situation of mobile commerce market in Turkey. Ericsson Consumer Lab survey in Turkey affords comprehensive information in regards to mobile commerce on 2007.

Ericsson's analysis on users' affinities on telecommunication proves that Turkey is a very active and competitive market in mobile communications. Users in Turkey are ambitious to services such as internet and 3G applications. Besides, users in Turkey are not hesitant about changing their mobile service operator; 10% of users are ready to change their operator in case they get better rates.

According to Ericsson's research, 55% of current users in Turkey have been using mobile phones for at least six years. 18% of all users own two, and 3% of all users own three SIM cards. The reason for this is that some users want to take advantage of several operators' special campaigns to prepaid cards.

20% of users in Turkey are using invoiced lines, whereas 80% of users have prepaid cards, in case of young people this number goes up to 90%. Turkey is one of the countries the prepaid model is used most extensively. 72% of users are self-paying their bills.

This research indicates that all young people below the age of thirty send a minimum of one SMS per day. Turkey, together with Sweden is above world average on this case. While 13% of all users in Turkey are sending more than 10 SMS per day, 17% are sending 5-10 SMS, and 26% 2-4 SMS per day. While 54% are replying with SMS, 24% give a call back and 9% SMS back and give a call. According to previous researches, they declare that SMS is popular in all Mediterranean cultures, and states that they love communicating, but this also has good reasons like operators' campaigns such as prepaid cards and free SMS. It is also stressed that among young people the use of instant messaging like MSN and ICQ is common on both internet and mobile internet users.

After SMS, the most commonly used services are downloading of ring tones and polyphonic melodies by 62% of users. A minimum of 55% of users are downloading games and music, also.

According to Ericsson consumer lab research, subscribers use mobile phone as the private territory. 46% of users call mobile to mobile when they are at home, too. The reason for this is the cheaper tariffs on mobile to mobile communications. On the other hand, another reason for users to more frequently use their mobile phones is that they feel the mobile phone as their private territory. For especially young individuals living with their families or sharing rooms with their siblings, mobile phones are territories they can keep their private lives and messages safely.

Ericsson's survey proves that users in Turkey are ambitious for the 3G services which have not started being provided to users, yet, because of the non-finished licensing process despite of the ready infrastructure of operators. 48% of users have stated interest in video call, 47% on mobile internet, and 38% mobile TV. On the other hand, it is also stated that 78% of users strongly demand a fixed monthly rate for the 3G services. According to Ericsson, Turkey statistics show that every year 1.5 million young "technology users" are entering the market, and that this creates a minimum of five million potential users for 3G applications. Following means that Turkey's 3G market will be as extensive as mobile markets of all advanced countries like Sweden, Norway, and Belgium.

Turkey is world leader with 18% second hand mobile phone usage, while England and Russia are following by 15%. The popularity of second hand consumption of mobile phones with high tax rates applied to new phones causing to over inflate the sales prices of phone to exceed purchasing power of users.

Data for this study were collected from a sample of 2106 respondents from 30 different cities in Turkey. Participants have been chosen from different socio-economic groups of age, gender and regional criteria. Age and gender were proportionally distributed according to Turkey's existing demographics. 35% of participants were workers, 50% primary school, 35% college, and 15% graduated from university.

4 TECHNOLOGY ACCEPTANCE MODELS

Factors that influence adoption of information technology (IT) have been subject to extensive researches. Researchers have borrowed models from other areas such as social psychology to predict an individual's intention to adopt IT. Among these were the well-established models like the theory of planned behaviour, also helping to explain and predict the intention to adopt.

It is known that there are several models competing to determine the intention to adopt to IT in the literature, such as theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), theory of planned behaviour (TPB) (Ajzen, 1991), technology acceptance model (TAM) (Davis, 1989), decomposed theory of planned behaviour (DTPB) (Taylor & Todd, 1995a), and Extended TAM.

4.1 Theory of Reasoned Action

The most widely used theoretical base for research on the factors affecting user acceptance of information systems is Fishbein and Ajzen's, (1975) theory of reasoned action (TRA). An important fundamental of TRA is that individuals are rationale and use information available to them in systematic manner (Igbaria, Livari & Maragah, 1995).

TRA proposes that belief influences attitude, which in turn guides to intention, and then creates behaviour. In other words, belief is the most direct master factor of behavioural intention. According to Ajzen and Fishbein (1975), intention is in turn appointed by the individuals' attitude and subjective norms concerning the behaviour. Attitude is defined as individual personal feelings and beliefs toward the behaviour. Subjective norm is defined as an individual perception of how the people think of the behaviour (Ajzen et al., 1980). In TRA, the behaviour is clarified as a function of one's beliefs regarding the consequence of individual behaviour and an assessment of value of each of those outcomes. According to TRA, behaviour is defined by the intention to perform, because people generally behave as they intend to do, within the available time and context. (See Figure 4)

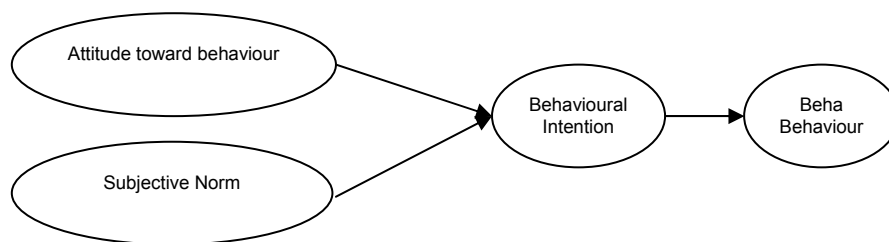


Figure 4: Theory of Reasoned Action (Fishbein and Ajzen, 1975)

TRA has been widely applied in a variety of research fields, from predicting the intention to seek psychological services for alcohol abuse (Codd & Cohen, 2003) to predicting the consumption of fats and oils (Saba & Natale, 1998). The theory has also been used in the information systems field, personal computer applications, telemedicine, e-mail, broker workstations and WWW are the examples of technologies that have been investigated through this model.

4.2 Theory of Planned Behaviour

Another model that is mostly used by Information System researchers is the theory of planned behaviour (TPB).

The theory of planned behaviour extends from TRA by integrating an additional construct, namely perceived behaviour control, to account for situations in which an individual lacks substantial control over the targeted behaviour (Ajzen, 1991); (See Figure 5).

According to TPB, an individual's behaviour can be explained by behavioural intention that is jointly influenced by attitude, subjective norms, and perceived behavioural control. "The attitude toward the behaviour refers to the degree to which person has a positive or negative judgment or general feeling toward the behaviour or object based on expected results" (Fishbein & Ajzen, 1975; Ajzen, 1991). "Subjective norm concern to the perceived social pressure whether to perform or not to perform the behaviour, while perceived behaviour control refers to an individual's perception of the ease or difficulty of performing the particular behaviour" (Ajzen, 1991).

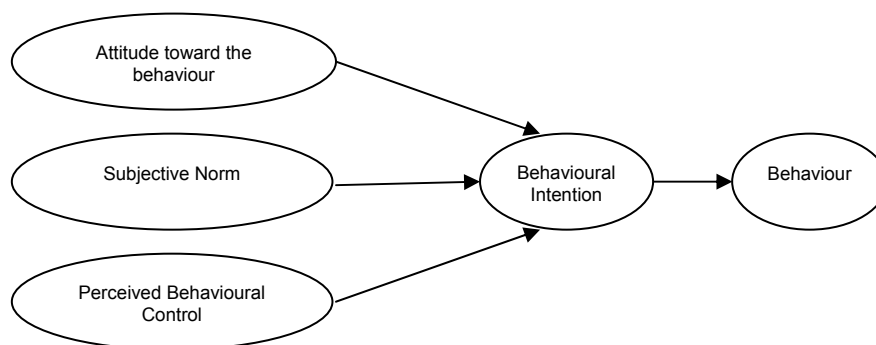


Figure 5: Theory of Planned Behaviour (Ajzen, 1991)

Limayem, Khalifa and Frini, (2000) studied the acceptance of online shopping. The study supports the suitability of the TPB model to explain behavioural intention and the applicability of the model in the online shopping context. Variables such as attitude, subjective norm and behavioural control were accepted to be important determinants of intention.

In another study, Venkatesh used the TPB to explain the gender difference in decision making context. The study proved that women were strongly influenced by subjective norm and perceived behavioural control, while men were strongly influenced by their attitude

4.3 Technology Acceptance Model

TAM was developed by Davis to explain computer – usage behaviour. TAM was derived from Fishbein and Aijzen’s theory of resound action. According to TRA, beliefs influence attitudes, that in turn to intentions, which generate behaviours. The key purpose of TAM is to ‘provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end—user IS technologies and user populations ‘ (Davis et al., 1989, p 985).

The difference of TAM from TRA is that TAM does not contain a subjective norm factor as the determinant of intentions. And also unlike TRA, TAM proposes only two constructs that are perceived ease of use and perceived usefulness. (See Figure 6) These beliefs have been admitted by researchers as the most important factors in explaining the system case. In his study Davis defined perceived usefulness as ‘the degree of which the person believes that using a particular system would enhance his or her job performance’ and perceived ease of use as ‘the degree of which a person believes that using a particular system would be free of effort’ (Davis et al., 1989, p. 985).

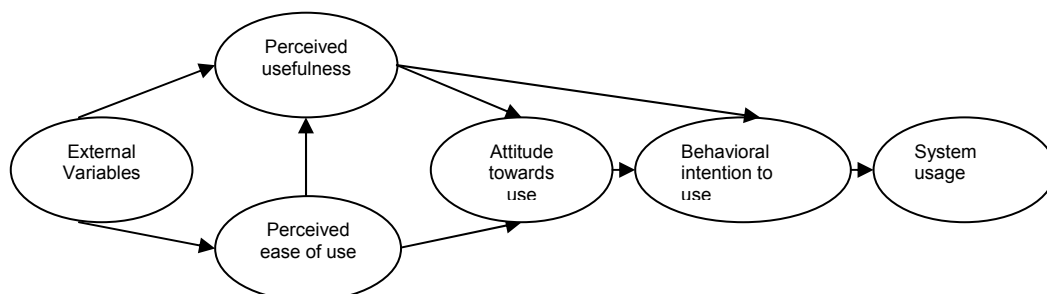


Figure 6: Technology Acceptance Model (Davis et al., 1989)

Among a number of studies TAM is believed to be the most powerful and parsimonious model in explaining the acceptance of information technology and information systems (Davis, 1989; Igbaria, 1995; Mathieson, 1991). Many researchers have conducted TAM's explanatory power and validity in different studies which were characterized by user group, type of technology and organizational context.

Taylor and Todd in their study reported following: "According to TAM, the easier a technology is to use, and the more useful it is perceived to be, the more positive consumer attitude and intention toward using the new technology is created. Correspondingly, the usage of the technology increases."

The modified TAM has been utilized to clarify and predict technology use in various disciplines. These studies have been summarized in the Table 4.

Table 4: TAM in various disciplines

Discipline	Authors
Decision Science	Venkatesh and Davis, (1996)
Management Science	Venkatesh and Davis, (2000)
Information Technology	Hubona and Geitz, (1997)
Information Technology and Management Information System	Chau, (1996)
Expert System	Berry, (1997)
Information Systems	Collins, (1994); Igbaria, (1995)and Igbaria, (1996);Brosnan, (1997);Ferguson, (1997)
Website usage	Heijden, (2001)
Voice Mail	Adams, (1992)
Email Application	Gefen and Straub, (1997)

Davis, (1989) stated that further studies in technology acceptance research must draw attention to understand how other external factors influence original TAM constructs. Hence, TAM main constructs such as perceived ease of use and perceived usefulness may not fully provide an explanation for behavioural intentions towards the use of mobile commerce; following creates a need to find other constructs to have more reliable prediction on the mobile commerce acceptance level.

Same as Davis et al., (1989) other scholars have discovered some restrictions of TAM and they have included other external constructs such as emotions, subjective norm, image, social influence, control, facilitating conditions, perceived enjoyment,

perceived needs, and value to improve explanatory power of model (Legris et al., 2003; Nysveen et al., 2005; Venkatesh et al., 2003).

As the result of literature review on TAM model, the paragraphs below summarize studies that have employed this model to understand the IS usage intention.

Mathieson, (1991) found that TAM predicts intention to use a spreadsheet package same as Adam, Nelson and Todd, (1992) in their study regarding the electronic mail and voice mail use. Taylor and Todd, (1995) declared that TAM predicts usage of PC laboratory. Despite of all studies, the TAM's main constructs do not fully show the specific influences of technological and usage-context factors that may alter the users' acceptance (Moon & Kim, 2001).

Davis, (1989) study developed and validated perceived usefulness and perceived ease of use by involving 152 industrial users and four application programs. The result of this study was as follows: Both usefulness and perceived ease of use were significantly correlated with usage. Perceived usefulness had a significantly greater correlation with usage than did perceived ease of use.

Davis et al., (1989) predicted people's computer acceptance from a measure of their intentions, and explained intentions. In this research 107 full time MBA students took part. The research resulted with perceived usefulness having a stronger influence on intention than perceived ease of use. Also attitude only partially mediated the effects of these beliefs on intention.

In the replication of Davis' original study Adams conducted two studies to verify the factors' validity of perceived ease of use and perceived usefulness. The results which were achieved in Davis' study were confirmed by Adams et al., (1992). They found significant relationship between both constructs and system usage.

Igbaria et al., (1995) developed and tested an integrated conceptual model of computer usage. The author found in this study, by involving 214 part time MBA students, that individual, organizational, and system characteristics have an effect on perceived ease of use and perceived usefulness.

Hu et al., (2001) found that TAM provides reasonable explanation of user's intention to use technology. The study found that perceived ease of use was not a significant determinant, while perceived usefulness appears to be a determinant of attitude and intention.

Chau, (1996) studied the assessment of modified TAM, and according to his study, perceived near-term usefulness had the most significant influence on behavioural intention. Perceived long-term usefulness also exerted a positive, but lesser impact. The direct relationship between ease of use and, intention to use is insignificant. Adams et.al, (1992) found that TAM predicts intention to use electronic mail and voice mail.

The Table 5 summarizes the studies integrating TAM model to understand the technology acceptance or Information System usage intention which were discussed above.

Table 5: Research related to Technology Acceptance Model (TAM)

Studies	Research purposes	Results
Davis 1989	Developing and validating two main construct.	Both main TAM constructs, usefulness and perceived ease of use were significantly correlated with usage , PU had a significantly greater correlation than did PEOU
Davis et.al 1989	Predicting individual's computer acceptance by measuring their intentions.	PU strongly influences intentions, PEOU had a small but significant effect on intentions; attitudes only partially mediated the effects of these beliefs on intention
Mathieson 1991	Comparing two main IS model (TPB and TAM)	Both TAM and TPB predicts intention to use an IS .TAM is less complex and is easier to apply, then TPB. Also, TAM provides general information while ,TPB provides more specific information that can better guide development
Adams et.al 1992	Replicating the Davis' study on the relationship between perceived use, perceived ease of use and system usage.	The results were confirmed by Adams. The relationship between PU and PEOU and usage is influenced by whether the use is mandatory or voluntary.

Table 5: Research related to Technology Acceptance Model (TAM) (Continued)

Studies	Research purposes	Results
Davis 1993	Identifying system characteristics, and user perception impact.	In this study perceived usage showed to be more influential than perceived ease of use in determining usage. Design choices was found to be an influential determinant of user acceptance.
Taylor and Todd 1998	Comparing TAM , TPB and DTPB	All TAM, TPB, and decomposed TPB well in terms of their ability to explain behaviour. The decomposed TPB provides a fuller understanding of behavioural intention by focusing on the factors likely to influence systems use through use of both design and implementation strategies.
Chua and Hu 2001		
Igbaria et.al 1995	Developing and testing conceptual model of computer usage.	The tested model confirms the effects of individual, organizational, and system characteristics on perceived ease of use and perceived usefulness. Also this study confirms that perceived ease of use effects perceived usage.
Chau 1996	Empirical assessment of a modified TAM model	Perceived near-term usefulness had the most significant influence on behavioural intention, while perceived long-term usefulness had positive but lesser impact on behavioural intention. Direct relationship between ease of use and behavioural intention were not significant.
Al –gahtani and King 1999	Testing and developing TAM	TAM is valuable tool for predicting attitudes, satisfaction, and usage from beliefs and external variables
Jiang et.al 2000	The exploring applicability of the TAM model in explaining physicians' decisions to accept telemedicine technology	Perceived usefulness was found as a significant determinant of attitude and intention. A need of external factors to find other constructs to have more reliable prediction on the acceptance of telemedicine technology was also declared in this study.
Venkatesh and Davis 2000	Developing and testing TAM by explaining perceived usefulness and usage intention in terms of social influences and cognitive instrumental processes	Both social influence processes and cognitive instrumental processes significantly influenced user acceptance.
Horton et.al 2001	Application of TAM in explaining intranet usage	Perceived usefulness, perceived ease of use and information usage were implicated as being predictive of intranet use in organizational context.

