Aalto University
School of Business

Factors Affecting Entertainment Mobile Application Adoption

Marketing

Master's thesis

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FACTORS AFFECTING ENTERTAINMENT MOBILE APPLICATION ADOPTION

Master´s Thesis
Eeva Nevasalo
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ABSTRACT

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Abstract

Today consumers are requiring more and more services that can be used regardless of time and location; the high adoption of next-generation mobile handsets is creating huge opportunities for new and innovative mobile services. However, research of mobile communications has not been able to keep up with this development.

The purpose of this thesis is to answer the need to understand the factors that drive entertainment mobile services´ acceptance and adoption. Simultaneously the thesis further strengthens the Unified Theory of Acceptance and Use 2 (UTAUT2) by expanding it to cover the context of entertainment mobile applications.

Overview of the past research is provided and UTAUT2 is chosen as a framework for this thesis and is tested with survey data of 150 respondents. Factor analyses is used to test the 7 factors that influence consumer adoption of entertainment mobile applications: (1)performance expectancy, (2) effort expectancy, (3) social influence, (4) facilitating conditions, (5) hedonic motivation, (6) price value, and (7) habit. Also cluster analysis and cross-tabulation are provided.

The results indicate that altogether six factors (performance expectancy, effort expectancy, social influence, hedonic motivation, price value, and habit) affect adoption of an entertainment mobile application. Cluster analysis and cross-tabulation found five different user segments that are (1) average app users seeking enjoyment and usefulness, (2) unlikely users, (3) super users, (4) users under social pressure, and (5) paying users seeking usefulness.

Keywords Mobile services, mobile internet, TAM, Technology Acceptance Model, UTAUT, UTAUT2, technology adoption, mobile application, entertainment

AALTO YLIOPISTON KAUPPAKORKEAKOULU TIIVISTELMÄ

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Pro-Gradun nimi Tekijät, jotka vaikuttavat viihteellisen mobiilisovelluksen omaksumiseen

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Tiivistelmä

Nykyään kuluttajat vaativat yhä enemmän palveluja, joita voidaan käyttää aikaa ja paikkaa katsomatta; seuraavan sukupolven mobiililaitteiden laaja omaksuminen luo suuria mahdollisuuksia uusille ja innovatiivisille mobiilipalveluille. Tästä huolimatta mobiiliviestinnän tutkimus ei ole pystynyt pysymään tämän kehityksen mukana.

Kyseisen pro-gradu tutkielman tarkoitus on vastata tähän tarpeeseen ja yhä paremmin ymmärtää tekijöitä, jotka johtavat viihteellisten mobiilipalveluiden omaksumiseen. Samanaikaisesti tämä pro-gradu tutkielma vahvistaa yhdistettyä teknologian omaksumis- ja käyttöteoriaa (Unified Theory of Acceptance and Use 2, UTAUT2), laajentamalla teoriaa kattamaan viihteellisten mobiilisovellusten kontekstin.

Kyseinen pro-gradu tutkielma tarjoaa katsauksen aiempaan tutkimukseen ja teoreettiseksi viitekehykseksi on valittu UTAUT2, jota on testattu 150 vastaajan aineistolla. Tutkielmassa käytetään faktorianalyysia testaamaan teorian 7 tekijää, jotka vaikuttavat viihteellisten mobiilisovellusten omaksumiseen kuluttajaympäristössä: (1) toiminnallinen odotus, (2) vaivannäköodotus, (3) sosiaalinen vaikute, (4) johdattelevat edellytykset, (5) hedoninen motivaatio, (6) hinta-arvo ja (7) tapa. Tutkielma tarjoaa myös klusterianalyysin sekä ristiintaulukoinnin kyseisestä aineistosta.

Tulokset viittaavat siihen, että kuusi tekijää ovat niitä (toiminnallinen odotus, vaivannäkö, sosiaalinen vaikute, hedoninen motivaatio, hinta-arvo ja tapa), jotka vaikuttavat viihteellisen mobiilisovelluksen omaksumiseen. Klusterianalyysin ja ristiintaulukoinnin seurauksena löydettiin viisi erilaista käyttäjäsegmenttiä, jotka ovat: (1) keskivertokäyttäjät, (2) epätodennäköiset käyttäjät, (3) superkäyttäjät, (4) sosiaalisen paineen alla olevat käyttäjät ja (5) maksavat käyttäjät, jotka hakevat hyödyllisyyttä.

Avainsanat Mobiilipalvelut, mobiili-internet, TAM, Technology Acceptance Model, UTAUT, UTAUT2, teknologian omaksuminen, mobiilisovellus, viihde

Contents

1 Introduction 5

1.1 Overview of the Past Research 6

1.2 Research Questions and the Structure of the Thesis 8

2 Theoretical Background 10

2.1 Technology Acceptance Model (TAM) 11

2.2 Technology Acceptance Model – A Theoretical Extension (TAM2) 12

2.3 Unified Theory of Acceptance and Use of Technology (UTAUT) 15

3 Theoretical Framework, UTAUT2 18

4 Empirical Study 22

4.1 Questionnaire Design 22

4.2 Data Collection 23

5 Analysis 26

5.1 Reliability and Validity 26

5.2 Factor Analysis 28

5.3 Cluster Analysis 31

5.4 Cross-Tabulation 33

6 Findings 34

6.1 Factors and Elimination of Facilitating Conditions 34

6.2 Segmentation Using Cluster Analysis 39

6.3 Cross-Tabulation 41

6.3.1 Cross-Tabulation with Gender 41

6.3.2 Cross-Tabulation with Age 42

6.3.3 Cross-Tabulation with Experience 44

6.3.4 Cross-Tabulation with Use 46

7 Conclusion 50

7.1 Results 51

7.2 Theoretical and Managerial Implications 54

7.3 Limitations and Future Research 55

References 56

List of Figures

Figure 1. Technology Acceptance Model (TAM) 11
Figure 2. Technology Acceptance Model 2 (TAM2) 14
Figure 3. Unified Theory of Acceptance and Use of Technology (UTAUT) 15
Figure 4. Theoretical Framework – Unified Theory of Acceptance and Use of Technology 2 20
Figure 5. Scree Plot 31
Figure 6. Visual Solution of Clustering Choice 33
Figure 7. Framework of the Thesis – Modified UTAUT2 38

List of Tables

Table 1. Demographics of Respondents 24
Table 2. Cronbach´s alpha 27
Table 3. Descriptive Statistics and Correlations 28
Table 4. KMO and Bartlett´s Test 29
Table 5. Eigenvalue and Cumulative Variance Explained 30
Table 6. Rotated Factor Matrix 35
Table 7. Rotated Factor Matrix Excluding Facilitating Conditions 37
Table 8. Cluster Means of the Factor Analysis Results 39
Table 9. Statistical Significance of the Cluster Analysis Results (ANOVA) 40
Table 10. Cross-Tabulation with Gender 42
Table 11. Cross-Tabulation with Age 43
Table 12. Cross-Tabulation with Experience in Months 44
Table 13. Cross-tabulation with Self-Estimated Experience 45
Table 14. Cross-Tabulation with Use 47
Table 15. Summary of the Five Clusters 48

Appendices

Appendix 59

1 Introduction

Telecommunication industries especially in mobile phones are moving into era where data and video usage will be as important as voice usages. In other words, it is slightly moving from communication-oriented services such as voice calls to more complex content-oriented services. As a consequence, device manufacturers, telecom operators, content providers and media are constantly in search for killer applications that will explode the mobile market. There are over 700 000 applications available on Google Play alone that are being downloaded 1.5 million times each month (Google Play). There are various applications in various categories but it seems that especially entertainment is selling well. (Aarnio et al. 2002)

Since the launch of the first trailblazer iPhone 3, the production and mainstream usage of smartphones has exploded. In the recent years mobile industry has been growing at an escalating speed worldwide. It is predicted, that by 2016, there will be 1.4 mobile devices per capita (Cisco, 2012). The number of smartphones is also growing at a fast speed and it is estimated that 5 billion people will be smartphone users in five years (Saylor, 2012). Today still only 12% of world's handsets are smartphones; however this low rate of smartphones is covering no less than 82% of transferred mobile data. Globally the data usage has seen a huge growth as mobile data traffic grew 2.3-fold over 2011 and that is more than doubling for the fourth year in a row (Cisco, 2012). The interesting fact about the data transfer growth is that people are not just browsing web more but they are using mobile applications (apps) more (Saylor, 2012).

Today consumers are requiring more and more services that can be used regardless of time and location; the high adoption of next-generation mobile handsets is creating huge opportunities for new and innovative mobile services that can respond to this changing demand (Mallat et al. 2004). Mobile phones are not anymore just for making calls but mobile phone as a hybrid medium has become a solid part of the mass communications mix offering an alternative channel of communication and entertainment (Wei, 2006). Mobile device is no longer the 'it' item itself but is assumed to operate as the mean to access mobile services;

"The future of mobile telephony is expected to rely on mobile services and the use of mobile services will be an integral part of the revenues to be generated by third generation mobile telephony" (Carlsson et al. 2006).

The demand for mobile information services is skyrocketing and the demand is raising high interest in coupling the mobile services with positioning technologies. (Hage et al. 2003). There are various mobile applications available to help people with pretty much everything they are doing. Mobile apps can be divided into games, social networking, entertainment, news, and others, and many apps contain various before mentioned features. According to Aarnio et al. (2002) and Pihlström et al. (2008) entertainment services have been long neglected by researchers as they are in fact the most popular mobile services (including games) and are said to have a significant growth potential.

This smartphone take over and the huge expected growth, where mobile services are seeing a mass-adoption, is providing a huge demand for even more developed and diverse mobile services now and in the future. Nevertheless, research of mobile communications has failed to keep up with this development (Wei, 2006). From the marketing perspective this provides highly interesting research area as the app economy is taking over and changing the markets.

1.1 Overview of the Past Research

Before moving on to the overview of the past research, an understanding of what a mobile service is needs to be discussed. There is no conceptual agreement on the term "mobile services". The term mobile service may have different meanings in telecommunications, information systems, or media and services marketing fields. Mobile services are commonly referred to as services that can be accessed via mobile device such as text messaging, calling, internet etc. Philtsröm et al. (2008) provide a good explanation of mobile services defining them as "content services that are accessed via mobile hand set (mobile, smartphone) and are delivered in an interaction between a company and a consumer. In this thesis 'application' or "apps" are used as synonyms for mobile services to highlight the distinction between apps and other activities made with mobile device that don't require applications.

In this thesis mobile applications mean applications that can be downloaded from app stores such as news, games or social networking etc. To be clear, this study is focused on entertainment mobile applications other than games.

Other entertainment mobile services than games are very little studied, as entertainment mobile services are mostly considered to be games. Mobile gaming is usually also studied with different versions of Technology Acceptance Model (TAM) as are also other studies concerning mobile services in general.