4.4 Decomposed TPB

Taylor and Todd, (1995) created a version of TPB called the Decomposed TPB (DTPB) which combines the best makings of both models (TAM and TPB). As the TAM and TPB models were mainly used to explain IS usage and technology acceptance, their main model constructs were more specific to IS context. Therefore Taylor and Todd replaces behavioural, normative and control beliefs and their associated weights with IS constructs that may be important in other usage situations or in the different contexts (See Figure 7).

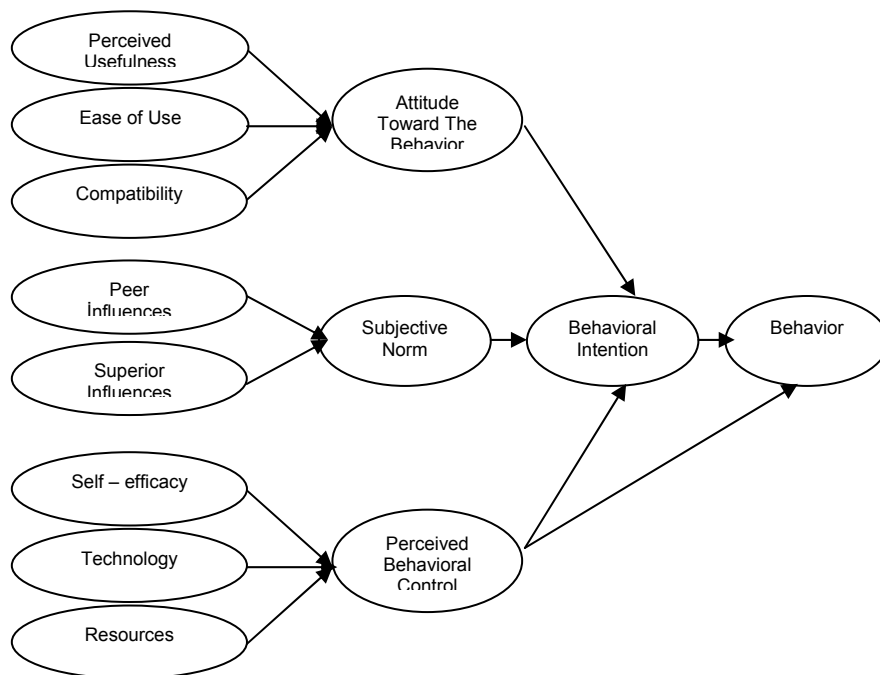


Figure 7: Decomposed Theory of Planned Behaviour (Taylor and Todd, 1995a)

4.5 E

xtended TAM model

Lin and Luarn, (2005) in their study on mobile banking, employ TAM by adding one internal control factor “perceived self-efficacy” and one external control factor “perceived cost” to reflect people’s concerns about the knowledge and financial resources needed to use mobile commerce (See Figure 8).

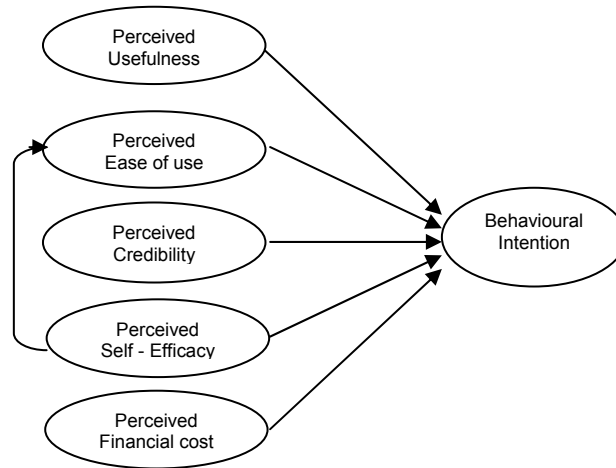


Figure 8: Extended TAM model (Lin and Luarn, 2005)

The results of this study is as follows: perceived self-efficacy, perceived financial cost, perceived credibility, perceived ease of use and perceived usefulness all had a significant effect on behavioural intention. Perceived self-efficacy was found to have a significant influence on perceived ease of use which in turn had a positive effect on both perceived usefulness and perceived credibility. The findings of this study strongly suggest that extended TAM has a higher ability to predict and explain behavioural intention to use information systems in the mobile commerce context.

In another study Luarn and Lin, (2005) explore factors that predict consumer intention to use mobile services. This study presents and validates a comprehensive model to explain and predict consumer intentions to use m-service systems based on the TAM, TPB and Luarn & Lin's, (2005) m-banking acceptance model. The findings of this study strongly support the feasibility of using the proposed model to assist in understanding the acceptance of m-service by individuals. Perceived usefulness, ease of use, credibility, self-efficacy and financial resources were observed to have positive influences on behavioural intentions.

Both perceived credibility and perceived financial resources were found to have a stronger effect than the traditional TAM variable, perceived ease of use on behavioural intention.

4.6 Comparison of TAM with Other Theoretical Models

Prior researchers have provided some theoretical frameworks for research in the acceptance of information technology and information systems. Among them, the technology acceptance model is believed to be powerful and parsimonious in explaining IT and IS adoption behaviour (Davis, 1989; Igbaria, 1995; Mathieson, 1991).

The paragraphs below provides information on comparison studies on TAM and other models, and shows reason of choosing TAM for this study.

4.6.1 *Technology Acceptance Model (TAM) & Theory of Planned Behaviour (TPB)*

In most studies TPB is described as a general theory of human behaviour, while TAM is known as a specific theory of Information System usage. Researchers have observed that TAM does not include *constructs* that may predict the usage behaviour. For instance: Mathieson, (1991) and Taylor and Todd, (1995) compared TAM with the theory of planned behaviour, and suggest that Technology acceptance model constructs only marginally overlap with subjective norms and perceived behavioural control.

The technology acceptance model differs from TPB in various directions. Nevertheless Matheson criticized TPB and declared “TPB is not specific to Information System and is less parsimonious than TAM”. Also he stated “TPB requires unique operationalizations in every different situation in which TPB is used” (Mathieson et al., 2001).

In comparison study, Mathieson, (1991) found that TAM and TPB predict intentions to use an Information System very good. The result of the study also indicated that TAM is easier to apply, is less complex than TPB to model, but provides very general information, while TPB provides more specific information that can better guide development. 163 senior and junior students were involved in this study.

Gentry and Calantones, (2002) compared three intention models (TRA, TAM and TPB) to determine which model better explains behavioural intention. The study showed that TPB works well in explaining the behavioural intention, though TAM explains variance better than other two models.

4.6.2 TAM, TPB & Decomposed TPB

Chau and Hu, (2001) compared the TAM, TPB and DTPB in conducting the telemedicine acceptance among physicians. In this study, attitude was decomposed. The attitude and perceived behavioural control influences on behavioural intention while subjective norm does not influence the intention. The result of this study demonstrates that perceived ease of use had no significant effect on attitude, while perceived usefulness was found significant.

Prior studies reveals that the TAM appeared to be superior to TPB in explaining behavioural intention to use, and that the DTPB which integrates the TPB and TAM, is better than the TAM but the difference is not substantial (Chau & Hu, 2001). For instance: Taylor and Todd, (1995a) added four constructs to explain the effect of perceived behavioural control and their DTPB, as the result of this study they declared that DTPB's small increase in predictive power comes at the cost of a large increase in model complexity.

4.6.3 TAM and Extended TAM

The findings of their study strongly suggest that extended TAM has a higher ability to predict and explain behavioural intention to use information systems in the mobile commerce context .The R-square in this study was 82%; in the studies of Chau and Hu, (2001)–42%, Taylor and Todd, (1995a)-60% ,Mathieson, (1991)-70% and Mathieson et al., (2001)-43.8% respectively. Lin and Luarn extended model, therefore, represents a large improvement in explanatory power, with small increase in model complexity.

5 RESEARCHES RELATED TO MOBILE COMMERCE

Following section provides a short literature review on studies conducted on mobile commerce.

Mobile commerce market has attracted much interest among researchers, developers and service providers, and has been announced as the next step for business, with anytime, anywhere voice and data communications capabilities.

The high potential of mobile commerce market have been supported by increasing penetration of mobile devices and the popularity of internet among researchers, research companies and service providers. However, current market situation is not meeting expectation of scholars and research firms, and is moving relatively slow (Kleijen et al; Ho, S.Y et al.,) several studies were conducted on mobile commerce to understand the adoption of mobile commerce so that this new inactive market can be used more.

Cheong and Park, (2006), studied mobile internet acceptance in Korea by employing TAM as the base model and developed a more comprehensive version of TAM to better reflect Mobile internet context. The comprehensive model employs following additions: perceived playfulness, contents quality, system quality, internet experience and perceived price level. Attitude toward mobile was found to be the most significant factor in predicting behavioural intention. Also study identifies the positive role of playfulness and the negative role of the perceived price level in developing attitude and intention. They also found positive relationship between system quality and perceived usefulness as well as between content quality and perceived usefulness.

Nysveen, Pedersen, (2005) conducted the study examining gender effect in explaining intention to use mobile chat services. The study surveyed 684 mobile chat services users in Norway. Based on the TRA and Technology Acceptance Model the study results suggest that social norms and intrinsic motives such as enjoyment are important determinants of intention to use among female users, whereas extrinsic motives such as usefulness and—somewhat surprisingly—expressiveness are key drivers among men.

Kleijnen, Wetzels and Ruyter, (2003) conducted a survey of wireless finance in Netherlands. The study employs TAM with additional constructs such as perceived cost, system quality, and social influences. Moderating effects of the variables such as age, computer skill and mobile technology readiness and social influences were investigated. Almost all hypotheses were proved.

Finally, Clarsson et al., (2006) noted that the mobile industry is no more only about the voice communication over the phones, and he declared that the future of mobile industry is relying on mobile services. Therefore, service providers are searching for the new type services they would be able to introduce to the new developing mobile industry market. Bowman et al., (2006) also stressed the importance of mobile services and stated that the success of telecommunication sector relies on mobile internet services improvement.

Table 6 summarizes the empirical studies concerning the mobile commerce discussed above.

Table 6: Research related to mobile commerce

Studies	Fields
Hung, Ku, and Chung (2003); Je Ho Cheong and Myeong-Cheol Park (2006)	Mobile Internet adoption, adopting Davis's [1989] ; Mobile internet acceptance in Korea .
Lu, Yu, Liu, and Yao(2003)	Wireless Internet adoption.
Barwise and Strong (2002) and Tsang, Ho, and Liang [2004]	"permission-based" advertising
Brown et al. 2003; Kleijnen, Wetzels and de Ruyter 2004; Lin and Luarn (2004)	Mobile banking/finance
Lee et al. 2002,	Cross-cultural comparison
Petty 2003	Security issues
Kumar and Stokkeland 2004	Location-based services (GPS)
Kleijnen, de Ruyter, and Wetzels (2004)	Mobile gaming adoption in the Netherlands.
Okazaki (2004)	A pull-type advertising platform on i-mode.
Wang, Lin and Luarn (2006);	Predicting consumer intention to use mobile services ;
Nysveen, Pedersen (2005)	Explaining intention to use mobile chat services.

As was stated above, despite of the popularity and high penetration of mobile devices, consumers are still not using all services that are provided by the telecommunication firms. In order to develop a strong business strategy in this accruing

new market, companies should know the factors predicting usage intention. It is therefore very important to understand the key factors affecting the adoption of mobile commerce.

6 RESEARCH MODEL

From a theoretical point of view, the TAM has been the most frequently used base for m-commerce adoption, followed by the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and the Theory of Planned Behaviour (TPB) (Ajzen, 1991). TAM has been widely used in Internet adoption studies and other research according the Information System adoption. And it has proved its accuracy about predictions of information systems in the last twenty years (Davis et. al, 1989; Davis, 1993; Davis and Vankatesh, 1996; Vankatesh 1999; Morris and Vankatesh, 2000; Horton et. al, 2001).

Nevertheless the literature review encloses studies on another extended TAM model which was also derived from original TAM by incorporating additional constructs such as perceived credibility, perceived financial cost and perceived self efficacy. This model was explored by Lin and Luarn (2005), in their study on mobile internet adoption and was declared by some researchers as the most parsimonious model in explaining the mobile commerce adoption. According to Lin and Luarn, this model represents a large explanatory power equalled to 82%, with small increase in model complexity.

As extended TAM model is already derived from TAM by adding additional constructs and is not really investigated by other researchers and does not have a wide literature review as TAM model, it is suggested to use original TAM by incorporating some additions which were used in extended TAM such as perceived credibility and self-efficacy.

Based on the literature review, other constructs such as price level, system quality, content quality, and technology readiness index were incorporated into the research model.

The arguments and supports related to each construct will be discussed in more detail together with the hypotheses in the next part of this thesis.

6.1 Attitude Towards Use

According to Fishbein and Ajzen, (1975), attitude is defined as an individual's positive and negative feelings about performing the target behaviour. Attitude toward behaviour refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour. Fishbein and Ajzen,(1975) in their study argued that attitude towards behaviour is made up of beliefs about engaging in the behaviour and the associated evaluation of the belief.

Prior studies have validated the effect of s. Davis et al (1989) found that attitude had a strong significant influence on behavioural intention.

Cheong and Park, (2005) found that attitude toward mobile internet was the most significant factor in predicting the behavioural intention to use Mobile Internet.

Hu and Chau, (1999) and Chang and Cheung, (2001) in their studies regarding the acceptance telemedicine and WWW found that attitude have a positive affect on intention to use. In comparing study the TAM, TPB, and DTPB Taylor and Todd (1995a), also revealed same results as Hu and Chau.

In another study on predicting of user acceptance of e-shopping on the Web, Hung Pin Shih, (2004) found that perceived ease of use and perceived usefulness significantly and positively affect individual attitudes toward e- shopping.

In the study of Internet Banking Liao et al., (1999) suggested that attitude toward using the Internet Banking by individuals significantly affect their intention to adapt to the new technology.

Bobbitt & Dabholkar, (2001) and Fishbein and Ajzen, (1975) also suggest that attitudes will have a strong, direct positive effect on intentions. The wide variety of studies have validated and supported the relationship between attitudes and intentions. Therefore in this study it is hypothesized that:

H1: Attitude toward mobile commerce has a positive effect on the intention to use mobile commerce.

6.2 Perceived Usefulness

The perceived usefulness is defined as “the extent to which a person finds that using the system will enhance his or her job performance” (Doll et al., 1998). “The perceived usefulness of something is its ability to provide a means-end relationship (i.e. the given thing as a means to a desired end), or to provide a rationale upon which to make decisions. Means-end knowledge accounts for why consumers use a product.” (Barczak et al., 1997). The perception of usefulness is formed in interaction with other individuals and a system (Venkatesh and Davis, 2000).

Davis et al., (1989), found that perceived usefulness has significantly greater correlation with usage behaviour than did ease of use and also perceived usefulness strongly influenced intentions.

Hu et al., (1999), study on explaining physicians’ decisions to accept telemedicine technology showed that perceived usefulness as a significant determinant of attitude and intention.

Mao and Yaprak, (2005), on comparison study of mobile phone services behaviour between US and Turkey found that perceived usefulness significantly influenced behavioural intention to use.

Finally, Khalifa, (2006) in his study on determinants of mobile commerce approach showed that perceived usefulness is the most important factor for predicting behaviour intention. Cheong and Park, (2005) found that perceived usefulness has positive impact on attitude toward mobile internet.

Since perceived usefulness has previously been proved to affect usage behaviour (Davis, 1989; Lu et al., 2003), therefore in this study it is hypothesized that:

H2: Perceived usefulness positively influences behavioural intention to use mobile commerce.

H3: Perceived usefulness positively influences attitude toward using mobile commerce.

6.3 Perceived Ease of Use

Perceived ease of use is another major determinant of attitude towards use in the TAM model developed by Davis, (1989). The perceived ease of use is defined as “the extent to which a person believes that using the system will be free of effort” (Doll et al., 1998).