TAM theory was originally introduced in 1989 by Fred Davis. TAM was developed to explain people's willingness for technology acceptance and use of its time such as electronic mail. Davis (1989) discovered that there are two main factors that affect technology adoption, which were *Perceived Usefulness* and *Perceived Ease of Use*. This theory has been extremely popular and much used in the information systems research and has received many extensions ever since.

Well known following extensions of TAM are Technology Acceptance Model 2 (TAM2) (Venkatesh & Davis 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003) and Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (Venkatesh et al. 2012). The latter one will also be applied in this thesis. These extensions added new factors to the model that affect technology adoption such as social influence, hedonic motivation etc. and introduced background variables such as age and gender that moderate the effects. The theories will be closer discussed later on.

The research that these models have conducted are interesting and provide a good starting point to investigate entertainment mobile services which are little studied but very interesting from a theoretical and practical marketing perspective, as mobile application industry is becoming even bigger economy. In order to reach an applicable marketing approach to this subject, the present thesis introduces cluster analysis and cross-tabulation to meet the needs of marketers.

In the next chapter we shall have a closer look at the research questions and the structure of this thesis.

1.2 Research Questions and the Structure of the Thesis

Based on the theoretical foundation, this thesis aims to answer the need to understand the factors that drive entertainment mobile services´ adoption. Simultaneously the thesis further strengthens the Unified Theory of Acceptance and Use 2 (UTAUT2) by expanding it to cover the context of entertainment mobile application usage as Venkatesh et al. (2012) requested for further research on testing the UTAUT2 in the context of different technologies. To achieve this research gap, this thesis proposes one main research question with two sub-research questions.

Research question 1

- What are the main factors affecting entertainment mobile application adoption?

Sub-research questions

- How has the Technology acceptance model evolved from working environment perspective into covering a consumer approach?
- What are the segments that can be identified from the users of an entertainment mobile application?

In order to answer these research questions this thesis is structured into seven chapters. The introduction chapter introduces the topic and the purpose of the study to the reader and helps to perceive the big picture of the thesis and also clarifies the research questions that the rest of the thesis aims to answer.

Chapter 2 covers the background of technology adoption research. This chapter introduces some of the main technology acceptance research models and theories that help to understand where the study used in this thesis derives from. Chapter 3 introduces the theoretical framework of the study and UTAUT2, the theory applied in this thesis. Chapters 4 and 5 outline the methodology of the study, beginning from planning and implementing

the data collection all the way to cover the methods applied to analyze the data in this thesis. The design of questionnaire and collection of the data are closely discussed in chapter 4. The chapter reasons the questionnaire design and explains how the survey was conducted and to whom it was administered to. The chapter 5 introduces different analysis methods used in this thesis which include factor analysis, cluster analysis, and cross-tabulation.

Chapter 6 presents the analysis of the data and findings that are then closer discussed in chapter 7. In chapter 7 theoretical and managerial implications, limitations of the study are also discussed. This chapter also provides suggestions for future research.

2 Theoretical Background

Technology acceptance has been widely studied since the 80's when the first more developed computing systems started emerging. The first study of technology acceptance, which has been highly cited in academic research, is the Technology Acceptance Model, TAM (Davis, 1989). Today and in the near past, the model has received a lot of critic mainly due to its "over use" and lack of consumer perspective. Despite the critics the model has been cited more than 14 000 times (Google Scholar) and followed by numerous extensions by researcher, most notably Technology Acceptance Model 2 (TAM2) (Venkatesh & Davis, 2000), and later Unified Theory and Use of Technology (UTAUT), and the recently published Unified Theory of Acceptance and use of Technology 2 (UTAUT2), that extends the previous model into covering consumer context (Venkatesh et al. 2012).

Before going into deeper look at technology acceptance models, we shall first discuss and define the context of this study, mobile services and entertainment.

Entertainment is consumed to inflict hedonic enjoyment. The hedonic perspective of perceived value refers to the customer's fantasies, feelings and sense of fun derived from the service provided (Holbrook & Hirschman, 1982). Compared with utilitarian value and social value, hedonic value is experienced more. In mobile phone services, e-mail, text messaging, web browsing, voice recognition, sharing, and video may be provided, and these services can make the using of a mobile phone more entertaining, which in turn provides hedonic value to consumers if the user appreciates the outcome of the service (Lee et al., 2010). In other words, using an entertainment mobile application is an experience of adventure, creating enjoyment.

The next three chapters will introduce the three different technology acceptance models. These models have focused on organizational context and are to be previewed only to understand the background of technology acceptance research in information systems science and to understand the background of the model used in this thesis. This study is based on Unified Theory of Acceptance and Use of Technology in a consumer context, which will be viewed more closely in chapter 3.

2.1 Technology Acceptance Model (TAM)

Technology Acceptance Model by Davis (1989) has been considered as the pioneer work for studying technology adoption and over the years the research results with TAM have been generally consistent (Legris et al. 2003).

TAM model, as the following studies until UTAUT2, concentrate on white collar environment aiming to explain and predict technology use in a working environment. In his work, Davis (1989) found two specific determinants that influence technology acceptance: perceived usefulness and ease of use. Perceived usefulness Davis defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" and ease-of-use as "the degree to which a person believes that using a particular system would be free of effort". One of the most significant finding of these determinants in the study was the relationship between usefulness-usage and ease-of-use-usage. Davis (1989) discovered that usefulness was significantly more strongly linked to usage then ease-of use was – "Although difficulty of use can discourage adoption of an otherwise useful system, no amount of ease of use can compensate for a system that does not perform an useful function".

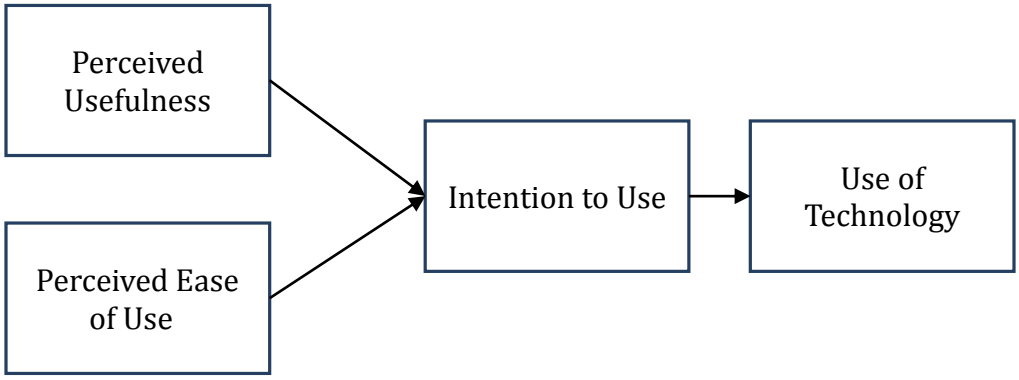

Figure 1. Technology Acceptance Model (TAM)

The Figure 1 describes how the user of a technology tends to consider the usefulness and ease of use of a new system before actually using it. The easier the system is perceived to be the more useful it is perceived to be, and together perceived ease of use and usefulness of

the system create the intention to use which then leads or not leads to use of the system. (Davis, 1989)

Explaining user acceptance of new technologies is one of the most mature research areas in information systems literature (Venkatesh et al. 2003). TAM is considered to be simple and easy to apply, theoretically and empirically justified model to explain the acceptance of technology adoption and use (Hans, 2000). The pioneer study of TAM has been widely used for its clear structure and it is easy to apply to different situations, but on the other hand, this advantage is also the biggest downside of the model. It has been widely criticized for being too simple and overused. After Davis proposed a new version of the model TAM2, the model then included also subjective norm (see chapter 2.2). Overall the two models explained only 40% of information system's use. Legris et al. (2003) found that most of the studies do not measure system use, and what TAM really measures is the variance in self-reported use, which is not a precise measure - they discovered that an analysis using TAM does not lead to consistent or clear results. The authors stated that significant factors are not included in the TAM models (Legris et al. 2003). TAM is also criticized for not offering enough information for system designers to create new user-friendly technologies (Venkatesh, 2000).

Despite the critics, TAM has proven to be a useful theoretical model in understanding the use behaviour in Information Systems Research (Legris et al. 2003). TAM has offered a platform for new theory development on the path to understand technology acceptance as will be seen in the next chapters covering TAM extensions.

2.2 Technology Acceptance Model – A Theoretical Extension (TAM2)

After Davis (1989) published his research on technology acceptance, it has been widely used and graced: before TAM 2, TAM had become well-established as a robust and powerful model in explaining technology acceptance (Davis & Venkatesh 2000). Davis and Venkatesh (2000) proposed an extension to the previous TAM which discovered more factors affecting technology use. Davis and Venkatesh (2000) then published a research of technology

acceptance model to cover also social influence. They created a model that extended the previous TAM to explain perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. Davis and Venkatesh (2000) implemented four longitudinal studies to test TAM2. To distinguish mandatory use and voluntary use and to examine the effect of voluntariness, the authors chose two sites where usage of the system was voluntary, and two sites where usage was mandatory.

Davis and Venkatesh (2000) included social influence to the model, which they then divided into subjective norm, voluntariness, and image. Subjective norm describes the force people have on each other and is defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question". They stated that subjective norm had a strong effect on mandatory usage but not on voluntary usage. To distinguish these two, mandatory and voluntary, Davis and Venkatesh (2000) proposed voluntariness in their model as a moderating variable, and defined it as "the extent to which potential adopters perceive the adoption decision to be non-mandatory".

Image was also added to be one of the social influence aspects as people tend to perform certain task to establish or to maintain a favorable image within a group. The authors defined image as "the degree to which use of an innovation is perceived to enhance one's status in one's social system" (Venkatesh & Davis, 2000).Davis and Venkatesh (2000) theorize that people use mental representations for assessing compatibility of work goals and the consequences of performing the act of using a technology system to estimate the use-performance contingency. Cognitive instrumental process is added to explain the usefulness of a technology. Cognitive instrumental processes consist of job relevance, output quality, result demonstrability, and ease of use. Job relevance describes how implementing an important task can be supported with the given technology. In other words, people asses how useful the given technology is to implement a certain task and how well this task matches their job goals. Job relevance will have a positive effect on perceived usefulness. Output quality is continuum to job relevance as it describes how well the technology performs these job tasks. Result demonstrability describes how users see the results of a system and how these results can be demonstrated. Even if a system produces effective job-relevant results but does that in an obscure matter, user might be unable to understand the

usefulness of the system. Perceived usefulness, familiar from the pioneer study of TAM, is seen as a direct determinant of perceived usefulness in TAM2 – the easier the system is to use, the more useful it will be considered to be.

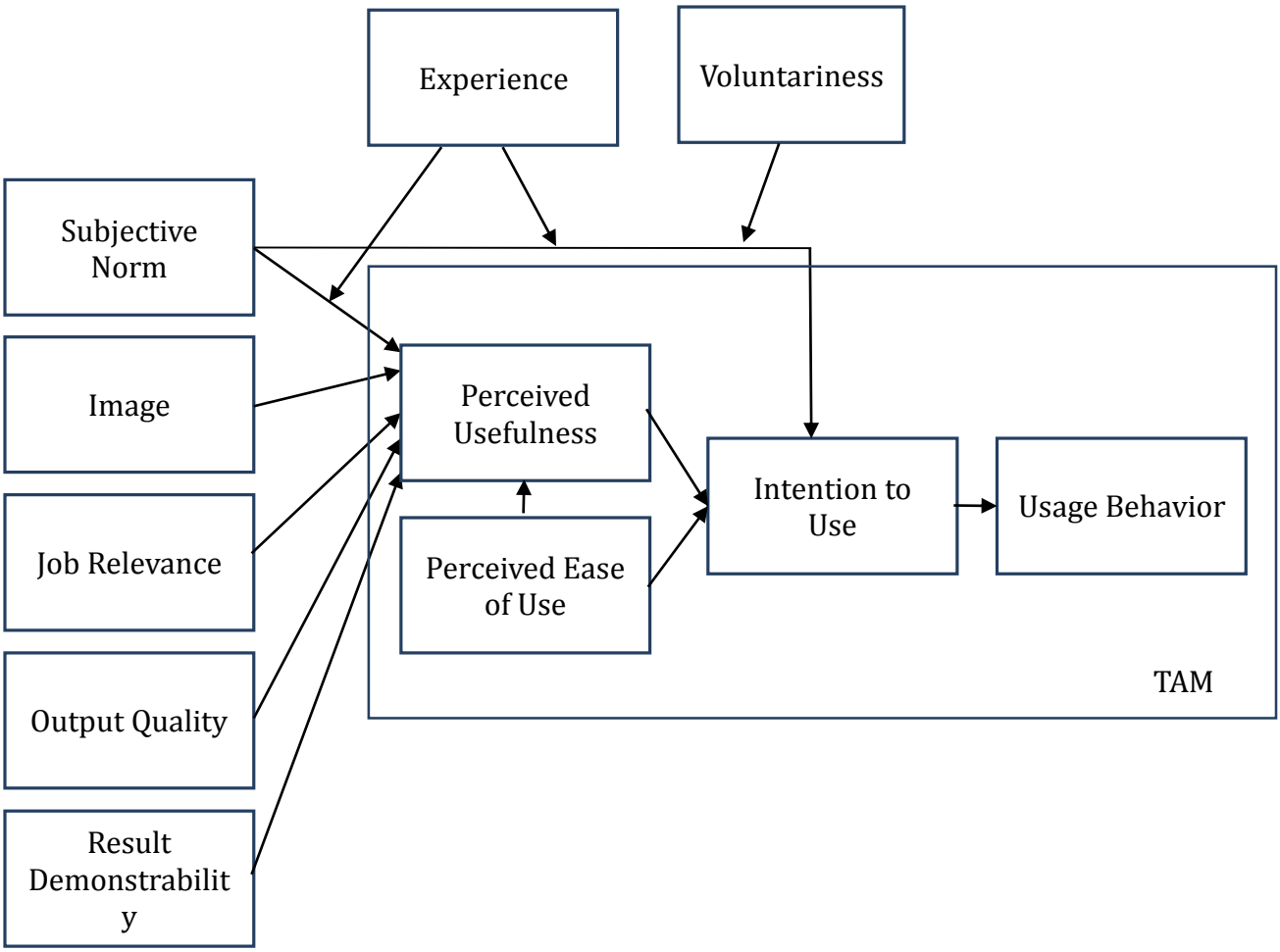

Figure 2. Technology Acceptance Model 2 (TAM2)

The study was an improvement to the previous TAM and social influence has strongly been present in the subsequent studies and theories whereas cognitive instrumental process was not that significant explaining the use and has been dropped from later studies. What comes to later studies, we will cover the next extension Unified Theory of Acceptance and Use of Technology in the following chapter.

2.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

In 2003 yet another extension of TAM was introduced by Venkatesh et al. (2003). The aim of the unified theory was to integrate all the many theories of technology acceptance. Venkatesh et al. (2003) gathered the eight before constructed models studying technology acceptance and created UTAUT based on these theories. Theories reviewed for constructing UTAUT were the theory of reasoned actions, the technology acceptance model, the motivational model, the theory of planned behavior, a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory. The new unified model formulated based upon conceptual and empirical similarities across these above mentioned theories can be seen in the Figure 3 below.

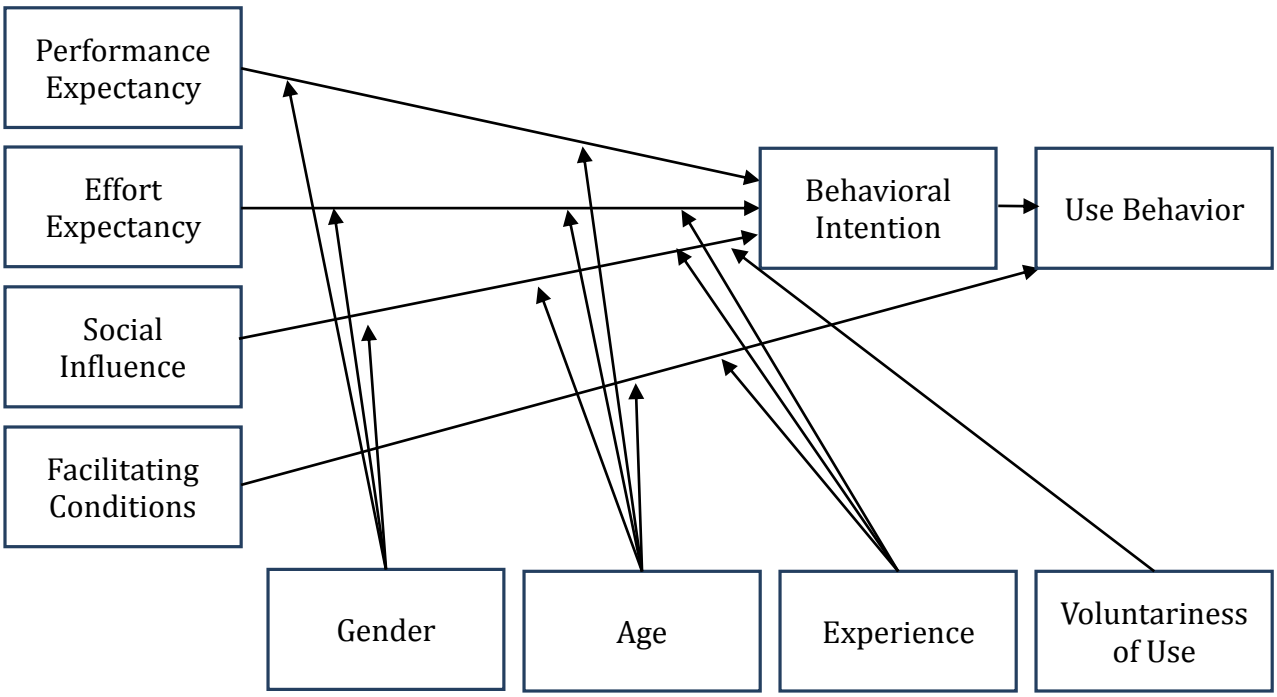

Figure 3. Unified Theory of Acceptance and Use of Technology (UTAUT)

Performance expectancy, effort expectancy, social influence, and facilitating conditions are direct factors that influence intention and behavior and these factors are moderated with gender, age, experience, and voluntariness.

Performance expectancy explains the degree to how well the individual believes that the given technology will help in performing a certain job performance. The influence of performance expectancy on intention to use is moderated by gender and age. Effort Expectancy explains how easy to use the given technology is perceived to be and its influence on behavioral intention is moderated by gender, age and experience. Social influence describes how the user of a technology believes that important others want him to use the given technology. Social influence is said to influence behavioral intention by all moderators - gender, age, voluntariness, and experience. Facilitating conditions is a factor that explains how the user believes the infrastructure supports the use of a technology. The authors found that this factor has no significant influence on behavioral intention but its influence on usage is moderated by age and experience. As explained above, UTAUT then posits three direct factors of intention to use and two direct factors of usage behavior.

UTAUT achieved integrating 32 main effects and four moderators reviewed from previous models as determinants of intention into a model that incorporated four main effects and four moderators. UTAUT was praised also for bringing the moderating factors into the model as they help address the problems of inconsistency and explain the behavioural differences of different groups of people (Qingfei et al. 2008). UTAUT became appreciated and a lot used model for explaining technology acceptance since its publication as the theory was able to account for 70 percent of the variance in usage intention which was a huge improvement over the other eight previous models and their extensions. Although UTAUT model succeeds in explaining more of the variance in terms of information system use, Verdegem & Marez (2011) argue that the main added value of the model lies in the theoretical and empirical relevance - the model of UTAUT should be seen as a basis for further empirical analysis (Venkatesh et al. 2003) (Verdegem & Marez, 2011).

UTAUT has been criticized for being a too complicated model as Bagozzi (2007) proclaimed UTAUT to be too complex as it adds so many different variables that it makes the model

difficult to use. van Raaij and Schepers (2008) also criticized that UTAUT aims to incorporate too many models into one so that its constructs become a combination of too many factors that end up representing nothing. Unlike Bagozzi (2007) and van Raaij and Schepers (2008), Qingfei et al. (2008) found UTAUT being a powerful model exactly for its complexity: the model is the most comprehensive one with extensive inclusion of factors of its time.

Despite the critics, UTAUT has received positive feedback for being a robust and a relevant model (Verdegem & Marez, 2011). Since its' publication, UTAUT has served as a baseline model and has been applied to various technologies in organizational and non-organizational scenes. There have been many variations, modification and applications of the study in order to fit the theory into a certain setting. There are three types of integrations of UTAUT. The first one examined UTAUT in different contexts. The second one aimed at expanding the model to explain its endogenous mechanisms and the third one was the inclusion of exogenous predictors of the UTAUT variables. (Venkatesh et al. 2012)

The newest addition to the family of technology acceptance models is 2012 published Unified Theory of Acceptance and Use of Technology 2 which is constructed to study a consumer context (Venkatesh et al. 2012). This newest model will be discussed more closely in chapter 3.

3 Theoretical Framework, UTAUT2

The theoretical framework of the thesis is not a combination of technology acceptance models but directly adapted from one model. As this thesis applies Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) directly as a theoretical framework, the theory will be closely discussed in this chapter.

The many previous extensions and the fact that understanding technology acceptance and use is one of the mature streams of information systems research didn't prevent Venkatesh from developing yet another extension of the model. There was a need for another extension as the UTAUT received critics for having challenges of investigating different kinds of technologies and use contexts, such as work environment versus consumer environment (Verdegem & Marez, 2011).