Perceived ease of use is predicted to influence perceived usefulness, because the easier a system is to use, the more useful it can be. Following link has been strongly supported by other researchers, (DeLone & McLean, 1992; Venkatesh, 2000; Gefen & Straub, 2000; McCloskey, 2006).

Davis (1989) in his study found that ease of learning is an important component of ease of using – in fact. In his study, he stated that prior studies have proved strong correlations between ease of learning and ease of use (following results have been found by Adams et al., 1992; Segars and Grover, 1993; Subramanian, 1994; and Doll et al., 1998).

Prior studies indicated that perceived ease of use has significant effect on usage intention, whether affecting perceived usefulness directly or not (Agarwal & Prasad, 1999; Davis et al., 1989; Hu, Chau, Sheng, & Tam, 1999; Jackson, Chow, & Leitch, 1997; Venkatesh, 1999, 2000; Venkatesh & Davis, 1996, 2000; Venkatesh & Morris, 2000).

Venkatesh & Morris, (2000) study showed that men perceived usefulness to be more influential in making a decision to use a new technology whereas women perceived ease of use to be more important.

Finally, Moon and Kim, (2001) stated ‘that IT’s that are easier to use will be less threatening to the individual, implying that perceived ease of use will have a positive effect on users’ perceived credibility as interacting with e-learning’. Perceived ease of use was also found to be a significant antecedent to the perceived credibility of Internet Banking (Wang et al., 2003).

It is expected that ease of use influences perceived usefulness, attitude towards use, and perceived credibility. It is also known that perceived ease of use is hypothesized as a predictor of perceived usefulness. Thus in this study it is hypothesized that:

H4: Perceived ease of use will have a positive effect on perceived usefulness of m-commerce

H5: Perceived ease of use will have a positive effect on attitude toward using m-commerce.

H6: Perceived ease of use will have a positive effect on perceived credibility of m-commerce.

6.4 Mobile Phone Self-efficacy

Computer self-efficacy is a variable that has been proposed and examined as an additional variable of an individual's use of IT/IS (e.g. Compeau and Higgins, 1995; Igbaria and Livari, 1995). Based on the social cognitive theory developed by Bandura, self-efficacy can be defined as the belief that one has the capability to perform a particular behaviour (Bandura, 1977).

According to literature review, computer self-efficacy has been widely applied in IT/IS studies and is considerably positive conductive to individuals' beliefs of system ease of use and usefulness (Barbeite, 2004; Wang, 2002).

Prior studies on computer self-efficacy (Agarwal et al., 2000; Johnson & Marakas, 2000; Chau, 2001; Honget al., 2001) have confirmed the consequence of self-efficacy construct in understanding the individuals' responses to Information Technology. Mathieson, (1991) and David, (1989) argued that there is a link between self-efficacy and perceived ease of use. Mathieson et al., (2001) stated that an individual with high expertise might rate a system as easier to use than an individual with lower expertise.

The causality between self-efficacy and ease of use has been discussed in several studies (e.g. Igbaria & Iivari, 1995; Venkatesh & Davis, 1996; Venkatesh, 2000; Wang, 2003).

Agarwal et al., (2000) showed a stronger relationship between specific computer self-efficacy and ease of use.

Wang et al., (2006), stated that an individual with high expertise might have a higher intention to use a system than an individual with lower expertise. Based on the social cognitive theory Compeau & Higgins (1995), defined self-efficacy as the belief that one has the ability to perform a specific behaviour.

Also found that self-efficacy has a direct influence on system usage. Mathieson et al, (2001) in their extended TAM model, showed that perceived knowledge resources have an influence on intention to use an IS.

Luarn and Lin et al., (2005), found that perceived self-efficacy has a significant effect on perceived ease of use, which in turn has positive influence on perceived usefulness, perceived credibility and behavioural intention. They also suggested that perceived self-efficacy influences behavioural intention, either directly or indirectly, through its effect on perceived ease of use. This indicates that self-efficacy can be a significant antecedent of the behavioural intention to use m-commerce with the presence of perceived ease of use in the model.

Wu and Wang (2007), in their study on mobile computing access factors on healthcare found that mobile health service (MHS) self-efficacy had strong indirect impact on healthcare professional behavioural intent through the mediators of perceived usefulness and perceived ease of use.

Finally, Khalifa and Shen (2006), study on determinants of mobile commerce adoption, also showed that self-efficacy influences the intentions to adopt m-commerce, and was also confirmed by them as an important additional factor of TAM model.

Taking the prior studies regarding the IS acceptance into consideration it was decided to integrate the perceived self-efficacy construct into the model, and It was assumed to be an important factor in adopting mobile commerce. Thus it is hypothesized that:

H7: Higher self-efficacy will lead to higher perceived ease of use of m-commerce.

H8: Higher self-efficacy will lead to higher behavioural intention to use m-commerce.

6.5 Perceived Credibility

Trust has generated a great deal of research in organizational studies. Liu et al. (2004); Luo (2002); Malhotra et al. (2004) have indicated the trust construct as an important determinant of consumer behaviour in the electronic commerce context

According to Gefen et al., (2003) and McKnight et al., (2002a), trust is believed to be an expectation on the part of consumers to ensure that the online company, with which they engage in transactions, will not take an advantage of the situation. Carter & Bélanger, (2005) in their study on intention to use e-government services, trustworthiness was found to be a significant predictor of intention to use.

In order to make consumer to participate in online shopping, online companies have to meet certain criteria for privacy and security policies. McKnight et al. (2002b) found that trust in companies increases the probability of consumer participation in e-commerce transactions.

Also prior studies on internet banking adoption showed the trust as a critical driver of adoption in this context (Bradley and Stewart, 2002; Page and Luding, 2003). The importance of including trust has been showed by Polatoglu and Ekin (2001), and also by Kardaras and Papathanassiou, (2001), who researched organisations. Daniel (1999) predicted security to be one of the determinants of customer acceptance of Internet Banking.

In this thesis and in the literature review the perceived credibility construct is defined as the ability of conducting the transaction securely and ability of maintaining the privacy of personal information.

Based on Wang et al., (2003), perceived credibility is the extent to which a person believes that using m-service will be free of security and privacy threats. Wang et al., (2003), study on online banking found that perceived credibility has a significant influence on behavioural intention to use. They also found same results in their study regarding the electronic tax filling.

Ong et al., (2004) study confirms the significant influence of perceived credibility on behavioural intention to use e-learning, showing that it is not sufficient to develop an e-learning system with valuable functions and user-friendly interaction to attract more user. It is more important to assure e-learners that they are free of privacy and security threats. In addition, perceived credibility seems to influence users' attitudes toward using e-learning.

Luarn & Lin, 2005 study confirms Wang et al.'s (2003) research that found a significant direct relationship between perceived credibility and behavioural intention to use mobile banking.

Based on the literature review, the perceived credibility affects the acceptance of mobile commerce. Here, perceived credibility is defined as the ability of conducting the transaction securely and ability of maintaining the privacy of personal information.

Since many researchers have found that trust related construct perceived credibility influences consumer behaviour, thus this study hypothesized following:

H9: Perceived credibility will have positive effect on behavioural intention to use m-commerce.

H10: Perceived credibility will have positive effect on attitude toward using m-commerce.

6.6 Perceived Price Level

As original TAM model was developed in organizational context, the cost of using particular product/service by its user was not considered as important variable, since actual user was an organization as the one who was paying for services. From the private context, cost or price of services become the critical factor in consumer decision whether to adopt or not a particular service/product/technology.

Liao and Cheung, (2001) examined that the price has significant impact in the development of initial willingness to e-shop on the internet and they confirmed that price has a significant affect in developing behavioural intention to use.

Khalifa and Shen, (2006) study found that a price/cost service is confirmed to be an important driver of mobile commerce adoption. An implication of this result is that m-commerce providers need to pay particular attention to their pricing strategy.

Mao and Yaprak, (2006) study on comparison study between Turkey and USA also showed price variable as the critical factor in indicating the behavioural intention to use.

Cheong and Park, (2005) study on mobile internet acceptance in Korea found that perceived price level has a negative significant affect on behavioural intention and attitude toward mobile internet.

Main point of marketing effort is to understand the process of customer decision making and according to this process marketing department formulates a proper strategy that can affect the behaviour of customer. Lee, (1999) and Zeithaml, (1988) studies recognized service cost factor as a key determinant of intention to use. They stated that if the cost of services exceeds the benefit, customers do not subscribe the particular service. Therefore in this study it is hypothesized that:

H11: The perceived price level has negative impact on his/her attitude toward using m-commerce

H12: The perceived price level has negative impact on his/her intention to use

6.7 Perceived System and Content Quality

Prior studies (DeLone and McLean, 1992; Seddon, 1997; Lee, 1999; Lin and Lu, 2000) has showed that system quality plays a key role in the context of IS, because user are not willing to use the system when they experience delay in response, disconnection or poor security when they subscribe a particular service.

According to DeLone and McLean, (1992) study the information quality and system quality is found to be important factors that bring the success of IS.

Lin and Lu, (2000) study has employed three factors such as: information quality, response time, and system accessibility as IS qualities. In their study they stated that information quality, response time, and system accessibility is useful predictors of the perceived ease of use and the perceived usefulness.

The concept of perceived contents quality is similar to the information quality and used in the study of DeLone and McLean, (1992) and Lin and Lu, (2000) because information is often regarded as contents in the context of the internet.

Cheong and Park, (2005) study found a significant relationship between perceived usefulness and perceived system quality, as well as between perceived usefulness and perceived content quality. Also they showed that the quality of contents has stronger affect than the system quality in developing the belief about the usefulness of mobile internet, which, in turn, plays a key role in developing attitude and intention to use. Therefore in this study it is hypothesized that:

H13: A customer's perceived system quality and content quality has a positive impact on his/her perceived usefulness.

6.8 Technology Readiness Index

Parasuraman, (2000) introduced the concept of a Technology Readiness Index (TRI) and defined this as ‘people’s propensity to embrace and use the new technologies for accomplishing goals in home life and work’. The construct can be evaluated as an overall state mind resulting from complete structure of mental enablers and inhibitors that jointly define an individual’s tendency towards using the new technologies.

Mick and Fournier, (1998) study, suggest that individuals experience positive and negative feelings about the technology based outcomes. In this study, they defined eight technology paradoxes with which consumer have to bear: control/chaos, freedom /enslavement, new/obsolete, competence/incompetence, efficiency/inefficiency fulfils /creates needs, assimilation/isolation, and engaging/disengaging.

As the result of multi year researches Parasuraman, (2000) developed TRI scale. In starting position 44 questions were developed based on group interviews, afterwards these questions were again tested by other studies and were reduced to 36 questions. Following scale provides measures for four TRI constructs such as innovativeness, optimism, discomfort and insecurity.

Parasuraman, (2002) defined innovativeness as one’s tendency to be a technology pioneer and thought leader, and optimism as a positive view of technology and belief that it offers flexibility, efficiency in their lives. Discomfort was defined as a perceived lack of control over technology and feeling of being overpowered by it, insecurity was defined as distrust of technology and scepticism about its capability to work in a proper way.

The combination of scores on the four technology readiness dimensions represents a person’s overall technology readiness (Parasuraman and Colby, 2001). Several empirical studies provide the insight that the TRI scale is capable of capturing the relationship between technology readiness and technology usage behaviours (for example, Colby and Albert, 2003; Farby, 2004; NTRS, 1999, 2000, 2001 Parasuraman and Colby, 2001).

Based on individual's technology readiness score and the TRI, Parasuraman and Colby (2001) further classified technology customers into five technology readiness segments, namely, explorers, pioneers, sceptics, paranoids, and laggards. They stated that "explorers" are highly optimistic and innovative; they score high in technology readiness and are highly motivated and fearless to try new technology once it appears in the market. "Pioneers" are relatively early adopters of new technology but are simultaneously held back by inherent discomfort and insecurity; they are innovative yet cautious. "Sceptics" are fairly techno-ready; they are lowly motivated and need to be convinced of the benefits of using the emerging technology. "Paranoids" are the insecure; they are later adopters of new technology. Though paranoids are convince of the benefits of the technology, at the same time, they are concerned about the risks and barriers of technology adoption. "Laggards" are the resistant ones, who are likely the last adopters of new technology; and they may never use new technology unless they are forced to do so. (Lai, 2008)

Prior studies found that explorers and pioneers are high in technology readiness and tend to embrace new technology earlier than the others (e.g. Parasuraman and Colby, 2001; Lai et al., 2005)

According to literature review, it is expected that individuals who are more technology ready are likely to be keener to use technology-based products or services. Hence it is hypothesized that:

H14: Discomfort has negative impact on his /her intention to use m-commerce

H15: Innovativeness has positive impact on his /her behavioural intention to use m-commerce

H16: Optimism has high positive effect on his /her behavioural intention to use m-commerce

H17: Insecurity has negative impact on his/ her behavioural intention to use m-commerce

H18: Innovativeness has positive impact on his /her attitude toward using m-commerce

H19: Optimism has high positive effect on his /her attitude toward using m-commerce

H20: Insecurity has negative impact on his/ her attitude toward using m-commerce

H21: Discomfort has negative impact on his /her attitude toward using m-commerce

The below figure summarizes theoretical model and the hypotheses developed for this study (See Figure 9).

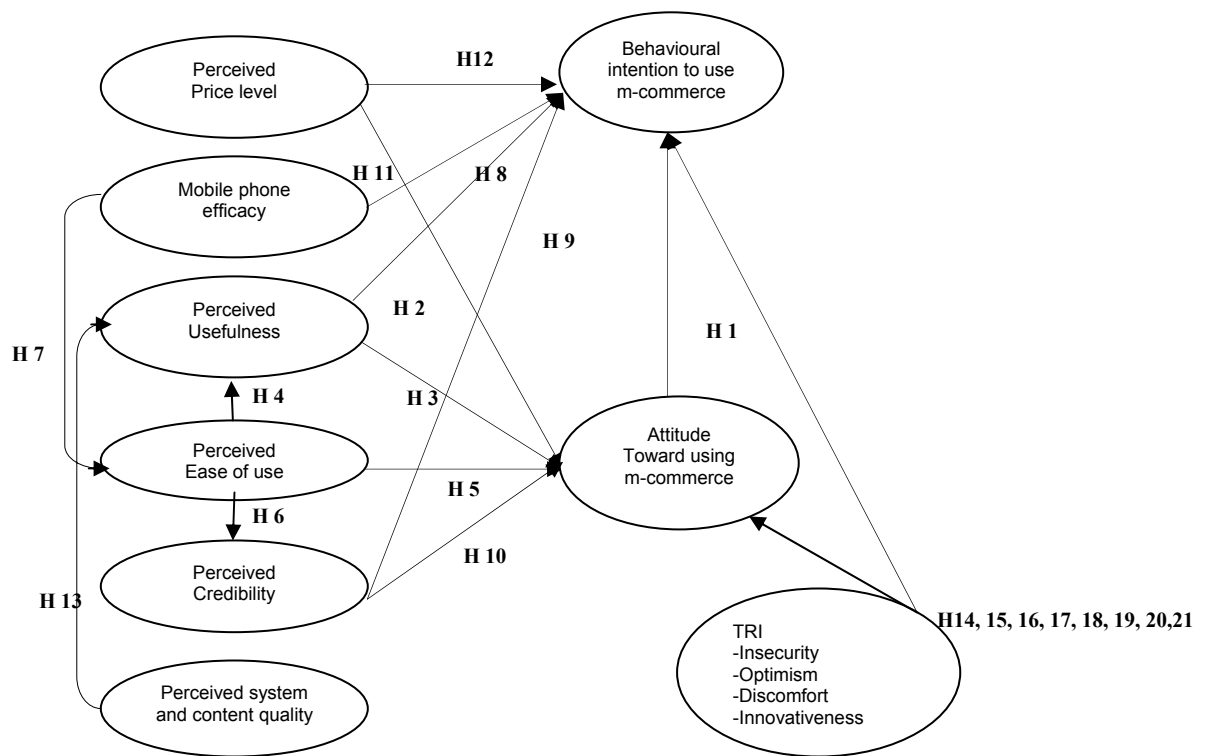


Figure 9: Theoretical Model

7 METHODOLOGY

7.1 Aim of the Research

Given the high penetration of mobile devices, mobile commerce is expected to experience a substantial growth. However, most mobile commerce services have failed to meet expectation, except for very mobile commerce services like ring tone downloads (Anil et al., 2003).