Venkatesh et al. (2012) developed another extension of the Unified Theory of Acceptance and Use of Technology, naming the theory simply UTAUT2. Though this area is rather worn out, Venkatesh et al. (2012) succeeded in creating something new to complement the area of technology research: the aim of the UTAUT2 is to understand technology acceptance and use in a consumer context. Nowadays consumer technology is a multibillion dollar industry given the number of devices, applications, and other technology services targeted to consumers, UTAUT2 has been a very welcomed extension as all the previous studies were focused on organizational context (Venkatesh et al. 2012). UTAUT2 is not just a theory in academic research but useful in business life as well as it can help organizations to better design, market and target their products for consumers at various stages of the use curve.

UTAUT2 is based on UTAUT with three new relationships introduced: hedonic motivation, price value, and habit. Furthermore, the authors dropped voluntariness from the model, as it is something that can be assumed to be self-evident in a consumer context.

The previous UTAUT concentrated on extrinsic motivation, which is more relevant in the working environment. In order to complete the theory of motivation, the authors added intrinsic motivation, or *hedonic motivation*, to the model. Hedonic motivation has been

included as a key predictor in consumer research and it is also been widely used in information systems research in the consumer context. Hedonic motivation is defined as "fun or pleasure derived from using a technology". Hedonic motivation is conceptualized as enjoyment in previous studies and it has been shown to play an important factor as a direct influence on technology acceptance and use (Venkatesh et al. 2012). This additional factor supports the decision to choose this model to be a theoretical framework in this thesis as the aim is to study entertainment mobile application adoption. Hedonic motivation, in other words enjoyment, can be seen as an important factor when studying entertainment mobile applications as the ultimate goal for entertainment consumption is assumed to be enjoyment, that is to say hedonic motivation (Oliver and Raney, 2011).

Price value is another new extension to the model. Price is an important factor to be taken into consideration in consumer context as, unlike workplace technologies, consumers have to bear the cost of purchasing technology and technological services – the cost may have a significant impact on consumers' technology use. Price value is defined as following: "consumers' cognitive tradeoff between the perceived benefits of the applications and the monetary cost of using them." (Venkatesh et al. 2012) The price value is positive when the perceived benefits are considered to be greater than the perceived cost. This is an interesting factor considering mobile application context as there are free applications available and as well applications that cost, therefore it is interesting to study how this factor affects consumers´ perception of adapting a mobile application service.

The authors state that contextual habit has been shown to be a critical factor predicting technology acceptance, therefore *habit* is included to model as the third new factor. The authors define habit as "a perceptual construct that reflects the results of prior experiences". The model of UTAUT2 is presented in the Figure 4 below.

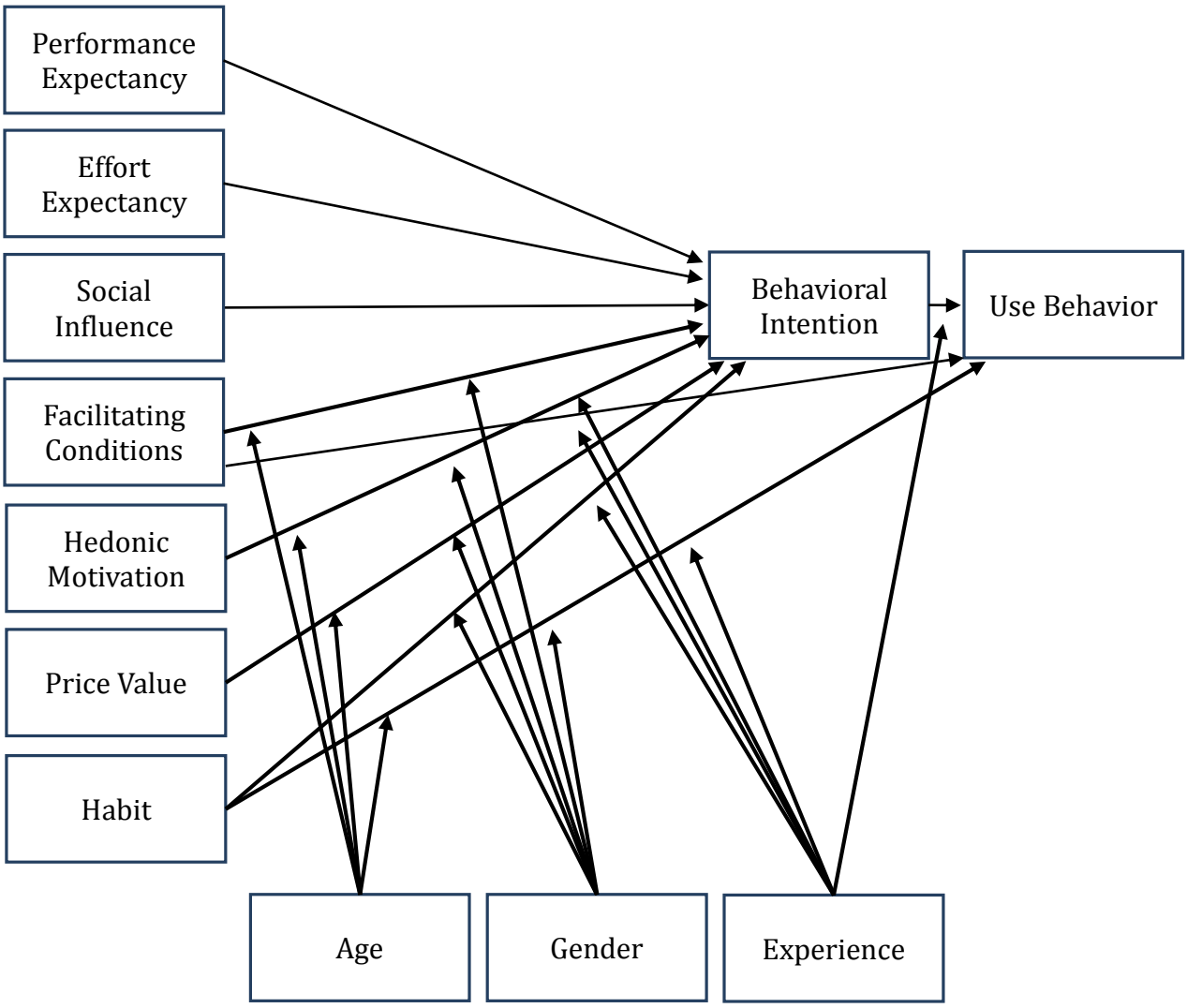

Figure 4. Theoretical Framework – Unified Theory of Acceptance and Use of Technology 2

The Figure 4 demonstrates the former model of UTAUT with the extension made to meet consumer context, UTAUT2. The new additional relationships are shown as darker arrows in the Figure.

This chapter explained the theoretical framework of the thesis, based on UTAUT2. The essential part of the framework is to understand the hedonic motivation and other factors that influence the use of an entertainment mobile application. The main objective in the framework is to test the theory in another context and to find the factors that affect

technology adoption. The next chapter will cover the empirical part of this thesis. Chapters 4 and 5 will describe the methodology of the research and the chapter 6 covers the findings of the present thesis.

4 Empirical Study

This chapter covers the empirical research methods, the design of the questionnaire and the survey target group.

This study investigates the factors affecting entertainment mobile applications adoption. Since this study is built strongly on UTAUT2 (Venkatesh et al. 2012), the questionnaire has been adapted from the UTAUT2 study with few modifications to meet the nature of mobile applications. Also the survey is conducted quantitatively as did Venkatesh et al. (2012) in order to be generalizable to the population of interest and in order to complete the planned quantitative analysis of the data. The next sections describe in detail how the questionnaire was formed and how the target group to whom the questionnaire was administered to was selected.

4.1 Questionnaire Design

The questionnaire design was adapted from Venkatesh et al. (2012) as a core of the survey. Also some modifications were made in order to adjust the survey into the mobile application context.

The background questions, that impact the conditions of use and intention to use are age, gender and experience. Age was measured in years. Venkatesh et al. (2012) measured experience in their questionnaire in months rather than self-evaluation. Contrary to Venkatesh et al. (2012), this thesis measured experience both in months and by asking respondents to evaluate themselves as a “novice” user or an “expert” user. The decision to measure experience in a more versatile way was made due to the nature of mobile application context; some users may be quick learners and be experienced even though they haven’t used applications long. Measuring experience trough months and self-estimation will provide a bigger picture of true experience.

Venkatesh et al. (2012) adapted the scale for the UTAUT2 constructs from UTAUT (Venkatesh et al. 2003). These constructs were performance expectancy, effort expectancy, social influence, facilitating conditions, and behavioral intentions. One statement (entertainment mobile applications are compatible with other technologies I use) was dropped from the original questionnaire from the section of facilitating conditions of Venkatesh et al. (2012) because this thesis limits the context to mobile applications in mobiles only, so no other technologies are relevant.

The habit scale Venkatesh et al. (2012) adapted from Limyam and Hirt (2003). The authors draw the scale for hedonic motivation from Kim et al. (2005) and the price value scale was selected from Dodds et al. (1991).

These above mentioned scales were measured using seven-point Likert scale, 1 being "strongly disagree" and 7 being "strongly agree".

Use of entertainment mobile applications was not directly drawn from Venkatesh et al. (2012) as it did not fit the context. Use scale was constructed according to entertainment mobile application context covered with question concerning how often users use entertainment mobile applications. Use was measured also with seven-point Likert scale, ranging from 1 "never" to 7 "many times per day".

A Finnish software company provided their application user information for completing the survey. The questionnaire was created in English and it was administered to the application users from 21 different countries via email. The used questionnaire is provided in appendix.

4.2 Data Collection

An email approach was selected to collect the data. The study was quantitative, so online collection would be affective and appropriate style of collecting the mass data. For distributing the questionnaire, a Finnish software company offered their user contact

information to reach the target group of the research, as the users of the company´s mobile application are using entertainment applications already. The user base consists of people from all over the world, so online survey was a natural choice. The user contact list consisted of 8000 users that were contacted via email in order to complete the study.

The survey was available online for two months during November and December 2012, during which a total of 150 responses were collected. A reminder message was sent to the target group in the middle of the collection period. 50 respondents were female and 100 were male. Distribution of respondents within age groups was as following: 2% of respondents were under 16, 10% of respondents were the age of 16 to 20, 19% of respondents were between 21-25. The biggest respondent group was the age group of 26-30 which covered 27% of the respondents. 7% of respondents were 31-35 and 13% were 36-40. 22% of respondents were over 40 years old.

		Gender		
		Female	Male	Total
Age	Under 16	1 (2%)	2(2%)	3(2%)
	16-20	6(12%)	10(10%)	16(10%)
	21-25	12(24%)	16(16%)	28(19%)
	26-30	16(32%)	24(24%)	40(27%)
	31-35	4(8%)	6(6%)	10(7%)
	36-40	3(6%)	17(17%)	20(13%)
	Over 40	8(16%)	25(25%)	33(22%)
Total		50(100%)	100(100%)	150(100%)

Table 1. Demographics of Respondents

The age distribution between genders was not completely evenly distributed. There were relatively more female respondents in the younger age groups than men and relatively more male respondents in the older age groups.

5 Analysis

After collecting the responses forming the data described in chapter 4, chapter 5 will cover the analysis part. This chapter describes each method in detail used in this thesis. All calculations were executed with SPSS statistics software. The methods used in this thesis include factor analysis and cluster analysis, cross-tabulation of the data and reliability and validity.

5.1 Reliability and Validity

This chapter covers the assessment of reliability and validity. Reliability is an assessment of consistency between multiple measurements of a variable, and therefore the less random error and more consistent results a study design can produce over time and multiple repetitions, the better the reliability. Validity, on the other hand, measures precision. Reliability will be discussed first, as any summated scale should be analyzed for reliability to ensure its appropriateness before proceeding to assess validity (Hair et al. 2012, 125).

There are two ways to measure reliability: one way is to measure consistency between the responses at two points in time (external) and the other is to measure internal consistency, which applies to the consistency among variables in a summated scale, which is more commonly used (Hair et al. 2010, 125). Reliability will be evaluated with Cronbach's alpha, which assesses the consistency of the entire scale. According to Hair et al. (2010, 125) the accepted lower limit for Cronbach's alpha is 0.70, although it may decrease to .60 in exploratory research. If the number of items in a factor is large, the reliability will increase and the researcher should place more stringent requirements for scales. The current data has no factors that include many variables (max 4), therefore no additional requirements are made.

	Recomended value > 0.70		
Factor	**Cronbach's Alpha**	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
Hedonic Motivation	.913	.917	3
Effort Expectancy	.893	.894	4
Social Influence	.918	.918	3
Facilitating Conditions	.779	.792	3
Price Value	.901	.901	3
Habit	.858	.858	3
Performance Expectancy	.881	.881	3

Table 2. Cronbach´s alpha

All the Cronbach's alpha measures are above the recommended value of 0.70 and therefore statistically significant and it can be said that the data is highly reliable and fit for factor analysis.

The variables in this thesis are drawn from the UTAUT2 theory; it can be argued that the data is also externally reliable. What comes to validity, as said that the variables are adopted from the UTAUT2, it is also safe to say that the metrics are also valid. Validity can be said to exist also in this context as the model is designed to measure adoption of a consumer technology, which mobile applications are indeed. Venkatesh et al. (2012) have assessed the variables for both reliability and validity. In addition to content validity, some objective measures include convergent and discriminant validity. Factor analysis provides an assessment of the interrelationships among variables, essential in forming a summated scale trough assessment of content validity and scale dimensionality. Convergent validity means that the scale item should have high intra-construct correlation within its own construct and discriminant validity means they should differ enough from constructs that they do not belong to (Hair et al. 2010, 127).

			Correlations						
Construct	**M**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Hedonic Motivation	4.65	1.35	**.86**						
Effort Expectancy	5.71	1.30	.46*	**.76**					
Social Influence	3.61	1.91	.32*	.17*	**.86**				
Price Value	5.58	1.52	.26*	.30*	.23*	**.83**			
Habit	4.22	1.85	.36*	.19*	.43*	.17*	**.78**		
Performance expectancy	4.63	1.69	.35*	.22*	.41*	.21*	.43*	**.81**	
Facilitating conditions	5.58	1.52	.29*	.40*	.17*	.45*	.12*	.21*	**.71**

Significant at p< 0.001

Table 3. Descriptive Statistics and Correlations

Looking at the Tables 2 and 3, it is safe to say that the data is reliable and valid. This being said, the method of factor analysis shall be discussed in the next chapter.

5.2 Factor Analysis

Factor analysis is a good tool for data reduction or summarization and to identify underlying dimensions (factors) that explain the correlations in a set of variables. Before the factor analysis was implemented, reliability and validity were confirmed in order to apply the data for further analysis, as already discussed in the previous chapter.

In order to conduct a factor analysis, the appropriateness of the factor model needs to be tested. There are two ways to do this. One is Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which should be at least 0.5, and the other is Bartlett's test of sphericity (Malhotra, 2010, 640), which should be <0.05 in order it to be statistically significant (Hair et al. 2010, 105). What comes to the data of this research, it is safe to say that the data is excellent for

factor analysis since the KMO score of the data was .856 and Bartlett's test significant at the .000 level.

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy. (KMO)	0.856
Bartlett's Test of Sphericity	.000

Table 4. KMO and Bartlett´s Test

The primary purpose of factor analysis is to define the underlying structure among the variables in the analysis. This thesis applies principal components analysis (PCA), which forms the basis for multivariate data analysis and it has been extensively used as a part of factor analysis. The goal of PCA is to find relationships between objects and data reduction. (Esbensen & Geladi, 1987) The class membership may be found by exploring the available data or it may be known in advance. In this thesis the class memberships are known before hand as this thesis follows the guidelines of UTAUT2 when conducting the analysis.

Factor analysis defines sets of variables that are highly interrelated, called factors. These factors represent dimensions within the data. First the factor matrix is computed and then rotated. Rotation means that factors are turned about the origin. Rotation does not impact on the loadings but is made to achieve a simpler, theoretically more meaningful factor pattern from which the results are easier to interpret. (Hair et al. 2010, 113).

The main reason for conducting a factor analysis in this thesis is to test the fitness of UTAUT2 into entertainment mobile application context and to further conduct a cluster analysis. Factor analysis gives an empirical confirmation of the theory, based on the actual data, but it also helps reduce data to a more manageable level. There was indeed complexity within the

data discovered with factor analysis, which led to a removal of a factor. A scree test was conducted to discover the amount of acceptable factors.

The scree test is used to identify the optimum number of factors that can be extracted before the amount of unique variance starts to dominate. Scree plot is a way to visually demonstrate the accepted amount of factors with a curve, an eigenvalue cutoff point 1.0 is usually used. Figure 5 describes the scree plot curve which is used to evaluate the cutoff point (eigenvalue > 1). (Hair et al. 2010, 110)

Factor	Eigenvalue	Cumulative % of Variance Explained
1	8.131	36.960
2	3.520	52.961
3	2.079	62.410
4	1.329	68.450
5	1.232	74.049
6	1.080	78.957
7	.880	82.958
8	.503	85.245
9	.449	87.284
10	.394	89.074

Table 5. Eigenvalue and Cumulative Variance Explained

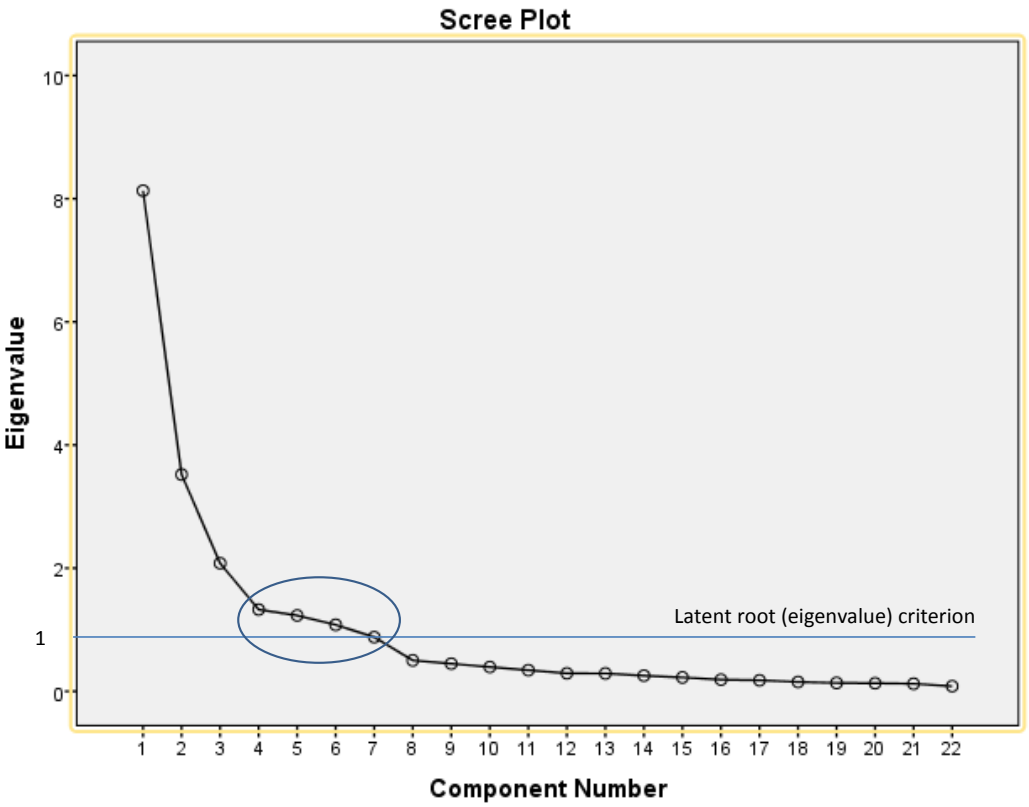

Figure 5. Scree Plot

The acceptable range of factors is highlighted on the scree plot curve. It seems that 6 factors would be ideal contrary to the 7 factors that Venkatesh et al. (2012) propose in their model, with 79% of cumulative variance explained. Factor analysis and selected factors will be discussed closer in chapter 6.1.

5.3 Cluster Analysis

Cluster analysis is conducted in this thesis in order to better meet the needs of marketers. Information of user segments have been little provided and further examination how UTAUT can help in exploring different profiles of users of technology is requested in previous researches (Verdegem & Marez, 2011; Venkatesh et al. 2012).

Cluster analysis is a beneficial method from the marketing perspective to group the factors according to similarities within the groups, such as customer segments. The purpose of cluster analysis is to classify objects into homogeneous groups. Objects in each cluster tend to be similar to each other and distinct from other clusters.

The formed factor analysis results can be used to perform a cluster analysis, so no surrogate variables are needed. The number of clusters needs to be carefully considered. There is no straightforward way of doing this as the analysis itself does not provide clusters automatically – deciding on the number of clusters requires judgment on the part of the researcher and the researcher must assess the validity of the clustering process (Malhotra, 2010, 664). Cluster distance can be checked with analysis of variance (ANOVA). ANOVA is used to assess the statistical significance of difference between groups. This method is used in chapter 6.2 when assessing the number of clusters and ANOVA table is provided.

Clusters can be assessed in a way that the distance at which clusters are combined can be used as criteria. This information can be obtained from the dendrogram (Malhotra, 2010, 670). According to ESRI (2002) there are three key pieces of information that can be detected from the dendrogram:

1) **Weight**
   Weight is the rough percentage of all individuals that fall within each cluster.
2) **Compactness**
   Compactness represents the minimum distance at which the cluster comes in existence – how similar the elements of a cluster are.
3) **Distinctness**
   How different is each cluster from its closest cluster.

SPSS software outputs a dendrogram of the data that could be used in an assistance when choosing the clusters. However, due to number of respondents the dendrogram image generated from the current data is unreadable and will be used in this case as a visual guidance when choosing the clusters. Nonetheless it was still possible to determine the clusters from the branches. Five clusters were selected by evaluating weight, compactness, and distinctness. The dendrogram of the current data is shown in Figure 6.