The popularity of e-commerce cannot be measured by the popularity of computers as has been proven. Ankar and D’Incau, (2002) also argued that the popularity of mobile commerce cannot be measured by the popularity of mobile devices.

Research needs to consider how users’ characteristics and their beliefs influence their use of mobile commerce. Through a better understanding of individual differences, telecommunication firms may develop strategies that appeal to specific segments of consumer phone markets.

In this direction the aim of research is to answer for following questions:

- What are the factors that influence mobile commerce adoption?
- Does the Technology Readiness construct and additional constructs influence the consumer intention to use mobile phone services?
- What are the specific factors altering the consumer’s attitude to use services offered by mobile commerce?
- What are the specific factors influencing the consumers’ intention to use?

7.2 Sample

Data for this study were collected from a sample of 227 respondents from 3 different cities in Turkey: Ankara, Erzurum and mainly Istanbul.

A summary of the demographic characteristics of the respondents is provided as follows: out of 227 respondents 50.7% of respondents were female, while 49.3% of the respondents were male.

88.5% of the sample has been concentrated in the first and second groups pertaining to the age between 19 and 34. 11.5% of respondents are over 35. As seen from the table below, a very balanced distribution has been achieved between age and gender groups (See Table 7).

Table 7: Frequency distribution of demographic variables

		Gender		Frequency	Percent
		Female	Male		
Age	25 or younger	49	50	99	43.6 %
	26-34	50	52	102	44.9 %
	35 or older	16	10	26	11.5 %
	N	115	112	227	100 %
Marital Status	Married	31	31	62	27.3 %
	Single	84	81	165	72.7 %
	N	115	112	227	100 %
Education	High School and Below	12	11	23	10.1 %
	University	75	75	150	66.1 %
	Master and PhD degree	28	26	54	23.8 %
	N	115	112	227	100 %
Income level	500 YTL or less	21	13	34	15 %
	500 YTL- 1000 YTL	30	29	59	26 %
	1000 YTL - 2000 YTL	40	39	79	34.8 %
	2000 YTL – 3000 YTL	15	17	32	14.1 %
	3000 YTL – or more	9	14	23	10.1 %
	N	115	112	227	100 %

The results obtained from the frequency analysis of marital status shows that 3% of respondents are widowed and divorced; because of this small percentage we have recoded those groups as single respondents. The number of single respondents is much

greater than the number of married respondents. About 72.7% of the respondents are single, while about 27.3% of respondents are married.

The gender of respondents according to marital status shows us that a nearly equal distribution has been achieved between those two groups (See Table7).

When the education level of the respondents is taken into the consideration, it is seen that small percent of respondents have graduated from high school and below. 23.8% of respondents have received a Master degree and PhD Degree education. And a considerable group of 66.1% has received a university education. The gender of respondents according to each education level is also proportionally distributed (See Table 7).

The results obtained from the question regarding the amount of Income Level show that a group of 15% stated to have a monthly income of 500 YTL or less, a group of 26% stated to have monthly income of 500YTL-1000 YTL, a group of 34.8% has stated to have monthly income of 1000 YTL-2000 YTL, a group of 14.1% stated to have monthly income of 2000YTL–3000 YTL, and finally a group of 10 % stated to have monthly income of 3000 YTL or more (See Table 7).

The gender of respondents according to Income level shows that second, third and forth groups are proportionally distributed, as illustrated in the table, about 62 % of respondents who stated to have monthly income of 500 YTL or less are female, while 38% are male. About 61 % of respondents who stated to have a monthly income of 3000 or more are male, while 39% are female (See Table 7).

7.3 Instruments

The data collection instrument used in this study is a multi-factors questionnaire based on previous researches on Electronic Commerce and Mobile Commerce.

The questionnaire was conducted to different age groups in order to get a meaningful data and to understand a real market situation. Prior to the questions, there was a brief explanation of the aim of research for the respondents to provide their understanding and interest.

The questionnaire can be divided into five parts. The first part is formed by the demographic questions; second part is formed by the Mobile commerce (services) questions (See Table 8; Table 9; Table 10; Table 11; Table 12). The third part is formed by five questions related to ownership of technological products or services and 3 questions to use of technological products or services (See Table 13). Forth part is formed by questions related to the Technology Readiness (See Table 14), and finally fifth part is related to the list of services that are used currently by respondents and a list of services that respondents would like to use in the future (See Table 15).

7.3.1 Demographic Questions

The demographic questions used in this survey were gender, age, education level, income level and marital status.

7.3.2 Mobile Commerce Constructs

7.3.2.1 Perceived Ease of Use, Perceived Usefulness, Behavioural Intention to Use and Attitude Towards Use

Items for the perceived ease of use, perceived usefulness, behavioural intention and attitude towards use were taken from the previously validated inventories (Davis, 1989; Davis et. al, 1989; Cheong, 2005; Wang et. al, 2005) and perceived ease of use and perceived usefulness were modified to fit specific technology studied. Instruments were mainly adopted from Cheong, (2005) and Wang et al., (2006). Survey participants were asked to rate each question on the scale with 6 point scale, 1=’’strongly agree’’ to 6=’’strongly disagree’’. Questions are given in the Table 8.

Table 8: Original TAM constructs

Perceived ease of use
▪ I think that a mobile service is easy to use. ▪ I think that learning to use mobile services is easy to understand. ▪ I think that using mobile services can be easily skilful.
Perceived usefulness
▪ I think that mobile phone services are helpful to improve my performance in general. ▪ I think that mobile phone services provide very useful information to me. ▪ I think that mobile phone services are helpful to enhance effectiveness of my life in general. ▪ I think that mobile phone services are very useful to my life in general.
Behavioural Intention to use :
▪ Assuming that I have access to the mobile services, I intend to use them. ▪ I intend to use mobile phone services as much as possible. ▪ I recommend others to use mobile phone services
Attitude towards use:
▪ I think that using mobile phone services is good idea. ▪ I think that using mobile phone services is beneficial to me. ▪ I have positive perception about using mobile phone services.

7.3.2.2 *Mobile Phone Efficacy*

The items for mobile phone efficacy construct were adopted from the study of Mao, (2005), who used original instrument of computer self-efficacy developed by Compeau & Higgins, (1995). Survey participants were asked to rate each question on the scale with 6 point scale, 1= “strongly agree” to 6=”strongly disagree”. Questions are given in the Table 9.

Table 9: Mobile phone efficacy construct

Mobile phone efficacy
▪ I had only the manual for reference. ▪ I had seen someone else using Advance Mobile Phone Services (internet, etc) before trying by myself. ▪ I could call someone for help if i got stuck. ▪ Someone else help me to get started. ▪ I had used similar services like these before

7.3.2.3 *Perceived Credibility*

Perceived credibility was adapted from Smith et al., (1996) and Wang et al., (2003). Survey participants were asked to rate each question on the scale with 6 point scale, 1=”strongly agree” to 6=”strongly disagree”. Questions are given in the Table 10.

Table 10: Perceived credibility construct

Following questions were adapted from Smith et al 1996:
▪ Companies should never sell the personal information in their databases to other companies. ▪ When people give personal information to a company for some reason, the company should never use the information for any other reason. ▪ I believe my personal information is safe when I use my cell phone or PDA to purchase goods or services.
Following questions were adapted from Wang et al 1996:
▪ Using mobile services would not divulge my personal information. ▪ I would find mobile services secure in conducting my transactions

7.3.2.4 *Perceived System Quality and Perceived Content Quality*

The measures of perceived system quality and perceived content quality were taken from the study of DeLone and McLean, (1992) and Lin and Lu, (2000). Survey participants were asked to rate each question on the scale with 6 point scale, 1=“strongly agree” to 6=“strongly disagree”. Questions are given in the Table 11.

Table 11: Perceived system quality & Perceived content quality construct

Perceived Service Quality: ▪ I think that the m-internet provides very reliable service. ▪ I think that m-internet is secure to use ▪ I think that the speed of m-internet is fast. Perceived Content Quality: ▪ I think that m-internet provides various information and services ▪ I think that the services and information I can get from m-internet is valuable ▪ M-internet provides the information and services that I need

7.3.2.5 *Perceived Price Level*

Items regarding perceived price level were adopted from the study of Liao and Cheung, (2001) and from the study of Mao, (2005). Survey participants were asked to rate each question on the scale with 6 point scale, 1=“strongly agree” to 6=“strongly disagree”. Questions are given in the Table 12.

Table 12: Perceived price level construct

Items adopted from the study of Liao and Cheung (2001): ▪ I think that using mobile phone services is expensive in overall. ▪ I think that the price level of using mobile phone services is burden to me. ▪ I think that the price level of using special service or information is expensive to use. Items adopted from the study of Mao (2005): ▪ The price of mobile phone services is important. ▪ I can afford to use mobile phone services. ▪ I would use mobile phone services (more frequently) if the cost/ price would be less. ▪ Mobile phone services are too expensive.

7.3.3 Technology Readiness Index Construct

The Technology Readiness Index (TRI) is a survey research scale that measures and classifies individuals by their propensity to embrace technology. Parasuraman, (2000) developed and validated the TRI scale.

TRI scale, which has 36 items in total, provides measures on four technology readiness dimensions. There are 10 items measuring optimism, 7 items for innovativeness, 10 items for discomfort and finally 9 items measures insecurity.(See table 14) Survey participants were asked to rate each question on the scale with 6 point scale, 1=’’strongly agree’’ to 6=’’strongly disagree’’.

In addition to TRI we incorporated two more scales from Parasuraman, items a total of 44 questions were adapted from the Parasuraman, (2000) survey.

Five questions were related to owning or having in home access to technology based products or services .These questions offered three response choices: currently have, plan to acquire in the next 12 months, and no plans to acquire. (See table 13)

Three questions were included about the use of specific technology based services; these included using ATM, conducting telephone banking and purchasing items online. These questions offered 3 response choices: used in the past 12 months, plan to use in the next 12 months, and no plans to use. (See table 13)

Table 13: Items related to ownership of technological products or services and use of technological products or services

Items related to owning or having in home access to technology based products or services: ▪ Do you use a cellular phone for your household? ▪ Do you have voice mail at home? ▪ Do you have a computer at home? ▪ Do you have internet service at home? ▪ Do you have Personal Digital Assistant (PDA)? Items regarding the use of specific technology based services: ▪ Have you ever used an ATM? ▪ Have you ever conducted telephone banking using an automated phone system? ▪ Have you purchase an item online?

Table 14: Technology readiness index construct

Items that measures discomfort

- Technical support lines are not helpful because they don't explain things in terms you understand.
- Sometimes you think that technology systems are not designed for use by ordinary people.
- There is no such thing as manual for a high-tech products or services that's written in plain language.
- If you buy high-tech product or service, you prefer to have the basic model over one with a lot of extra features.
- When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do.
- Technology always seems to fail at the worst possible time.
- There should be caution in replacing important people-tasks with technology because new technology can breakdown or get disconnected.
- It is embarrassing when you have trouble with the high-tech gadget while people are watching.
- Many new technologies have health or safety risks that are not discovered until after people have used them.
- New technology makes it too easy for government and companies to spy on people.

Items that measures insecurity

- The human touch is very important when doing business with a company.
- When you call a business, you prefer to talk to a person rather than a machine.
- You do not consider it safe to do any kind of financial business online.
- You do not consider it safe giving out a credit card number over a computer.
- You do not feel confident doing business with a place that can only be reached online.
- Any business transaction you do electronically should be confident later something in writing.
- Whenever something gets automated, you need to check carefully that the machine or computer is not making mistakes.
- If you provide information to a machine or over the on internet, you can never be sure it really gets to the right place.
- You worry that information you send over the internet will be seen by other people.

Items that measures innovativeness

- Other people come to you for advice on new technology.
- In general, you are among the first in your circle of friends to acquire new technology when it appears.
- It seems your friend learning more about newest technologies than you are.
- You enjoy the challenge of figuring out high-tech gadgets.
- You find you have fewer problems than other people in making technology work for you.
- You can usually figure out new high-tech products and services without help from others.
- You keep up with latest technological developments in your areas of interest.

Items that measures optimism

- Technology gives people more control over their daily lives.
- Products and services that use the newest technologies are much more convenient to use.
- You like the idea of doing business via computers because you are not limited to regular business hours.
- You prefer to use the most advanced technology available.
- You find new technology to be mentally stimulating.
- Learning about technology can be as rewarding as the technology itself.
- Technology makes you more efficient in your occupation.
- Technology gives you more freedom of mobility.
- You feel confident that machines will follow through with what instructed them to do
- You like the computer programs that allow you to tailor things to fit your own needs

7.3.4 *Items Related to Service Use*

In addition to the mobile commerce constructs and TRI constructs discussed above, we also asked a set of items regarding the mobile commerce services which were currently used and/or planned to be used in the future by respondents (See Table 15).

Table 15: Items related to service use

Following questions were asked to measure frequency use of mobile phone services :
▪ Send /receive pictures ▪ Send /receive SMS ▪ Receive calendar / reminder services ▪ Send /receive MMS ▪ Receive sports information ▪ Send /receive e-mail ▪ Listen to / download music ▪ Place bets online ▪ Play online games ▪ Use routine banking (pay bills etc.) ▪ Chat online with strangers ▪ Use routine banking (pay bills etc.)
Which service respondents would like to use:
▪ Search for and compare prices of product while shopping ▪ Receive shopping coupons ▪ Search for / receive product information while shopping ▪ Book cinema / theatre tickets ▪ Take part in online auctions ▪ Trade stock ▪ Buy products online ▪ Book travel tickets ▪ Access and use transaction services ▪ Use online currency conversion services

7.4 Statistical Analysis

In order to test the constructs underlying the multi-items questionnaire used in this study, a series of factor analyses were employed. As a result of these factor analyses summated scores were used to develop new variables, which were labelled and theoretical model was revised according to new variables

Then in order understand the effect of factors to dependent variables correlation and regression analyses were applied.

Later t-test and ANOVA analyses were conducted to understand if there was a difference between demographic variable and mobile commerce factors and technology readiness factors.

8 RESEARCH FINDINGS

8.1 Frequency distribution

Items related to owning or having in home access to technology based products or services.

It can be seen from the Table 16 that diffusion of cellular phones among the respondents was high being 98%. Diffusion of computer was also high being approximately 86%, with another 22% planning to get in the next 12 months. Seventy seven percent (77%) of respondents had Internet connection at home, with another 18% planning to get in the next 12 months. Forty two percent (42%) of respondents had voice mail services at home, with another 17% planning to get in the next 12 months.

As seen on Table 16 approximately 14% of respondents currently have Personal Digital Assistant, with another 17% planning to get in the next 12 months. Taking in consideration that PDA is an emerging product in Turkish telecommunication market, the above mentioned numbers are satisfactory.

Table 16: Frequency distribution of items related to owning/having in home access to technology based products or services

	Currently have		Plan to get in the next 12 months		No plans to get	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Do you use a cellular phone for your household?	223	%98.2	1	%0.4	3	%1.3
Do you have voice mail at home?	42	%18.5	17	%7.5	168	%74
Do you have a computer at home?	195	%85.9	22	%9.7	10	%4.4
Do you have internet service at home?	175	%77.1	41	%18.1	11	%4.8
Do you have Personal Digital Assistant (PDA)?	31	%13.7	39	%17.2	157	%69.2

Frequency distribution of items related to use of specific technology based services.

The use of ATM is high at approximately 95%. The use of telephone banking an automated phone system is also high at 73%, with another 29% planning to use in the next 12 months. Approximately 57% of respondents have purchased online and another

28% of respondents planning to purchase online products or services in the next 12 months.

The statistics above shows us that respondents in Turkey have positive attitude to use technology based services.

Table 17: Items regarding the use of specific technology based services:

	Used in the last 12 months		Plan to use in the next 12 months		No plans to use	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Have you ever used an ATM?	215	%94.7	3	%1.3	9	%4
Have you ever conducted telephone banking using an automated phone system?	165	%72.7	29	%12.8	33	%14.5
Have you purchase an item online?	129	%56.8	28	%12.3	70	%30.8

Frequency distribution of currently used mobile commerce services

Over 82% of respondents indicated that they use SMS services all the time with another 9% that use SMS services several times a month; this study confirms Ericsson survey which was discussed above. According to Ericsson lab survey all young people below the age of thirty send a minimum of one SMS per day. Turkey, together with Sweden is above world average on this case.

After the SMS services, the most frequently used services are receiving calendar/reminder services(56.4%), receiving/sending pictures (32%), and receiving /sending MMS(28.6%).

Table 18 results demonstrate that usage of services which require internet connection through mobile devices is relatively low or ignored by respondents in spite of their availability.

Only 7% of respondents indicated that they play online games, with another 66% who never used these services, nearly same results were achieved for chatting with (7%) and placing bets online services (2.6%).

Approximately 20% of respondents indicated that they use music listening and downloading services, with another 15% who use these services several times a month and with another 40% who never used these services. Twenty percent of respondents send and receive e-mail, while 44% of respondents indicated that they never used these services.

Usage of advanced and routine banking service is also relatively low, only 10% of respondents indicated that they use advanced banking service and 14% use routine banking services, while approximately 60% of respondents indicated that they have never use these services.

Table 18: Frequency distribution of currently used mobile commerce services

Services	Never use		Use several times a year		Use several times a month		Use all the time	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Send/receive pictures	36	%15.9	79	%34.8	39	%17.2	73	%32.2
Send/receive SMS	9	%4	14	%6.2	20	%8.8	184	%81.8
Receive calendar/reminder services	22	%9.7	41	%18.1	36	%15.9	128	%56.4
Send/receive MMS	39	%17.2	87	%38.3	36	%15.9	65	%28.6
Receive sports information	116	%51.1	52	%22.9	26	%11.5	33	%14.5
Send/receive e-mail	99	%43.6	57	%25.1	27	%11.9	44	%19.4
Listen to / download music	92	%40.5	55	%24.2	36	%15.9	44	%19.4
Place bets online	177	%78	24	%10.6	20	%8.8	6	%2.6
Play online games	151	%66.5	34	%15	26	%11.5	16	%7
Use advanced banking services	142	%62.6	41	%18.1	22	%9.7	22	%9.7
Chat online with strangers	146	%64.3	41	%18.1	24	%10.6	16	%7
Use routine banking (pay bills.)	128	%56.4	39	%17.2	27	%11.9	33	%14.5

The findings displayed in Table 18 consist with findings conducted by Ericsson Lab survey regarding the global usage of mobile commerce services that was discussed in the Mobile Commerce Market section of this thesis. The Ericsson survey show that on a global level the SMS is the most commonly used service, calendar function and

camera function are the next most used functions after voice and SMS. As the result of Ericsson survey downloading the ring tones, browsing the internet and use search engine were registered as a non optimized services.

Frequency distribution of mobile commerce services

Table 19 present the types of mobile commerce services that consumers are willing to use in the future. It can be seen that consumers are curious about using searching services, followed by the booking cinema/travel tickets services, transaction services, online currency conversion services, and online auction/trade stock services

Table 19: Frequency distribution of mobile commerce services

Services	Yes		No	
	Frequency	Percent	Frequency	Percent
Search for and compare prices of product while shopping	194	%85.5	33	%14.5
Receive shopping coupons	136	%59.9	91	%40.1
Search for / receive product information while shopping	179	%78.9	48	%21.1
Book cinema / theatre tickets	188	%82.8	39	%17.2
Take part in online auctions	49	%21.6	178	%78.4
Trade stock	77	%33.9	150	%66.1
Buy products online	134	%59	93	%41
Book travel tickets	180	%79.3	47	%20.7
Access and use transaction services	116	%51.1	111	%48.9
Use online currency conversion services	128	%56.4	99	%43.6

8.2 Factor Analyses and Reliability

We begin to analyze our data by applying factor analyses and reliability on mobile commerce and technology readiness index questionnaire. The factor analyses were used to summarize a large number of variables with a smaller number of derived variables called factors. After the factor analyses reliability tests were employed, items decreasing reliability were eliminated and factors of scales were found. Further new factors were labelled and used in analyses.

To understand, whether the data is appropriate for factor analysis or not, Kaiser–Meyer–Olkin Measure of Sampling Adequacy and Barlett Test of Sphericity were conducted. Related to KMO value, if KMO value is greater than 0.5 and Barlett test significance is 0.00 then the results of a factor analysis can be accepted as valid. In factor analyses Principle Component Method and Varimax Rotation were performed.

8.2.1 Factor Analysis Related to Use of Mobile Commerce

To conduct a factor analysis KMO and Bartlett test results were 0.725 and 1352.670 ($p=0.000$ respectively). As a result of a principal component analysis with varimax rotation we obtained 6 factors. Items which did not load to a single factor and items with loadings less than 0.5 were deleted from the variable set.

After conducting reliability analyses for each factor, items that decreased the reliabilities were also eliminated and factor analysis was repeated. The final result of factor analysis was 5 factors with reliabilities all above 0.70 (0.793, 0.798, 0.783, 0.749, and 0.790). The 5 factors retained to represent 64.18% of the variance (See Table 20).

We labelled factors as “Price level of m-commerce”, “Security of m-commerce”, “Privacy of m-commerce”, “Usefulness of m-commerce”, and “Ease of use of m-commerce”.

Table 20: Factor analysis for mobile commerce constructs

<u>Items / questions</u>	<u>Loading</u>	<u>Variance Explained</u>	<u>Cronbach Alpha</u>	<u>N of items</u>
Factor 1: Price level of mobile commerce				
I think that using mobile phone services is expensive in overall	.819	15.946	.7993	5
I think that the price level of using special service or information is expensive to use	.774			
Mobile phone services are too expensive	.759			
I think that the price level of using mobile phone services is burden to me	.691			
I would use mobile phone services (more frequently) if the cost/ price would be less	.669			
Factor 2: Security of mobile commerce				
I think that m-internet is secure to use	.843	15.734	.7983	6
I believe my personal information is safe when I use my cell phone or PDA to purchase goods or services.	.745			
Using mobile services would not divulge my personal information.	.740			
I think that the m-internet provides very reliable service.	.697			
I would find mobile services secure in conducting my transactions.	.647			
I think that mobile phone services is helpful to enhance effectiveness of my life in general	.841			
Factor 3: Usefulness of mobile commerce				
I think that mobile phone services provide very useful information to me.	.793	13.865	.7837	3
I think that mobile phone services are helpful to improve my performance in general.	.758			
I think that mobile phone services are very useful to my life in general.	.633			
Factor 4 : Ease of use of mobile commerce				
I think that using m services can be easily skilful.	.896	9.534	.7490	2
I think that learning to use m services is easy to understand.	.887			
Factor 5: Privacy of mobile commerce				
Companies should never sell the personal information in their databases to other companies.	.894	9.096	.7907	2
When people give personal information to a company for some reason, the company should never use the information for any other reason.	.844			
Total variance explained %		64.176		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.725			
Bartlett's Test of Sphericity	1352.670			
df	153			
Sig.	0.0000			

8.2.2 Technology Readiness Index

Since the questionnaire conducted for technology readiness index has been frequently used, and we planned to classify customers into five technology readiness segments, namely explorers, pioneers, skeptics, paranoids and laggards defined by Parasuraman and Colby (2001), we did not conduct factor analysis and the reliability analyses are given in the Table 21. The table below indicates that Cronbach's alpha for the TRI dimensions ranged from 0.65 to 0.78, only insecurity and innovativeness dimensions moderately reliable.

Table 21: Scores of TRI and its component dimensions

TRI dimensions	Mean	Std. Deviation	Minimum	Maximum	Cronbach's alpha
Optimism	2.50	.79	1.00	5.30	.77
Innovativeness	2.90	.85	1.00	5.14	.65
Discomfort	3.09	.89	1.00	5.20	.78
Insecurity	2.61	.78	1.00	4.56	.67
Overall TRI	3.47	.19	3.00	4.00	.85

The combination of scores on the above four technology readiness dimensions represents a person's overall technology readiness (Parasuraman and Colby, 2001). Based on TRI, the respondents were analyzed into five different segments according to Table 22, and results of frequency analysis is presented in Table 23 and shown in Figure 10.

Table 22: Characteristics of technology segments

	Optimism	Innovativeness	Discomfort	Insecurity
Explorer	<i>High</i>	<i>High</i>	Low	Low
Pioneers	<i>High</i>	<i>High</i>	<i>High</i>	<i>High</i>
Skeptics	Low	Low	Low	Low
Paranoids	<i>High</i>	Low	<i>High</i>	<i>High</i>
Laggards	Low	Low	<i>High</i>	<i>High</i>

Figure 10 shows that about 16% of the respondents were explorers; Parasuraman and Colby (2001) confirmed that explorers are an easy group to attract when new technology is introduced and they will be the first wave of customers. The survey found that approximately 48 % of respondents were sceptics, who did abhor

technology, but required to be convinced of the advantages of using the new technology. Once they were convinced of the benefits of new technology, they would willingly adopt emerging technology. Nearly 12% of the survey respondents were pioneers, who desired the benefits of technology but were more concerned about the difficulties and barriers involved.

It is known that pioneers are the next group in the line to try new technology, but for this they need help in making the technology work for them and they require some degree of assurance. About 22% of the respondents were technology laggards, according to Parasuraman and Colby (2001) laggards may never use the emerging technology unless they were forced to do so. The survey found approximately 2% of respondents was paranoids, who were convinced about benefits of the new technology, but were concerned about discomfort and insecurity.

Table 23: Dimension for technology readiness index constructs

	Frequency	Percent
Sceptic	109	48.0
Laggard	51	22.5
Explorer	37	16.3
Paranoid	3	1.3
Pioneer	27	11.9
Total	227	100.0

As there are only 3 respondents representing the paranoid group, we exclude it in further analysis, due to the insufficient number of representatives.

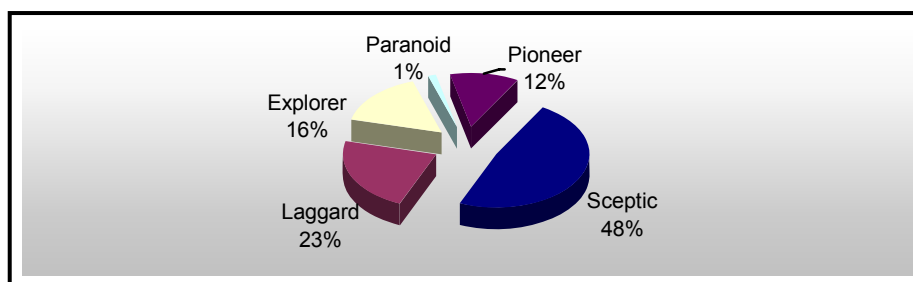


Figure 10: Technology Readiness Segments

8.2.3 Factor Analysis Related to Dependent Variables

When we conducted factor analysis to three items related to attitude towards use, KMO and Bartlett test results were 0.684 and 138.347 ($p=0.000$ respectively), with 0.720 reliability result (See Table 24). Factor analysis result was uni-dimensional.

Table 24: Factor analysis for attitude towards use

<u>Factor name</u>	<u>Questions</u>	<u>Variance Explained</u>	<u>Cronbach Alpha</u>	<u>N. of items</u>
Attitude	I think that using mobile phone services is good idea.	64.883	.7202	3
	I have positive perception about using mobile phone services.			
	I think that using mobile phone services is beneficial to me.			
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.684	
	Bartlett's Test of Sphericity		138.347	
	Df		3	
	Sig		0.0000	

In the same way, we conducted factor analysis to 3 items of behavioural intention to use. Cronbach alpha value was 0.755. KMO and Bartlett test results were 0.605 and 255.979 ($p=0.000$ respectively). Factor analysis result was uni-dimensional (See table 25).

Table 25: Factor analysis for behavioural intention to use

<u>Factor name</u>	<u>Questions</u>	<u>% of Var. Explained</u>	<u>Cronbach Alpha</u>	<u>N. of items</u>
Behavioural Intention	Assuming that I have access to the mobile services, I intend to use them.	69.145	.7549	3
	I recommend others to use mobile phone services.			
	I intend to use mobile phone services as much as possible			
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.605	
	Bartlett's Test of Sphericity		255.979	
	Df		3	
	Sig.		0.0000	

As a result of factor analyses items decreasing reliability were eliminated and factors of scales were found. Further new factors were labelled and the theoretical model (see Figure 11) was revised according to those factors (see Figure 12).

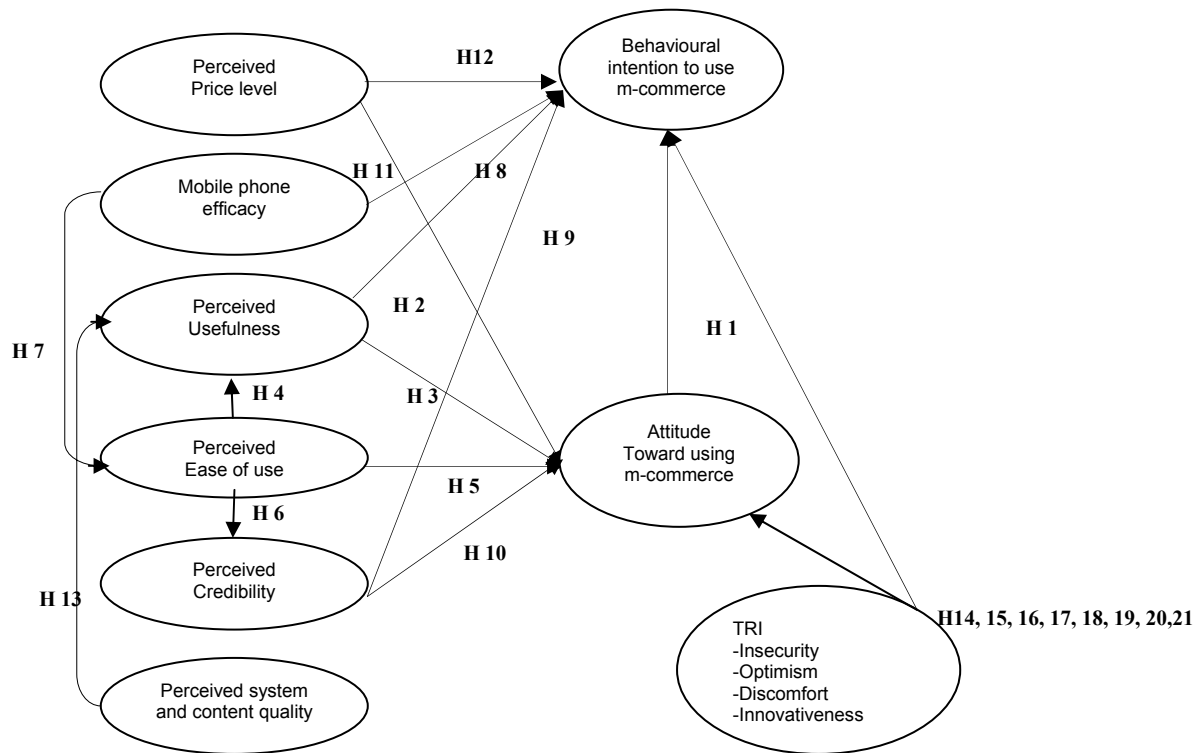


Figure 11: Theoretical Model

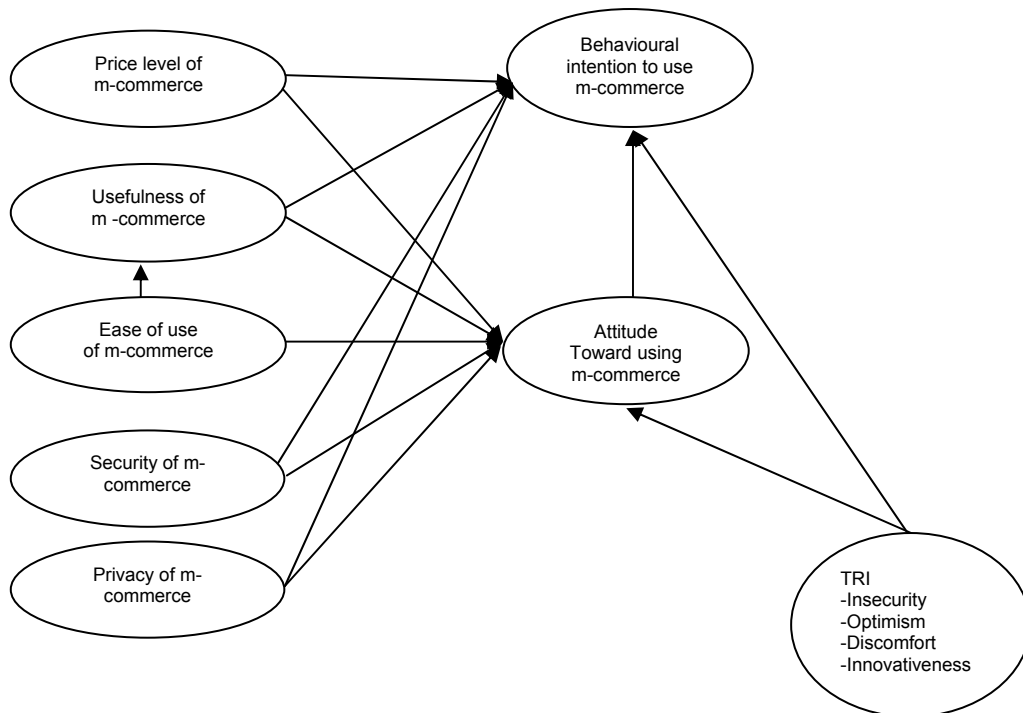


Figure 12: Research Model

According to the results of our research, Turkish m-phone users have perceived information security issues as personal security concerns. Therefore, the factor “perceived system and content quality” from the theoretical model has transformed into the factor of “security of m-commerce” and the factor “perceived credibility” was renamed as “privacy of m-commerce.”