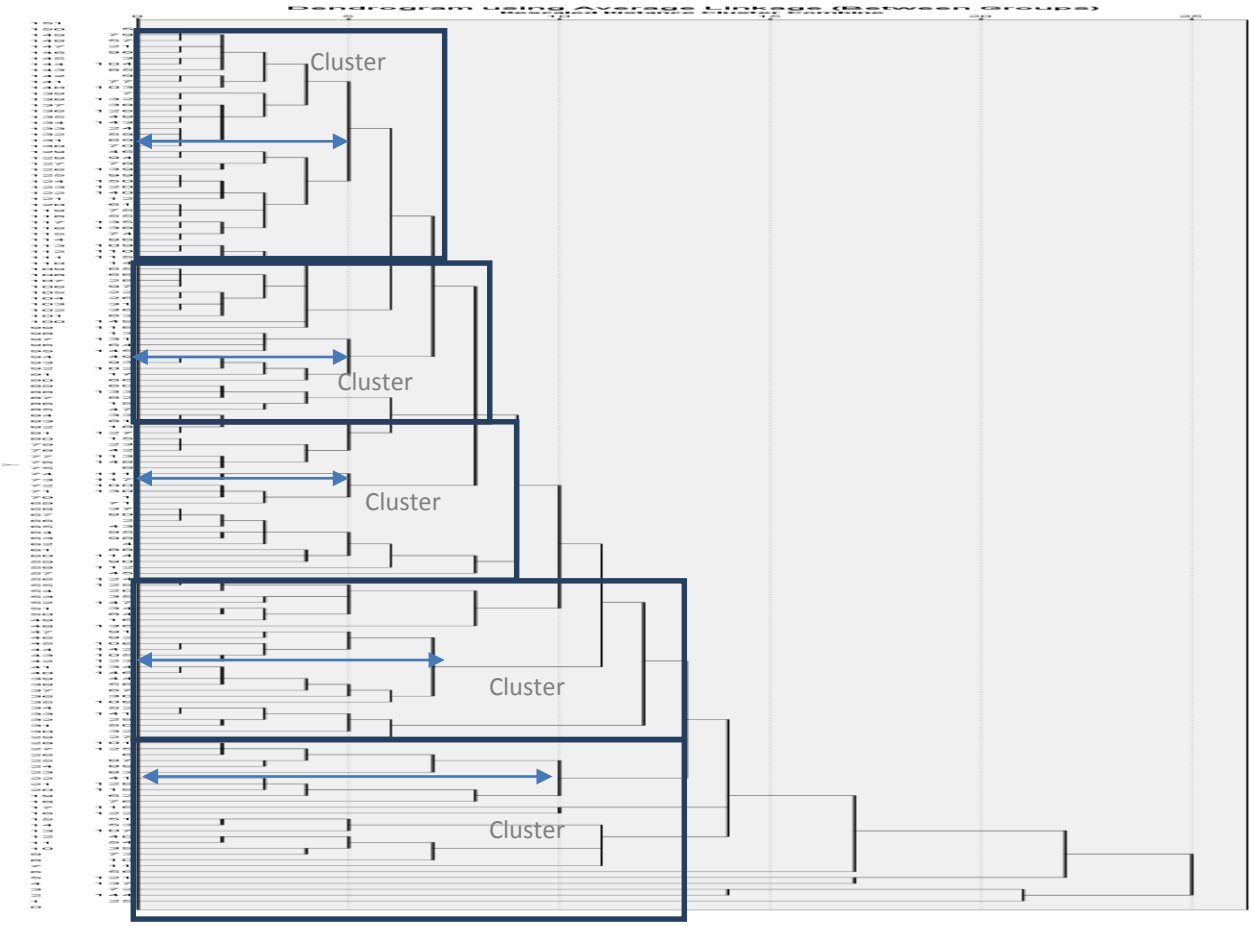

Figure 6. Visual Solution of Clustering Choice

5.4 Cross-Tabulation

Although the answers to questions concerning a single variable are interesting, we want to further analyze the variables comparing them to others by examining cross-tabulation. Cross-tabulation helps understanding how one variable relates to another variable. (Malhotra, 2010, 494). It helps us to gain a deeper understanding of the segmentation made with cluster analysis. Here cross-tabulation is made to refine the interpretation of different clusters by cross-examining the background variables age, gender, and experience.

In cross-tabulation, the statistical significance is commonly measured by the chi-square statistic. The greater the discrepancies between the frequencies are, the larger the value of

the statistic is (Malhotra, 2010, 498). The chapter 6 will cover the findings of three different cross-tabulation combinations and the chi-square values.

6 Findings

The previous chapter covered the methods used in this thesis to analyze the data, which are factor analysis, cluster analysis, and cross-tabulation. This chapter focuses on reporting the findings discovered in the analyses.

First the outcomes of the factor analyses are discussed. The analyses resulted in 6 factors, reducing the original amount of factors with one from UTAUT2. Second, cluster analysis is executed in order to group these factors into segments. The cluster analysis resulted in five clusters. Third and finally, a cross-tabulation is conducted in order to further study the cluster analysis results.

6.1 Factors and Elimination of Facilitating Conditions

Now that the factor analysis as a multivariate method has been reviewed in chapter 5.2, it is time for the actual analysis.

The factor analysis was made to all seven factors that lead to adoption of a new technology (Venkatesh et al. 2012): hedonic motivation, effort expectancy, performance expectancy, social influence, price value, habit, and facilitating conditions. The factor analysis was applied using the VARIMAX rotation and the rotated factor matrix (Table 6) shows how the loadings take up a position in each factor. All the factor items seem to load in their own factors according to the loadings, except facilitating condition seems to meander. As can be seen from the Table 4, facilitating condition seems sprawling and does not load into a one explicit factor. The loading indicates it being a part of effort expectancy (item 5, item 9), price value (item 5, item 9), social influence (item 13), and performance expectancy (item 13). Facilitating condition and its loadings are highlighted in red in the Table 6.

		Component					
Item	**Factor**	F1	F2	F3	F4	F5	F6
1.Learning how to use an entertainment apps is easy for me.	Effort Expectancy	**.870**	.113	.064	.108	.014	.083
2.My interaction with entertainment apps is clear and understandable.		**.787**	.151	.059	.375	.073	.071
3.It is easy for me to become skillful at using entertainment apps.		**.770**	.195	.047	.186	.087	.090
4.I find entertainment apps easy to use.		**.749**	.030	.047	.312	.070	.101
5.I have the knowledge necessary to use an entertainment app.	Facilitating Conditions	**.660**	**.499**	.033	.019	.097	-.116
6.At the current price, entertainment apps provide a good value.	Price Value	.133	**.887**	.028	.090	.073	.183
7.Entertainment apps are good value for the money.		.094	**.867**	.062	.127	.152	.149
8.Entertainment apps are reasonably priced.		.217	**.828**	.232	.110	-.042	-.047
9.I have the resources necessary to use an entertainment app.	Facilitating Conditions	**.558**	**.612**	-.008	.043	.074	-.112
10.People whose opinions that I value prefer that I use entertainment apps.	Social Influence	.061	.087	**.874**	.110	.205	.199
11.People who influence my behavior think that I should use entertainment apps.		.072	.121	**.855**	.167	.150	.243
12.People who are important to me think that I should use entertainment apps.		.004	.048	**.834**	.132	.157	.263
13.I can get help from others when I have difficulties using an entertainment app.	Facilitating Conditions	.248	.368	**.441**	.073	**.414**	-.233
14.Using an entertainment app is fun.	Hedonic Motivation	.324	.080	.085	**.845**	.157	.112
15.Using an entertainment app is enjoyable.		.302	.116	.161	**.835**	.178	.145
16.Using an entertainment app is very entertaining.		.211	.158	.212	**.813**	.114	.179
17.Using entertainment apps increase my productivity.	Performance Expectancy	.026	.018	.126	.121	**.870**	.170
18.Using entertainment apps help me accomplish things more quickly.		.059	.094	.217	.126	**.869**	.198
19.I find entertainment apps useful in my daily life.		.204	.139	.245	.219	**.684**	.355
20.I am addicted to using entertainment apps.	Habit	.063	.073	.223	.134	.138	**.862**
21.I must use entertainment apps.		-.061	-.005	.294	.110	.273	**.808**
22.The use of an entertainment app has become a habit for me.		.302	.139	.201	.246	.243	**.635**

Table 6. Rotated Factor Matrix

Facilitating condition has shown importance as it has a high loading and the Cronbach's alpha indicates to significance (.779), tough it is not so high than with other factors. However in this entertainment mobile application context, it seems it has no value as a separate factor that would affect adoption. Facilitating condition can be explained by three before mentioned factors. This might also result from the attributes of respondents. The questionnaire was send to people who already use mobile applications and therefore have the access to the necessary technology in order to use these mobile services. As facilitating condition describes how accessible is a given technology, it can be excluded from the model in this context, as the primary assumption is that application users have the access to the applications.

Another factor run was conducted, now excluding facilitating conditions. Table 7 below demonstrates the new factor loadings and factors and confirms the decision to remove facilitating conditions from the model.

Item	Factor	Component					
		1	2	3	4	5	6
Learning how to use an entertainment app is easy for me.	Effort Expectancy	**.889**	.063	.089	.135	.021	.053
My interaction with entertainment apps is clear and understandable.		**.814**	.053	.352	.171	.078	.049
It is easy for me to become skillful at using entertainment apps.		**.811**	.040	.146	.225	.096	.061
I find entertainment apps easy to use.		**.773**	.055	.286	.052	.087	.062
People who influence my behavior think that I should use entertainment apps.	Social Influence	.083	**.869**	.166	.134	.163	.216
People whose opinions that I value prefer that I use entertainment apps.		.058	**.868**	.124	.092	.194	.208
People who are important to me think that I should use entertainment apps.		.052	**.857**	.097	.093	.190	.203
Using an entertainment app is fun.	Hedonic Motivation	.325	.073	**.849**	.069	.146	.136
Using an entertainment app is enjoyable.		.303	.151	**.838**	.108	.170	.163
Using an entertainment app is very entertaining.		.218	.208	**.811**	.157	.115	.184
At the current price, entertainment apps provide a good value.	Price Value	.168	.034	.062	**.920**	.102	.120
Entertainment apps are good value for the money.		.138	.069	.092	**.906**	.184	.081
Entertainment apps are reasonably priced.		.196	.207	.138	**.818**	-.063	-.031
Using entertainment apps help me accomplish things more quickly.	Performance Expectancy	.085	.227	.112	.111	**.882**	.169
Using entertainment apps increase my productivity.		.033	.138	.120	.024	**.880**	.149
I find entertainment apps useful in my daily life.		.210	.255	.219	.146	**.692**	.334
I am addicted to using entertainment apps.	Habit	.054	.218	.135	.071	.131	**.884**
I must use entertainment apps.		-.051	.283	.099	.005	.263	**.834**
The use of an entertainment app has become a habit for me.		.272	.178	.273	.122	.212	**.685**

Table 7. Rotated Factor Matrix Excluding Facilitating Conditions

This decision of reduction of one factor leaves us with six factors affecting entertainment mobile application adoption. This was also previously supported with scree plot curve in chapter 5.2. The first factor, effort expectancy, accounts for 39% of the total variance explained. Effort expectancy, in other words ease of use, has indeed been a very important factor in all the history of technology acceptance research from the very first model of TAM. The modified model of UTAUT2 (Venkatesh et al. 2012) functions as the framework of the present thesis, shown in Figure 7.