As a result of the factor analyses items related to “mobile phone efficacy” construct was eliminated. Therefore some of the hypotheses were revised (See Table 26).

Table 26: Changes in hypotheses

Original hypotheses: H6: Perceived ease of use will have a positive effect on perceived credibility of m-commerce H7: Higher self-efficacy will lead to higher perceived ease of use of m-commerce H8: Higher self-efficacy will lead to higher behavioural intention to use m-commerce H9: Perceived credibility will have positive effect on behavioural intention to use m-commerce H10: Perceived credibility will have positive effect on attitude toward using mobile commerce H13: A customer's perceived system quality and content quality has a positive impact on his/her perceived usefulness.
Revised Hypotheses: H: Security will have negative effect on behavioural intention to use m-commerce H: Security will have negative effect on attitude toward using mobile commerce H: Privacy will have negative effect on behavioural intention to use m-commerce H: Privacy will have negative effect on attitude toward using mobile commerce

8.3 Multiple Regression

To test our revised theoretical model we conducted a series of multiple regression analyses.

8.3.1 Multiple Regressions for Behavioural Intention to Use

Based on literature survey and previous discussions we expect mobile commerce constructs (price level of mobile, usefulness of mobile commerce, ease of use of mobile commerce, security of mobile commerce and privacy of mobile

commerce) and technology readiness index constructs (optimism, insecurity, discomfort and innovativeness) to have positive effect on behavioural intention to use.

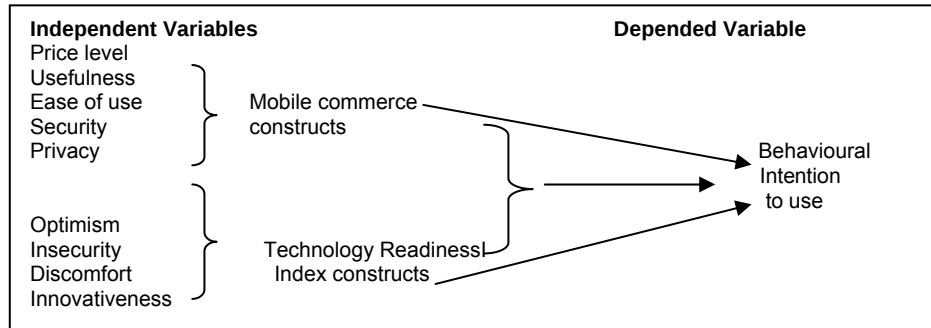


Figure 13: Multiple Regression for Behavioural Intention to Use

8.3.1.1 Mobile Commerce to Behavioural Intention

When we conducted multiple regression analyses for behavioural intention to use model (See Figure 13), to understand the relationship between mobile commerce constructs and behavioural intention to use, we obtained only three significant results that supported our assumption. Behavioural intention to use was explained by usefulness ($\beta=0.689$, $p<0.000$) security ($\beta=0.166$, $p<0.000$) and privacy ($\beta=0.101$, $p<0.019$). As reflected on the Table 27 usefulness of mobile commerce has highest contribution then other two constructs. The overall explanatory power of model was 60 % ($R=0.772$; $R^2=0.596$; $F=109.524$, $p=0.000$)

Table 27: Multiple regressions for behavioural intention–mobile commerce

Dependent variable : Behavioural intention			
Independent variables :	Beta	t-value	p-value
Usefulness of mobile commerce	.689	15.269	0.000
Security of mobile commerce	.166	3.688	0.000
Privacy of mobile commerce	.101	2.366	0.019
R=0.772 R ² = 0.596			
F=109.524 p= 0.000			

8.3.1.2 Technology Readiness Index to Behavioural intention to use

When we conducted multiple regression analyses for (See Figure 13), to understand the relationship between TRI constructs and behavioural intention to use, we

found out that optimism, discomfort, innovativeness and insecurity explained behavioural intention at 99% confidence interval ($F=15.657$, $p=0.000$ respectively, $R=0.469$; $R^2 = 0.220$). From this we can see that technology readiness variables have lower explanation power than mobile commerce variables, but those variables are still significant.

Table 28: Multiple regression for behavioural intention to use–TRI

Dependent variable : Behavioural intention			
Independent variables :	Beta	t-value	p-value
Optimism	.260	2.309	.022
Insecurity	-.245	3.632	.000
Discomfort	.271	-3.484	.001
Innovativeness	.182	3.813	.000
R=0.469 R ² = 0.220			
F=15.657 p= 0.000			

As reflected in Table 28 optimism, discomfort, and insecurity had almost equal contributions ($\beta=0.260$, 0.271 , and $\beta= -0.245$ only insecurity had a negative contribution) respectively, whereas innovativeness ($\beta=0.182$) had the lowest contribution in this analysis than other TR dimensions.

8.3.1.3 Attitude Towards Use to Behavioural Intention to Use

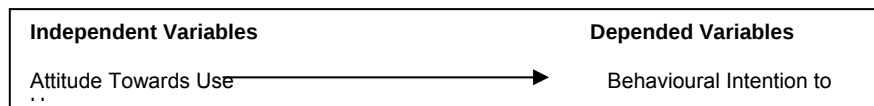


Figure 15: Multiple Regression for Attitude Towards Use

When we conducted multiple regression analyses for attitude towards use model (See Figure 15), attitude towards use explained behavioural intention at 99% confidence interval ($F=283.112$, $p=0.000$; $R=0.474$; $R^2=0.225$); (See Table 29).

Table 29: Multiple regression for behavioural intention to use–attitude

Dependent variable : Behavioural intention to use			
Independent variables :	Beta	t-value	p-value
Attitude towards use	.298	4.860	0.000
R=0.474 R ² = 0.225			
F=32.443 p= 0.000			

8.3.2 Multiple Regressions for Attitude Towards Use

Based on literature survey and previous discussions we expect mobile commerce constructs (price level of m-commerce, usefulness of m-commerce, ease of use of m-commerce, security of m-commerce and privacy of m-commerce) and TRI constructs (optimism, insecurity, discomfort and innovativeness) to have positive effect on attitude towards use.

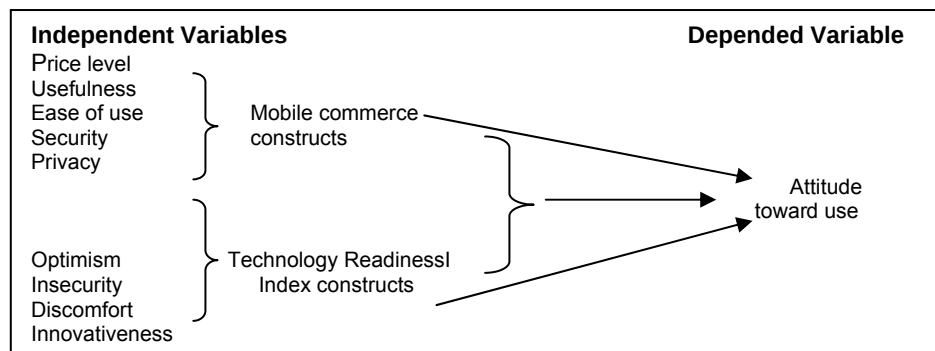


Figure 16: Multiple Regression for Attitude Towards Use

8.3.2.1 Mobile Commerce to Attitude Towards Use

When we conducted multiple regression analyses for behavioural intention to use model (See Figure 16), we obtained five significant results that supported our assumption (See Table 30). Usefulness, ease of use, security, price level and privacy explained attitude towards use at 99% confidence interval ($F=68.116$ $p>0.01$; $R=0.779$; $R^2=0.606$) β coefficient for usefulness, ease of use, security, price level and privacy were $\beta=0.640$, $\beta=0.149$, $\beta=0.153$, $\beta=0.112$, and $\beta=0.087$ respectively.

Table 30: Multiple regression for mobile commerce constructs

Dependent variable : Attitude towards use			
Independent variables :	Beta	t-value	p-value
Usefulness of mobile commerce	.640	14.047	.000
Ease of use of mobile commerce	.149	3.358	.001
Security of mobile commerce	.153	3.413	.001
Price level of mobile commerce	.112	2.576	.011
Privacy of mobile commerce	.087	1.996	.047
R=0.779 R ² = 0.606			
F=68.116 p= 0.000			

8.3.2.2 Technology Readiness Index to Attitude Towards Use

When we conducted multiple regression analyses for behavioural intention to use model (See Figure 16), to understand the relationship between TRI constructs and attitude towards use, we obtained only two significant results that supported our assumption (See Table 31).

Optimism and innovativeness explained attitude towards use at 99% confidence interval ($F=28.025$, $p=0.000$; $R=0.447$; $R^2=0.200$) β coefficient for optimism and innovativeness were $\beta=.269$ and $\beta=.239$ respectively.

Table 31: Multiple regression for TRI constructs

Dependent variable : Attitude towards use			
Independent variables :	Beta	t-value	p-value
Optimism	.269	3.751	.000
Innovativeness	.239	3.327	.001
R=0.447 R ² = 0.200			
F=28.025 p= 0.000			

8.3.3 Ease of Use of m-Commerce to Usefulness of m-Commerce

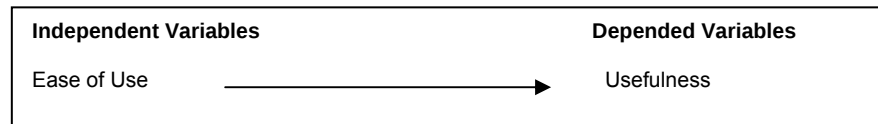


Figure 17: Multiple Regression Model for Usefulness

When we conducted multiple regression analysis for ease of use (see Figure 17), as reflected on the Table 32 ease of use has a low but significant effect on usefulness of mobile commerce. Ease of use explained usefulness of mobile commerce 0.05 %. ($F=11.829$, $p=0.001$, $R=0.223$, $R^2=0.05$ respectively).

Table 32: Multiple regression for usefulness

Dependent variable : usefulness of mobile commerce			
Independent variables :	Beta	t-value	p-value
Ease of use of mobile commerce	.223	3.439	.001
R=0.223 R ² = 0.050			
F=11.829 p= 0.001			

8.3.4 TRI–Mobile Commerce Constructs to Dependent Variables:

When we conducted regression analysis for attitude towards use by using both mobile commerce and technology readiness constructs, we found that technology readiness constructs do not have any explanatory power together with mobile commerce constructs, whereas separately in the analysis above TRI explained attitude towards use 20 %.

It can be commented that mobile commerce constructs such as usefulness, ease of use, price level, security and privacy are the best predictors of attitude towards use and behavioural intention to use, than TRI constructs.

Same results were achieved with regards to behavioural intention to use.

8.4 Independent Sample t-Test

In order to find out if the constructs showed any differences with regard to gender and marital status of the respondents independent sample t-test were conducted.

8.4.1 Independent Sample t-Test for Gender Variable

As a results of the independent sample t-tests no significant differences were found between the way males and females perceive usefulness, ease of use, privacy, security, price level and tree dimensions of TRI at 0.05 significant level. However there is difference in the way they perceive innovativeness (See Table 33).

It can be commented that females are more innovative than males ($t=2.823$, $p=0.005$; mean_F =3.053, mean_M =2.741).

Table 33: Independent sample t-test for gender

		N	Mean	Std. Dev.		t-value	p-value
Innovativeness	Female	115	3.053	0.874	Equal variances assumed	2.823	.005
	Male	112	2.741	0.790	Equal variances not assumed	2.826	.005
Levene's Test for Equality of Variances					F	p	
					0.414	0.521	

8.4.2 Independent Sample t-Test for Marital Status

None of the characteristics of the mobile commerce and technology readiness index are perceived significantly different by the two groups of marital status (Alpha=0.05).

8.5 One Way ANOVA Test

To test if there were differences between how the constructs were perceived by respondents with regard to demographic variables that had more than two groups a series of one way ANOVA tests were performed. Parallel to this we also performed one way ANOVA tests with TRI segments: sceptics, laggards, pioneers and explorers.

8.5.1 Education Level One Way ANOVA Results:

The analysis of variance we performed between the three groups with different education levels and the mobile commerce constructs and TRI constructs showed that respondents with different education status attributed significantly only to Insecurity construct ($F=3.461$, $p=0.033$); (See Table 34).

It can be commented that respondents who received Master and PhD are more concerned about security issues than respondents who received university degree. (mean_{HS}=2.623; mean_{MD&PhD}=2.524; mean_{Un}=2.847)

Table 34 One-way ANOVA test for education level

		N	Mean	F	Sig
Insecurity	High School and Below University	23	2.623	3.461	0.033
		150	2.524		
	Master and PhD	54	2.847		
Scheffe			Mean Difference	Std. Error	Sig
	High School and Below University	University	0.10	0.17	0.85
		Master and PhD	-0.22	0.19	0.51
	University	High School and Below	-0.10	0.17	0.85
		Master and PhD	-0.32	0.12	0.03*
	Master and PhD	High School and Below	0.22	0.19	0.51
		University	0.32	0.12	0.03*

8.5.2 Income Level One Way ANOVA Results:

The analysis of variance we performed between the five groups with different income levels and the mobile commerce constructs and TRI constructs showed that respondents with different income levels attributed significantly only to Insecurity construct ($F=3.358$, $p=0.011$); (See Table 35).

It can be commented that respondents with low income level pay less attention to security, than respondents with income level higher than 3000 YTL (mean₅₀₀₋₁₀₀₀=2.456; mean₂₀₀₀₋₃₀₀₀=2.778).

Table 35: One-way ANOVA test for income level

		N	Mean	F	Sig
Insecurity	500 YTL or less	34	2.369	3.358	0.011*
	500 YTL- 1000 YTL	59	2.456		
	1000 YTL - 2000 YTL	79	2.651		
	2000 YTL – 3000 YTL	32	2.778		
	3000 YTL – or more	23	3.000		
Scheffe			Mean Difference	Std. Error	Sig
500 YTL or less	500 YTL- 1000 YTL		-0.09	0.16	0.99
	1000 YTL - 2000YTL		-0.28	0.16	0.52
	2000 YTL – 3000 YTL		-0.401	0.19	0.99
	3000 YTL – or more		-0.63	0.21	0.52
500 YTL- 1000 YTL	500 YTL or lees		0.09	0.16	0.33
	1000 YTL - 2000 YTL		-0.19	0.13	0.05*
	2000 YTL – 3000 YTL		-0.32	0.17	0.99
	3000 YTL – or more		-0.54	0.19	0.70
2000 YTL – 3000 YTL	500 YTL or lees		0.28	0.16	0.46
	500 YTL- 1000 YTL		0.19	0.13	0.08
	1000 YTL - 2000 YTL		-0.13	0.16	0.52
	3000 YTL – or more		-0.35	0.18	0.70
3000 YTL – or more	500 YTL or lees		0.41	0.19	0.96
	500 YTL- 1000 YTL		0.32	0.17	0.45
	1000 YTL - 2000 YTL		0.13	0.16	0.32
	2000 YTL – 3000 YTL		-0.22	0.21	0.46

8.5.3 One-Way ANOVA results for “Insecurity” and “Age”:

The analysis of variance we performed between the three groups with different age levels and the Insecurity showed that there is a significant difference between the perception of insecurity of 25 years or younger and 26-34 years age group (mean_{25 or younger} = 2.414; mean₂₆₋₃₄=2.867), and between 26-34 age group and 35 years or older age group (mean₂₆₋₃₄ =2.867; mean_{35 or older} =2.359); (See Table 36).

Table 36: One-way ANOVA results for insecurity & age

		N	Mean	F	Sig
Insecurity	25 or younger	99	2.214	10.791	0.000
	26-34	102	2.867		
	35 or older	26	2.359		
Scheffe			Mean Difference	Std. Error	Sig
	25 or younger	26-34	-0.45	0.11	0.00*
		35 or older	0.05	0.17	0.95
	26-34	25 or younger	0.45	0.11	0.00*
		35 or older	0.51	0.16	0.01*
	35 or older	25 or younger	-0.05	0.17	0.95
		26-34	-0.51	0.16	0.01*

8.5.4 One-Way ANOVA results for “Innovativeness” and “Age”:

The analysis of variance we ran between the three groups with different age levels and the innovativeness showed that there is a significant difference between the perception of Innovativeness of 25 years or younger and 26-34 years age group (mean_{25 or younger} = 2.658; mean₂₆₋₃₄=3.141); (See Table 37).

Table 37: One-way ANOVA results for innovativeness & age

		N	Mean	F	Sig
Innovativeness	25 or younger	99	2.658	8.783	0.000
	26-34	102	3.141		
	35 or older	26	2.868		
Scheffe			Mean Difference	Std. Error	Sig
	25 or younger	26-34	-0.48	0.11	0.00*
		35 or older	-0.21	0.18	0.51
	26-34	25 or younger	0.48	0.11	0.00*
		35 or older	0.27	0.18	0.32
	35 or older	25 or younger	0.21	0.18	0.51
		26-34	-0.27	0.18	0.32

8.5.5 One-Way ANOVA results for “Discomfort” and “Age”:

The analysis of variance we performed between the three groups with different age levels and the discomfort showed that there is a significant difference between the perception of discomfort of 25 years or younger and 26-34 years age group (mean_{25 or younger} = 2.977; mean₂₆₋₃₄ = 3.340), and between 26-34 age group and 35 years or older age group (mean₂₆₋₃₄ = 3.340; mean_{35 or older} = 2.569); (See Table 38).

Table 38: One-way ANOVA results for discomfort & age

		N	Mean	F	Sig
Discomfort	25 or younger	99	2.977	10.084	0.000
	26-34	102	3.340		
	35 or older	26	2.569		
Scheffe		Mean Difference		Std. Error	Sig
	25 or younger	26-34	-0.36	0.12	0.01*
		35 or older	0.41	0.19	0.10
	26-34	25 or younger	0.36	0.12	0.01*
		35 or older	0.77	0.19	0.00*
	35 or older	25 or younger	-0.41	0.19	0.10
		26-34	-0.77	0.19	0.00*

8.5.6 One-Way ANOVA results for “TRI segments” and “Attitude Towards Use”:

The analysis of variance we performed between the four groups with different technology readiness segments and the attitude towards use (See Table 39) showed that there is a significant difference between the perception of attitude of sceptics and explorers, sceptics and pioneers, laggards and explorers, and laggards and pioneers (mean_{skeptics} = 1.939; mean_{laggards}=2.157; mean_{explorers}=2.892; mean_{pioneers}=2.803).

Table 39: One-way ANOVA results for TRI segments & attitude towards use

		N	Mean	F	Sig
Attitude	Skeptic	109	1.939	12.185	0.000
	Laggard	51	2.157		
	Explorer	37	2.892		
	Pioneer	27	2.803		
Scheffe			Mean Difference	Std. Error	Sig
	Sceptic	Laggard	-0.22	0.16	0.63
		Explorer	-0.95	0.18	0.00*
		Pioneer	-0.86	0.21	0.00*
	Laggard	Sceptic	-0.22	0.16	0.63
		Explorer	-0.73	0.21	0.01*
		Pioneer	-0.65	0.23	0.05*
	Explorer	Sceptic	0.95	0.18	0.00*
		Laggard	0.73	0.21	0.01*
		Pioneer	0.09	0.25	0.99
	Pioneer	Sceptic	0.86	0.21	0.00*
		Laggard	0.65	0.23	0.05*
		Explorer	-0.09	0.25	0.99

8.5.7 One-Way ANOVA results for “TRI segments” and “Behavioural Intention to Use”:

The analysis of variance we performed between the four groups with different technology readiness segments and the behavioural intention to use (See Table 40) showed that there is a significant difference between the perception of behaviour of sceptics and explorers, sceptics and pioneers, sceptics and laggards, laggards and explorers (mean_{skeptics} =2.171; mean_{laggards}=2.693; mean_{explorers}=3.369; mean_{pioneers}=3.025).

Table 40: One-way ANOVA results for TRI segments & behavioural intention to use

		N	Mean	F	Sig
Behavioural Intention	Sceptic	109	2.171	13.586	0.000
	Laggard	51	2.693		
	Explorer	37	3.369		
	Pioneer	27	3.025		
Scheffe			Mean Difference	Std. Error	Sig
	Sceptic	Laggard	-0.52	0.18	0.04*
		Explorer	-1.20	0.20	0.00*
		Pioneer	-0.85	0.21	0.00*
	Laggard	Sceptic	0.52	0.18	0.04*
		Explorer	-0.68	0.23	0.04*
		Pioneer	-0.33	0.26	0.64
	Explorer	Sceptic	1.20	0.20	0.00*
		Laggard	0.68	0.23	0.04*
		Pioneer	0.34	0.27	0.66
	Pioneer	Sceptic	0.85	0.23	0.00*
		Laggard	0.33	0.26	0.64
		Explorer	-0.34	0.27	0.66

9 DISCUSSION AND CONCLUSION

The main purpose of this thesis was examining factors that influence an individual's intention to adopt mobile commerce in Turkey. Thus, this study intended to understand the acceptance of mobile commerce from the consumer perspectives, by identifying main factors that are able to predict intention to use mobile services.

For this purpose, TAM has been employed as the base model for the study and has been modified to reflect the Mobile Commerce context. Apart from original technology acceptance model constructs (perceived usefulness and perceived ease of use) we modified the TAM by adding additional factors (such as: price level, mobile phone efficacy, perceived credibility, system quality and content quality, technology readiness index) into the model to examine those factor influences on behavioural intention ,and to understand which of those factors have a high influence on behavioural intention.

Attitude Toward Using Mobile Commerce

H1: Attitude toward using mobile commerce services has a positive effect on the intention to use mobile commerce services.

As expected, attitude toward using mobile commerce was found to have significant positive effect on the intention to use mobile commerce ($\beta=0.298$, $p<0.000$). A significant positive effect on intention to use is consist with other findings related to IS and technology acceptance (e.g. Cheong and Park, 2005; Hu and Chau, 1999 and Chang and Cheung, 2001; Fishbein and Ajzen, 1975; Davis et al, 1898; Taylor and Todd, 1995a).

In our model, the third highest predictive power for the intention to use is belonged to the attitude toward the service, followed by other constructs. This

reconfirms the role of the attitude in predicting the intention and, thus, supports the argument that this construct should continue to be used in the further researches of technology acceptance.

Usefulness of Mobile Commerce

H2: Perceived usefulness positively influences behavioural intention mobile commerce.

H3: Perceived usefulness positively influences attitude toward using mobile commerce.

As was hypothesized perceived usefulness, was found to have positive significant effect both on attitude towards use ($\beta=0.640$, $p<0.000$) and behavioural intention to use ($\beta=0.689$, $p<0.000$) mobile commerce. The findings consist with other empirical researches (e.g. Hu et al, 1999; Cheong, J.-H. & Park, M.-C. 2005; Yang, K 2005 – studies found positive effect on attitude towards use; Davis et al, 1989; Khalifa, M. 2006; Lu et al., 2003; Mao, E. et al, 2005; Venkatesh 1999; Venkatesh & Davis, 1996; 2000; Jackson et al, 1997; Agarwal & Prasad, 1999; - studies found positive effect on behavioural control).

Perceived usefulness appeared to be a key significant determinant of attitude and behavioural intention in both TAM and in the extended model. As has been already discussed above, perceived usefulness is defined as the one's positive beliefs about how much using mobile commerce will enhance one's job performance. This means that the key factor affecting consumers' usage intention is their beliefs regarding the usefulness of the mobile commerce.

In order to increase the usage of mobile commerce, mobile operators should conduct researches on consumer needs and expectations, and should continuously improve their services and enlarge the range of products according to the consumer requests.

Ease of Use of Mobile Commerce

H4: Perceived ease of use will have a positive effect on perceived usefulness of m-commerce

H5: Perceived ease of use will have a positive effect on attitude toward using m-commerce.

As was hypothesized perceived ease of use has positive effect on perceived usefulness as well as on attitude toward using mobile commerce ($\beta=0.149$, $p=0.001$). Ease of use explained usefulness of mobile commerce at 0.05 %

As was discussed above perceived ease of use is predicted to influence perceived usefulness, because the easier a system is to use, the more useful it can be. Following link has been strongly supported by other researches, (DeLone & McLean, 1992; Venkatesh, 2000; Gefen & Straub, 2000; Sandu & Corbitt, 2002; McCloskey, 2006). Following means that the easier the system to use in mobile context it can be the services or the mobile device the more useful it can be.

Mobile operators should provide less complex services and make the system easy to interact, for instance if some has to set up his or her phone it can be done by sending one simple SMS. Also people have difficulties in using mobile devices, due to their small screen, unfriendly user interface, low speed, complicated set ups; therefore companies should closely cooperate with mobile phone manufactures to develop more user friendly devices such as Blackberry and Ipad phone devices. These practices would definitely influence one's intention to use mobile commerce (Wang; Luarn & Lin 2006).

In a YouGov (2007) survey commissioned by Netonmy in the United Kingdom, 79% of consumers also felt that mobile services were becoming more complicated to understand and configure. This suggests that ease of use is also an important issue (<http://www.oecd.org/dataoecd/22/52/38077227.pdf>).

Price Level of Mobile Commerce

H11: The perceived price level has negative impact on his/her attitude toward using m-commerce

H12: The perceived price level has negative impact on his/her intention to use m-commerce

Contrary to our hypotheses we found significant, but positive impact of price level on attitude toward using mobile commerce services ($\beta=0.112$, $p=0.011$). Previous studies (ex. Cheong and Park, 2005; Lio and Cheung, 2001) showed price level has a negative significant impact on behavioural intention to use and on attitude towards use.

In the mobile context, the price level is determined to be the most important factor in decision making process. Therefore, telecommunication companies should build strategies that would allow everyone to use advanced mobile commerce services (m-internet, m-banking, etc).

According to statistics regarding the “comparative price levels for selected consumer services in Europe for 2005” the people of Finland (78) and Sweden(75) enjoy the advantage of cheap communication services, while Turkey was regarded as quite expensive for communication services(101). Since the m-commerce price level is quite expensive in Turkey, not all of the mobile phone users have the opportunity to use m-commerce services. And also since these services are fairly new to the Turkish customers, they don't have the habit of using these services in spite of their usefulness.

Even though our study supports the fact that there is a relationship, the reverse sign may be due to customers' perception of m-commerce as a status symbol.

Privacy of Mobile Commerce

Protecting consumers' privacy is an important factor for the success of e-commerce (Liu et al. 2004). The privacy concerns that are exhibited by e commerce customers are also applicable to mobile commerce customers, and have been addressed

in several studies (Culnan 1993; Hoffman et al. 1999b; Smith et al. 1996; Stewart and Segars 2002).

Customer privacy has always been a critical issue in marketing, but has assumed a greater significance in recent years with the rise of Internet-based commercial transactions (Rust, Kannan and Peng, 2002).

Most consumers are still quite uncomfortable with the concept of mobile business and they are sceptical whether these businesses are feasible and secure (Siau and Shen, 2003). A survey in Japan asked consumers whether they had any concerns about mobile payment schemes (MRI and Rakuten, 2004). Respondents named privacy issues (78.2%) and the potential increase in misuse and theft (75.9%) as the biggest source of concern.

Mobile technologies are considered “personal” technologies, attached to a particular body or person (Green, Harper, Murtagh and Cooper, 2001).

Privacy issues are therefore very important when using mobile devices in addressing the consumers. Hence, consumers are very sensitive about receiving messages from unknown person or organizations (eg. Location based services).

For instance there are now location-based services that the user does not have to request, such push location-based advertising allows messages to be sent to the user’s mobile phone to provide special offers in restaurants/shops near the user’s location. Some users perceive it as an invasion of privacy, while others may find it helpful. Therefore, telecommunication companies should identify the key elements for protecting the privacy of a user’s location information and develop commonly accepted rules that would provide important safeguards for the protection of the privacy of mobile phone users.

Therefore it was hypothesized that:

H: Privacy will have negative effect on behavioural intention to use m-commerce

H: Privacy will have negative effect on attitude toward using m-commerce

Contrary to our hypotheses we found significant, but positive impact of privacy on attitude toward using mobile commerce services ($\beta=0.087$ $p=0.047$) and on behavioural intention to use ($\beta=0.101$, $p=0.019$). Both results appeared to be relatively low.

Even though our study supports the fact that there is a relationship, the reverse sign may be due to cultural differences, which requires further research for explanation. As the magnitude of the relation was weak we believe this reverse sign does not cause a problem for our study.

Security of Mobile Commerce

In addition to privacy concern, the security of consumer information has been recognized as one of the important determinants of attitude toward using technology based products or services. Belanger et al. 2002, noted that in spite of the close relationship with privacy concerns, security is a different construct.

Palen and Salzman (2002) identified security as part of the advancement of usability in m-commerce and a part of the overall system complexity.

In this paper, security concerns refer to the extent to which one believes the personal information transmitted over the Mobile Internet would be secure and would not be accessed by unauthorized parties.

Laforet and Li, (2004) study on consumer attitude toward online and mobile banking in China found that security factor is the most important attribute that could motivate consumers' attitudes towards online banking in China.

Ong et al., (2004) study confirms the significant influence of perceived credibility on behavioural intention to use e-learning, showing that it is not sufficient to develop an e-learning system with valuable functions and user-friendly interaction to attract more user. It is more important to assure e-learners that they are free of privacy

and security threats. In addition, perceived credibility seems to influence users' attitudes toward using e-learning.

Luarn & Lin, 2005 study confirms Wang et al.'s (2003) research that found a significant direct relationship between perceived credibility and behavioural intention to use mobile banking.

Daniel (1999) predicted security to be one of the determinants of customer acceptance of internet banking. Therefore the hypothesis above were developed and analyzed.

H: Security will have negative effect on behavioural intention to use m-commerce

H: Security will have negative effect on attitude toward using m-commerce

Contrary to our hypotheses we found significant, but positive impact of security on attitude toward using mobile commerce services ($\beta=0.153$ $p=0.047$) and on behavioural intention to use ($\beta=0.166$, $p=0.019$).

Similar to privacy, security also had reverse sign than expected. Again this may be due to cultural differences. Turkish people seem to use technology even though they suspect it is not secure. This hypothesis must be tested in the coming studies.

Technology Readiness Index

As was hypothesized innovativeness and optimism positively influences behavioural intention to use and attitude toward using mobile commerce services, according to Parasuraman and Colby (2001) innovativeness and optimism are the contributors that may increase an individual's technology readiness.

Contrary to our hypotheses we found significant, but positive impact of discomfort on behavioural intention to use. Previous study show that discomfort had negative impact on behavioural intention to use IS.

As was hypothesized above insecurity was found have negative significant impact on behavioural intention to use, according to Parasuraman and Colby (2001) insecurity is inhibitor that may suppress technology readiness.

Moreover, the findings summarized that people with high degree education level such as master degree and PhD degree are more sensitive to the issue of security than people who received university degree, the results somewhat consist with findings of Sheehan (2002) who concluded that persons with higher levels of education are more concerned about their privacy online than persons with less education.

The empirical results reveal that consumers with income levels of 2.000–3.000 YTL-considerably high income level in Turkey-are more concerned about security issues than consumers with income levels of 500-1000YTL, the results consist with findings of Asquisty and Grossklags (2005) who conclude that the lowest income level group tended to be less concerned about privacy and security issues than other respondents.

The respondents of 26-34 years of age are more sensitive to the issue of security than respondents of lower age groups, the results somewhat consist with findings of Zhao and Gutierrez (2004) who conclude that customers do have some concerns about online security and trust, and these concerns differ among different age groups. Younger customers (18–24 years old) have less concern about online security and trust than older customers. This may be because younger people are more likely to take risks, and are less concerned about security.

Even though our study supports the fact that high age consumers are less sensitive to security issues than 26-34 age group, the reverse sign may be due to newly introduced market and their distant stance to the habit of using these services on a daily basis.