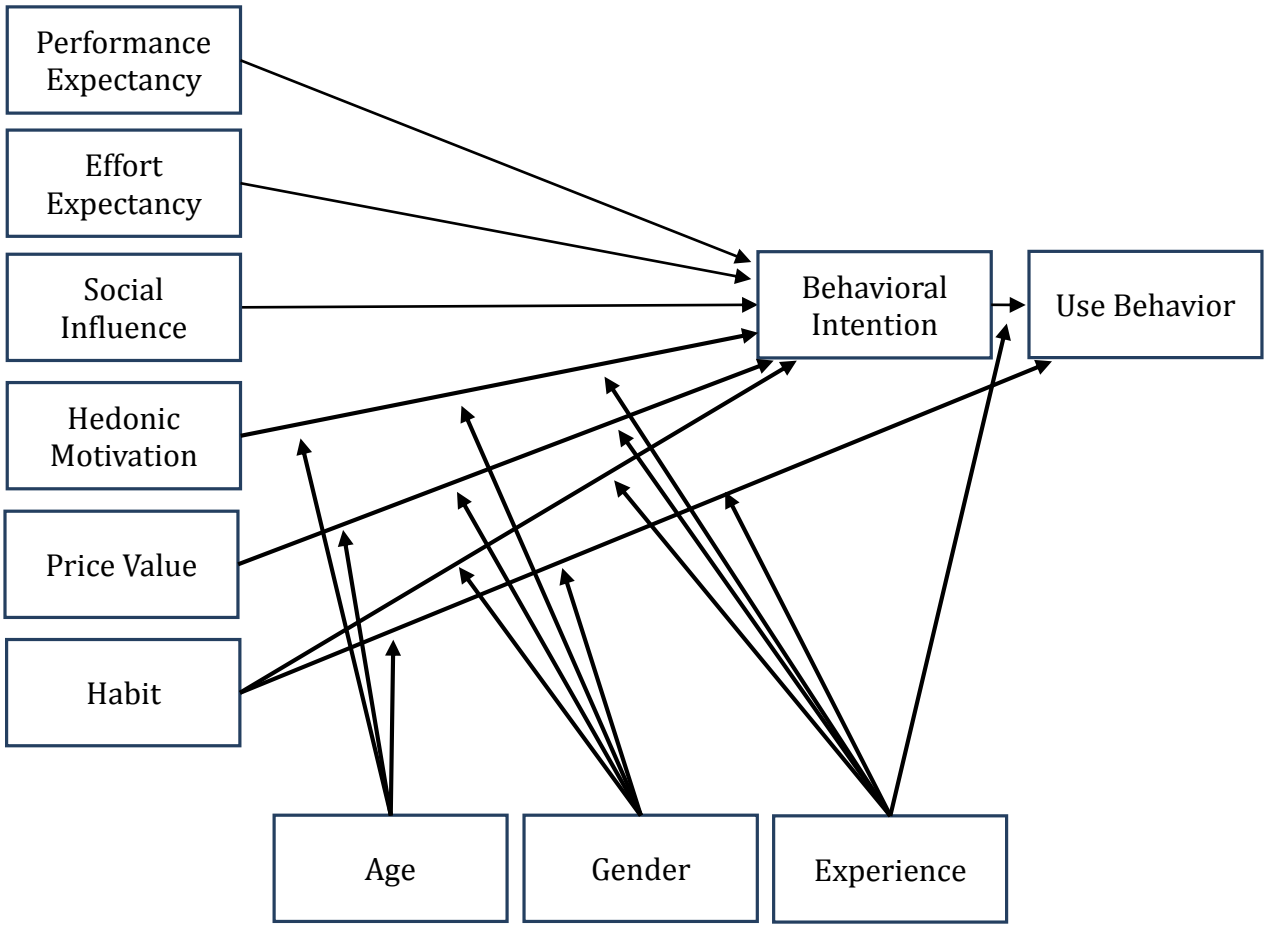

Figure 7. Framework of the Thesis – Modified UTAUT2

Another important fact to note is that traditionally in research, mobile entertainment has been considered to be mobile gaming. But the rising app economy has brought thousands of

other entertainment applications other than games to the markets. Usually entertainment technology acceptance research has indeed focused on the gaming industry and found that usefulness in this context is not relevant. It has been noted in many research that usefulness does not motivate users, has no significant direct effect on intention to use and it does not drive user participation (Hsu & Lu, 2004). Hsu and Lu (2004) argue that another factor instead of usefulness related to acceptance of entertainment-oriented technologies should be considered. However, the results found in this thesis show that usefulness is indeed an important factor measuring adoption of entertainment-oriented technologies, at least other than games. People seek purpose for their actions and usefulness motivates users to use the given entertainment mobile application.

6.2 Segmentation Using Cluster Analysis

Here the cluster analysis is based on the factor analysis and factor scores it has produced. In order to answer the second sub-question of the thesis, a K-means clustering technique was carried out, which resulted in five groups, or clusters, whose difference were statistically significant in each cluster.

	Cluster				
	F1	F2	F3	F4	F5
Effort Expectancy	.188	.595	.134	-1.544	-.135
Social Influence	-.020	-.299	.641	.115	-1.180
Hedonic Motivation	.670	-.033	.031	-.042	-1.074
Price Value	.505	-1.092	.455	-.637	.561
Performance Expectancy	.293	-.431	.082	-.601	.664
Habit	-1.087	-.098	.719	-.104	.231

Table 8. Cluster Means of the Factor Analysis Results

Table 8 shows the cluster means of the factor analysis. ANOVA results show the differences in variable means across the five clusters. All the results are statistically significant, demonstrated in the Table 9.

ANOVA						
	Cluster		Error		*F*	Sig.
	Mean Square	df	Mean Square	df		
Effort Expectancy	14.833	4	.618	145	23.987	.000
Social Influence	12.362	4	.687	145	18.005	.000
Hedonic Motivation	8.998	4	.779	145	11.545	.000
Price Value	17.751	4	.538	145	32.999	.000
Performance Expextancy	6.098	4	.859	145	7.096	.000
Habit	15.768	4	.593	145	26.607	.000

Table 9. Statistical Significance of the Cluster Analysis Results (ANOVA)

Based on the Table 8, we can already draw some conclusions of the factors. The idea of the cluster analysis is to group people according to their attitudes. Comparing the clusters to each other's and examining how they react to different factors, we can form five user segments:

1) These entertainment application users find apps quite easy to use and very enjoyable but also expect usefulness from entertainment apps. These users are occasional users and not socially influenced and are very content with pricing of entertainment apps. It could be said that this group is not necessarily very loyal or frequent users (habit not appreciated) but quite an interesting group as they enjoy apps a lot and are pleased with pricing. These users could be described as '*average app users seeking enjoyment and usefulness*'.

2) These users find entertainment apps very easy to use but that's about it. They don't appreciate any other factors: they don't consider apps being enjoyable or useful, they are not socially influenced and do not use entertainment apps frequently. They are also discontent with pricing. This cluster could be called as '*unlikely users'.*
3) These users find entertainment apps easy to use and are highly socially influenced. They feel that entertainment apps are enjoyable and well-priced. These users consider entertainment apps useful in their lives and use of an entertainment app has become a habit for them. These users could be described as '*superusers'.*
4) The users in cluster 4 are highly struggling with usability issues. They do not find entertainment apps enjoyable or useful. They have a negative attitude towards pricing and likely use only free apps, however this group is socially influenced. These users could be described as '*users under social pressure'*.
5) Cluster 5 contains users who are also struggling with usage. These users are not socially influenced and do not find entertainment apps enjoyable. However, they have a positive attitude towards price value and they find entertainment apps very useful. They are also habitual users. This cluster could be called '*paying users seeking usefulness"*.

6.3 Cross-Tabulation

In this section we will conduct cross-tabulation. Here the clusters will be cross-tabulated with demographic background variables gender, age, experience, and use. It is interesting to see how people in different clusters differ from each other demographically. First we will do a cross-tabulation with gender.

6.3.1 Cross-Tabulation with Gender

The data covers 150 responses with 100 being male and 50 being female. Table 10 details the gender distribution of respondents across the five clusters.

The gender distribution seems to be quite in line with the distribution of gender in the whole data (33% female). A notable segment considering gender distribution is the *superuser* – segment, where gender seems to be quite equally distributed, both men and women equally appreciate entertainment applications in this cluster. The cluster *paying users seeking usefulness* is slightly dominated by male users.

	Gender (n=150)		n	% of total
	Female	Male		
Average app users seeking enjoyment and usefulness	39 %	61 %	31	20
Unlikely users	27 %	73 %	33	22
Superusers	42 %	58 %	48	32
Users under social pressure	26 %	74 %	19	13
Paying users seeking usefulness	21 %	79 %	19	13
	100 %	100 %	150	100 %

Table 10. Cross-Tabulation with Gender

6.3.2 Cross-Tabulation with Age

The questionnaire contained a section of age which was divided into sections in order to clarify the handling of the data varying from under 16 to over 40 years. The age distribution of the current data can be seen in table 11.

There are two segments that seem to be interesting when cross-tabulating clusters with age:

- The cluster *superusers* seem to be dominated by young adults. Young adults are in fact said to be more innovative users and less resistant to new technology; they do not

face usability issues in a same way than the older users do. 67% of users in the cluster *super-users* are young adults (aged 16-30).

The second interesting cluster is the *users under social pressure.* It seems that this cluster consist of users aged 36 or more. This might result of the fact that this group of age are not born I the technology era and are not therefor natural users. Though these users are interested in new phenomenon such as mobile applications and use them under social pressure of environment and friends.

	Age							
	Under 16	16-20	21-25	26-30	31-35	36-40	Over 40	Total
Average app users seeking enjoyment and usefulness	0,0%	16,0%	16,0%	19,0%	6,0%	13,0%	29,0%	31 20,7%
Unlikely users	6,0%	12,0%	18,0%	21,0%	9,0%	15,0%	18,0%	33 22,0%
Superusers	0,0%	6,0%	21,0%	40,0%	8,0%	10,0%	15,0%	48 32,0%
Users under social pressure	0,0%	5,0%	16,0%	16,0%	5,0%	21,0%	37,0%	19 12,7%
Paying users seeking usefulness	5,0%	16,0%	21,0%	26,0%	0,0%	11,0%	21,0%	19 12,7%
Total	3	16	28	40	10	20	33	150 100,0%

Table 11. Cross-Tabulation with Age

6.3.3 Cross-Tabulation with Experience

Experience was measured both in months as Venkatesh et al. (2012) also did in their study, and as a self-estimate validation respondents choosing whether they consider themselves to expert of novice in using entertainment mobile applications. Table 12 provides the distribution of experience in months in each cluster.