In terms of innovativeness, our results show that the age group between 26 and 34 years is more innovative than 25 years or younger age group; the difference may be due to 26-34 years age group's excess of opportunities to experiment with new technology or their obligations to use new technologies (for example recently some

companies have introduced PDAs to increase work efficiency) whereas young generations do not have sufficient economic power to experiment new technologies or technology based services on time. Surprisingly, females in Turkey appeared to be more technology innovative than male.

The consumers of 35 years of age or older feel overloaded by the complexity of technology-related products than the group of 26-34 years old respondents. The result consists with findings of Wendy et al (1996) who found that some older adults continue to feel uncomfortable using an ATM.

Rama, de Ridder & Bouma, 2001, in their study stated that older people may find new technology systems harder to learn because of two inter-related factors: age-related cognitive change and “technology generation”. However, it is important to remember that older adults have not had the benefit of computer technology, as most of their working lifetimes computer technology did not exist (Browne, 2000). Other beliefs assert that the elderly lack the mental capacity to learn new technology (Saunders, 2004).

The empirical results with regard to technology readiness segment reveal that explorers have more positive attitude toward using mobile commerce services than sceptics, this results consist with Parasuraman and Colby (2001) study, they stated that explorer highly optimistic and innovative and fearless to try new technology once it appears in the market, while sceptics are lowly motivated and need to be convinced of benefits of using technology. The findings show that explorers also have more positive attitude toward using mobile commerce services than laggards.

The findings also show that pioneers have more positive attitude toward using m-commerce services than laggards, this results also confirms Parasuraman and Colby (2001) study, who stated that pioneers are relatively early adopters, but are simultaneously hold back by inherent discomfort and security issues, while laggards may never use technology unless they forced to do so. The findings reveal that pioneers have more positive attitude toward using mobile commerce services than sceptics.

Finally empirical findings show that explorers have positive intention to use m-commerce services than sceptics and laggards, and pioneers have positive intention to use m-commerce services than sceptics. The results consist with Parasuraman and Colby (2001) research. The findings reveal that first mobile commerce will be adopted by explorers then by pioneers, sceptics and finally by laggards.

10 LIMITATIONS

This study also has some limitations. First, investigation of mobile commerce acceptance is relatively new to researchers in the field of IS. Therefore, continued research is needed to generalize the findings of this study and extend the discussion to include additional technologies or groups.

Second, searching for additional variables that will improve our ability to predict usage intention more accurately is necessary.

Third, age is a limitation for this study, the percentage of older customers is proportionally less than other respondent groups. Therefore, further research must conduct proportional data. Moreover, most of the respondents in this study are highly educated and have an experience with ICT. As such, that they are not representative of Turkish society. Therefore further research has to be conducted in other regions with taking into consideration the education level.

Moreover, un-proportional distribution of technology readiness segment did not give us the opportunity to analyze whether segments differ in terms of current use of technology-based services and future adoption of mobile services.

Future research can also examine whether system characteristics, such as screen design, screen size, phone options and internet speed, have any influence on the acceptance of mobile commerce services.

Some of our findings (privacy, security, price level) were not statistically significant, and we wish to address this in future research studies.

APPENDIXES

APPENDIX 1: Questionnaire

Aşağıdaki çalışma Marmara Üniversitesi Sosyal Bilimler Enstitüsü İngilizce İşletme Anabilim Dalında yürütülmekte olan " Mobil hizmet (cep telefonu hizmetleri) ve teknoloji kullanımına tüketicilerin yaklaşımı" isimli yüksek lisans tezinin araştırması olup, sonuçları sadece bilimsel amaçla kullanılacaktır. Soruları eksiksiz doldurmanızı rica eder, yardımınız için teşekkür ederiz.

Yüksek Lisans Öğrencisi:
Jyldyza Sydykova

Tez Danışmanı:
Yrd.Doç.Dr.E.Serra YURTKORU

Cinsiyetiniz : ☐ Kadın ☐ Erkek

Yaşınız :

Eğitim Düzeyiniz: ☐ İlkokul ☐ Ortaokul ☐ Lise
☐ Üniversite ☐ Lisans üstü ☐ Doktora

Mesleğiniz:

Gelir düzeyiniz : ☐ 500 YTL'e kadar ☐ 500-1000 YTL'e kadar
☐ 1000- 2000YTL'e kadar ☐ 2000-3000YTL'e kadar
☐ 3000 YTL üstü

Medeni haliniz : ☐ Evli ☐ Bekar ☐ Dul ☐ Boşanmış

Çocuk sayısı : ☐ Yok ☐ 1 ☐ 2 ☐ 3 ☐ 4 ve üstü

Aşağıdaki derecelendirmeyi kullanarak (1-5) soruları cevaplayınız :

- 1- şu anda var
- 2- gelecek 12 ay içerisinde almayı düşünüyorum
- 3- almayı düşünmüyorum

	1	2	3
1. Günlük hayatınızda bir cep telefonu kullanıyor musunuz?			
2. Evde telesekreteriniz var mı?			
3. Evde bilgisayarınız var mı?			
4. Evde internet bağlantınız var mı?			
5. Kişisel Dijital Asistanınız (PDA) var mı?			

Aşağıdaki derecelendirmeyi kullanarak (6-8) soruları cevaplayınız :

- 1- son 12 ay içinde (aydır) kullanıyorum
- 2- gelecek 12 ay içerisinde kullanmayı düşünüyorum
- 3- kullanmayı düşünmüyorum

	1	2	3
6. Hayatınızda hiç ATM cihazı kullandınız mı?			
7. Hayatınızda hiç bilgisayar konuştuğunuz bir telefon bankacılığı hizmetinden faydalandınız mı?			
8. İnternette alışveriş yaptınız mı?			

CEP TELEFONU HİZMETLERİ KULLANIMI

	Kesinlikle Katılıyorum	Katılıyorum	Orduka Katılıyorum	Biraz Katılıyorum	Çok az Katılıyorum	Kesinlikle Katılmıyorum
1. Cep telefonu hizmetlerini kullanmanın iyi bir fikir olduğunu düşünüyorum						
2. Cep telefonu hizmetlere erişimim varsa ,onları kullanmayı isterim.						
3. Başkalarına cep telefonu hizmetlerini kullanmalarını tavsiye ederim						
4. Kendim denemeden önce, başka birini gelişmiş cep telefonu hizmetleri kullanırken görmüşüm.						
5. Başlangıçta biri bana yardım etti / etmesi gerekti.						
6. Mobil hizmetlerin kullanımının çok kolay olduğunu düşünüyorum						
7. Cep telefonu hizmetlerinin, performansımı artırmada bana yardımcı olduğunu düşünüyorum						
8. Cep telefonu hizmetlerinin ücretleri önemlidir						
9. Benim bütçem cep telefonu hizmetlerini kullanmaya elverişli.						
10. Cep telefonu hizmetlerinin bana çok kullanışlı bilgiler sunduğunu düşünüyorum						
11. Banka işlemlerimi yapmak için mobil hizmetleri kullanmayı güvenli buluyorum.						
12. Firmalar, veritabanlarındaki kişisel bilgileri diğer firmalara asla satmamalıdır.						
13. Firmalar abonelerinin kişisel bilgilerini ne sebeple olursa olsun başka kurumlarla paylaşmamalıdır						
14. Mobil internetle sağlanan bilgi ve hizmetlerin değerli olduğunu düşünüyorum						

	Kesinlikle Katılıyorum	Katılıyorum	Oldukça Katılıyorum	Biraz Katılıyorum	Çok az Katılıyorum	Kesinlikle Katılmıyorum
15. Mobil internetin çok güvenilir bir hizmet olduğunu düşünüyorum						
16. Cep telefonu hizmetleri aşırı pahalı.						
17. Cep telefonu hizmetlerinin hayatımın genelinde verimliliğimi ve etkinliğimi artırmama yardımcı olduğunu düşünüyorum						
18. Bu tür hizmetleri (mobil internet; MMS; gelişmiş cep telefonu hizmetleri) daha önce de kullanmıştım.						
19. Mobil hizmet kullanmaya başlarken elimde bilgi olarak sadece kullanma kılavuzu vardı /olması yeter						
20. Mobil hizmetleri kullanma becerisi kolaylıkla kazanılabilir						
21. Mobil hizmet kullanmaya ilgili takıldığım bir konuda yardım için başkasını arayabilirim.						
22. Mobil hizmetleri kullanmayı öğrenmenin çok kolay olduğunu düşünüyorum						
23. Cep telefonu hizmetlerini kullanmaya olumlu yaklaşıyorum						
24. Mobil hizmetleri kullanmak, kişisel bilgilerimin başkalarına sızmasına sebep olmaz.						
25. Mobil internet kullanmanın güvenli olduğunu düşünüyorum						
26. Mobil internetin çeşitli bilgi ve hizmetler sunduğunu düşünüyorum						
27. Cep telefonu hizmetlerinin benim için genelde kullanışlı olduğunu düşünüyorum						
28. Özel hizmetlerin veya bilgilerin fiyat seviyelerinin pahalı düzeylerde olduğunu düşünüyorum						
29. Mobil internetin hızının yüksek olduğunu düşünüyorum						
30. Mobil internet ihtiyacım olan bilgi ve hizmetleri sağlıyor						
31. Cep telefonu hizmetlerini kullanmanın genelde pahalı olduğunu düşünüyorum.						
32. Maliyeti/fiyatı daha düşük olsaydı cep telefonu hizmetlerini (daha sık) kullanırdım						
33. Cep telefonu hizmetlerini kullanmanın benim için faydalı olduğunu düşünüyorum						
34. Cep telefonumu veya PDA'imi alışveriş veya hizmet amaçlı kullandığımda kişisel bilgilerimin güvende olduğuna inanıyorum						
35. Cep telefonu hizmetlerini mümkün olduğunca çok kullanmaya çalışırım						
36. Cep telefonu hizmetlerini kullanmanın ekonomik bedelinin benim için ağır bir yük oluşturduğunu düşünüyorum.						

BİLGİSAYAR VE İNTERNET HİZMETLERİ KULLANIMI

	Kesinlikle Katılıyor	Katılıyor	Orta Katılıyor	Biraz Katılıyor	Çok az Katılıyor	Kesinlikle Katılmıyor
1. Teknoloji, insanların günlük hayatları üzerinde daha fazla kontrol sahibi olmasını sağlar						
2. Bir şirketle iş yaparken kişisel kontakt çok önemlidir.						
3. Diğer insanlar bana yeni teknolojiler hakkında danışmaya gelirler.						
4. Teknik destek hatları bana yardımcı olamıyorlar, çünkü bilgileri benim anlayacağım şekilde açıklamıyorlar.						
5. Bazen, teknoloji sistemlerinin sıradan insanlar tarafından kullanılmak üzere tasarlanmadığını düşünüyorum.						
6. En son teknolojiye sahip ürün ve hizmetleri kullanmak çok daha kolaydır.						
7. Bilgisayarla çalışmayı severim, çünkü iş saatlerine bağımlılığımı ortadan kaldırır.						
8. Bir iş yerini aradığımda, bir makinayla konuşmaktansa bir insanla konuşmayı tercih ederim.						
9. Var olan en ileri teknolojiyi kullanmayı tercih ederim.						
10. İleri teknolojiye sahip ürün veya servisler için sade bir dille yazılmış kullanma kılavuzu yoktur.						
11. Yeni teknolojinin çalışmaya teşvik edici olduğunu düşünüyorum.						
12. İnternet üzerinden herhangi bir finansal işlem yapmanın güvenli olduğunu düşünmüyorum.						
13. İleri teknolojiye sahip bir ürünü veya hizmeti satın aldığımda, birçok ekstra özelliği olan model yerine, basit modelini almayı tercih ederim.						
14. Teknoloji hakkında bilgi sahibi olmanın, teknolojinin kendisi kadar faydalı olduğunu düşünüyorum.						
15. Kredi kartı numaramı bilgisayar üzerinden vermenin güvenli olduğunu düşünmüyorum.						
16. Genellikle arkadaş çevremde, yeni çıkan teknolojilere ilk sahip olan ben olurum.						
17. İleri teknolojiye sahip bir ürünün veya servisin sağlayıcısından teknik destek aldığında, benden daha fazla bilen biri tarafından kandırıldığım izlenimine kapılıyorum.						
18. Sadece internet üzerinden ulaşılabilen bir yerle iş yapmak beni güvende hissettirmez.						

	Kesinlikle Katılıyor	Katılıyor	Orduka Katılıyor	Biraz Katılıyor	Çok az Katılıyor	Kesinlikle Katılmıyor
19. Görünüşe göre arkadaşlarım yeni teknolojiler hakkında benden daha fazla bilgiye sahipler.						
20. Yeni teknolojiler her zaman olabilecek en kötü zamanda arıza çıkıyor.						
21. Teknoloji beni mesleğimde daha verimli kılıyor.						
22. Önemli kişileri-görevleri teknolojiyle değiştirirken dikkatli olmak gerekir, çünkü yeni teknoloji bozulabilir veya bağlantısında sorunlar yaşanabilir.						
23. Diğer insanlar benden yeni teknolojiler hakkında bilgi almaya gelirler.						
24. Elektronik olarak gerçekleştirdiğim herhangi bir işlemin yazılı dokümanını da almayı isterim.						
25. Teknoloji bana daha fazla hareket özgürlüğü veriyor.						
26. İnsanlar izlerken yüksek teknoloji ürünü bir gereçle sorun yaşamak utanç vericidir.						
27. İleri teknolojiye sahip araçları kullanmayı öğrenmekten zevk alırım.						
28. Ne zaman herhangi bir şey otomasyona çevirilse, makine veya bilgisayarın hatasız çalıştığını kontrol etmem gerekir.						
29. Makinaların/bilgisayarların , onlara verilen işleri doğru/düzgün yapacağına güvenirim.						
30. Birçok yeni teknoloji, insanlar kullanmaya başlamadan farkedilemeyen sağlık veya güvenlik riskleri taşır.						
31. Teknolojiyi kullanırken diğer insanlardan daha az sorun yaşadığımı düşünüyorum.						
32. Bir makine aracıyla ya da internet üzerinden bilgi sunduğumda, asla doğru yere ulaştığından emin olamam.						
33. Kendi ihtiyaçlarım doğrultusunda ayarlayabildiğim bilgisayar programlarını kullanmayı severim.						
34. Yeni teknoloji, hükümetin veya firmaların insanları gözetlemesini fazlasıyla kolaylaştırıyor.						
35. Genellikle ileri teknolojiye sahip yeni cihazları ve hizmetleri başkalarının yardımı olmadan kullanmayı öğrenirim.						
36. İnternet üzerinden gönderdiğim bilgilerin başka kişiler tarafından görülmesinden endişe ediyorum.						
37. İlgi alanıma giren en son teknolojik yenilikleri takip ederim.						

Aşağıdaki cep telefonu hizmetlerini hangi sıklıkla kullanıyorsunuz ?

1- Hiç kullanmadım							
2- Bir veya iki kere kullandım							
3- Senede bir veya iki kere kullanıyorum							
4- Senede üç ila altı kere kullanıyorum	1	2	3	4	5	6	7
5- Ayda bir kere kullanıyorum							
6- Ayda birkaç kere kullanıyorum							
7- Her zaman kullanıyorum.							
1. Resim almak / göndermek							
2. Kısa mesaj almak /göndermek							
3. Takvim/hatırlatıcı hizmetleri almak							
4. Resimli mesaj almak /göndermek							
5. Spor haberleri almak							
6. e-posta almak /göndermek							
7. Müzik İndirmek /dinlemek							
8. İnternet üzerinden bahis oynamak							
9. İnternet üzerinden oyun oynamak							
10. Gelişmiş bankacılık hizmetleri kulanmak (kredi başvurusu)							
11. Yabancılarla internette chat yapmak							
12. Sıradan bankacılık hizmetlerini kullanmak							

Aşağıdaki hizmetlerden hangilerini kullanmak isterdiniz?

	Evet	Hayır
1. Alışveriş yaparken ürün aramak ve fiyatlarını karşılaştırmak		
2. Alışveriş kuponları almak		
3. Alışveriş sırasında ürün bilgilerini aramak ve almak		
4. Sinema/tiyatro rezervasyonları yapmak		
5. İnternet üzerinden müzayedelere katılmak		
6. Hisse senedi almak /satmak		
7. İnternet üzerinden ürün satın almak		
8. Seyahat biletleri almak		
9. Para aktarma servislerini kullanmak		
10. İnternet üzerinden döviz hesaplama servislerini kullanmak		

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