		Experience (in months)							
		Under 6	6-11	12-17	18-23	24-29	30-35	Over 35	Total
1	Average users seeking enjoyment and usefulness								31
		6,5%	3,0%	13,0%	6,5%	29,0%	3,0%	39,0%	20,7%
2	Unlikely users								33
		12,0%	3,0%	9,0%	9,0%	12,0%	3,0%	52,0%	22,0%
3	Superusers								48
		0,0%	19,0%	17,0%	6,0%	19,0%	4,0%	35,0%	32,0%
4	Users under social pressure								19
		16,0%	16,0%	21,0%	5,0%	10,0%	0,0%	32,0%	12,7%
5	Paying users seeking usefulness								19
		16,0%	10,0%	10,0%	10,0%	16,0%	6,0%	32,0%	12,7%
	Total	12	16	21	11	27	5	58	150
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Table 12. Cross-Tabulation with Experience in Months (chi-square 23.013 with 24 degree of freedom, p = 0.519, insignificant)

To clarify the Table of experience distribution, it can be said that the groups *under 6* and *6-11* are users with experience *less than a year*. Groups *12-17* and *18-23* are groups that have experience of *almost two years.* Groups *24-29, 30-35* and *over 35* have experience of *two years and more*.

The chi-square test of significance of cross-tabulation of experience in months does not reach significance (x=23.013, df=24, p=0.519) which means that there is no dependent relationship between cluster memberships and gender and the results should be treated with caution. There was an additional question concerning experience provided for the respondents in the questionnaire. They were able to state whether they consider themselves as expert or novice users. Interestingly, the relationship between the self-estimated experience and clustering solution seems to be dependent, chi-square test of significance providing us with significant values exceeding the threshold value of 0.05 (x=11.978, df=4, p=.018). 68% of respondents described themselves as expert users and the rest 32% considered to be novice users. The results are pretty much the same in both tables and respondents have been able to validate their experience quite well.

	Expert	Novice	Total
Average users seeking enjoyment and usefulness	19	10	29
	66,0%	34,0%	19,9%
Unlikely users	23	9	32
	72,0%	28,0%	21,9%
Superusers	39	8	47
	83,0%	17,0%	32,2%
Users under social pressure	8	11	19
	42,0%	58,0%	13,0%
Paying users seekin usefulness	11	8	19
	58,0%	42,0%	13,0%
Total	100	46	146
	100,0%	100,0%	100,0%

Table 13. Cross-tabulation with Self-Estimated Experience (11.978 with 4 degrees of freedom, p=.018, significant)

Clusters 1, 2, and 5 follow the distribution of expert and novice users. Clusters 3 and 4 are more interesting:

- Superusers were users that feel ease of use, a lot of enjoyment and the use of an entertainment app has become a habit for them. It is no surprise that this cluster is dominated by expert users.
- Users under social pressure -cluster is distributed quite equally, with some dominance of novice users. Comparing this to the distribution of all respondents it can be noted that these users have relatively large portion of novice users. These users are those who are struggling with usability issues but use entertainment applications because of social influence. Social influence indeed seems to be the driving force behind these novice users.

6.3.4 Cross-Tabulation with Use

In this section we will cross-tabulate the clusters with usage frequency. Question *How often do you use entertainment mobile applications?* was carried out with 7-point Likert scale 1 being '*never'* and 7 being '*many times per day'.*

Table 12 below shows the usage distribution in each cluster. There are several interesting findings that can be made from the cross-tabulation:

- In the first cluster the use frequency distribution is balanced deriving into almost all options. These are average users and it seems that the use frequency of apps varies a lot, some us many times per day and some less.
- This cluster consists of unlikely users that don't really appreciate entertainment apps, however they seem to use them quite frequently anyway. This might be due to the fact that this group finds entertainment apps very easy to use, tough the reason for use remains unknown.
- The cluster number 3, the *superusers,* are, as expected, heavy users. 58.3% said that they use entertainment apps many times per day.

- The use of *users under social pressure* varies a lot from many times per day to never.
- The final fifth cluster uses entertainment apps quite frequently. This might be due to the fact that these users find entertainment apps very useful.

		How often do you use entertainment apps?							
		1	2	3	4	5	6	7	Total
1	Average users seeking enjoyment and usefulness								31
		0,0%	0,0%	7,0%	3,0%	35,0%	26,0%	29,0%	20,7%
2	Unlikely users								33
		0,0%	3,0%	6,0%	9,1%	27,3%	18,2%	36,4%	22,0%
3	Superusers								48
		0,0%	0,0%	0,0%	2,1%	8,3%	31,3%	58,3%	32,0%
4	Users under social pressure								19
		10,5%	16,0%	10,5%	16,0%	26,0%	5,0%	16,0%	12,7%
5	Paying users seeking usefulness								19
		5,0%	5,0%	0,0%	11,0%	21,0%	26,0%	32,0%	12,7%
Total		3	5	6	10	33	35	58	150
		100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Table 14. Cross-Tabulation with Use (chi-square 52.632 with 24 degrees of freedom, p=.001)

To summarize, each cluster with a description can be seen from the Table 15 below. A fact to note is that clustering methods are subjective based on the data and the final analysis and

decision of the number of clusters are left to the researcher. Clusters should be evaluated with discretion and remembering that clustering depends on the data and can vary indeed for example with demographic variables being changed.

Cluster	%	Profile
Average users seeking enjoyment and usefulness	21%	Enjoying users with no usability issues.
Unlikely users	22%	Don't enjoy or feel usefulness. Not socially influenced or content with price, tough very skillful users.
Superusers	32%	Expert heavy users enjoying entertainment apps. Social young adults.
Users under social pressure	13%	Novice older group of users, affected by social influence.
Paying users seeking usefulness	13%	Willing to pay for usefulness and mainly male.

Table 15. Summary of the Five Clusters

In previous research of mobile services similar user-segments have been found that support the findings in this thesis. Moores´s study of technology life cycle model states (as cited in Pagani, 2004) that in order for a technology product to gain critical mass, it must go through these segments as a part of life cycle. Traditionally these user-groups have been named as innovators, early adopters, early majority, late majority, and laggards. These user-groups can be identified from the user-groups of this thesis. Pagani (2004) studied mobile services adoption in general and found five similar user groups as this thesis.

Superusers can be seen as Innovators:

"*Innovators are committed to new technology and are typically the first customers for anything that is truly brand-new. They are mainly interested in games in real time, multimedia messaging services, mobile shopping and location based services."* (Pagani, 2004).

Paying users seeking usefulness as Early Adapters:

" This cluster is composed of the "professionals," that is people who mainly are managers or entrepreneurs in life. They look for usefulness as the almost exclusive variable in order to access and pay for the service." (Pagani, 2004)

Average users seeking enjoyment and usefulness and users under social pressure as Early Majority:

"These people make the bulk of all technology infrastructure purchases. They do not love technology for its own sake. They believe in evolutionary, not revolutionary, products and innovations." (Pagani, 2004)

Unlikely users fall into groups of Late Majority and Laggards:

Late Majority – "These customers are pessimistic about their ability to gain any value from technology investments. They are price sensitive, highly skeptical, and very demanding." (Pagani, 2004)

Laggards – "These customers are not as much of potential customers as they are critics." (Pagani, 2004)

One thing to note when comparing the user groups found in this thesis to the technology adoption life cycle model by Moore (as cited by Pagani, 2004) is that usually the biggest group of consumers in a life cycle is early and late majority, depending on the state of the life cycle. In the data of this thesis the biggest group of users is the superusers (innovators). This truly shows that the target group to whom the questionnaire was administrated to are users of a brand new mobile application and therefore it is expected that majority of the respondents are innovators trying out a new application as the application product is in the beginning of its life cycle.

These clustering findings are important and supported by previous research. This information concerning different clusters (segments) can be very useful from the marketing perspective for future entertainment mobile application developers and marketers.

7 Conclusion

The purpose of this study was to explore UTAUT2 fit in the context of entertainment mobile services. To clarify the wanted field of mobile services, the focus was limited into entertainment mobile applications excluding games.

The goal of the thesis was to apply a new context for Unified Theory of Acceptance and Use of Technology as requested by Venkatesh et al. (2012) and also to investigate what are the factors that truly affect entertainment mobile application adoption. The mobile gaming context is already widely studied and it differs a lot from other entertainment mobile services, therefore it was decided to be left out in order to explore the factors that affect the other entertainment services that differ from games by their nature, purpose and such. In addition to test UTAUT2 in another context, the secondary purpose of the thesis was to investigate the consumer groups and understand the different segments that can be found in this user-group.

The empirical part of the thesis was conducted through an online survey which was sent to users of an entertainment mobile application. Altogether 150 responses were gathered for the analysis. The data generated by the application users was analyzed with factor and cluster analysis. Also cross-tabulation was conducted in order to answer the second sub-research question and further understand the different user-segments.

There were three research questions this thesis pursued to answer. The primary research question was

1. **What are the main factors affecting entertainment mobile application adoption?**

The secondary complementing research questions were

2. **How has the Technology acceptance model evolved from working environment perspective into covering a consumer approach?**

3. **What are the segments that can be identified from the users of an entertainment mobile application?**

7.1 Results

Regarding the first research question (main factors affecting adoption), the analysis of the data, especially factor analysis discovered that the factor *facilitating conditions* got a good score on Cronbach´s alpha but didn´t correlate as an independent factor. This factor rather correlated with effort expectancy, price value, social influence, and performance expectancy. This resulted in a withdrawal of the factor in this thesis. It can be stated that facilitating conditions is an important factor as it describes the availability of a certain technology, which is pretty obvious in adoption. However in this thesis, data was collected from users that already use entertainment mobile applications and therefore this factor has no relevance in this case.

Another important finding concerning factors affecting acceptance in this thesis was that usefulness is an important factor after all in an entertainment context when games are excluded. Unlike previously in research, this thesis found that users are motivated to use and participate in an entertainment mobile application when they find it useful.

Important practical outcomes especially from the marketing point-of-view were the clustering and cross-tabulation results. Clustering the data resulted in formation of five different groups of users which were then cross-tabulated with background variables age, gender, and experience and with usage frequency. Based on the cross-tabulation, the five segments were identified as following:

1. **Average Users Seeking Entertainment and Usefulness**

   These users enjoy entertainment applications and find them useful in their lives. Average users are mostly novice and slightly an older group of users. This group is not necessarily the most loyal user-group but interesting as it is pretty easy to please.

2. **Unlikely Users**

   These users are not an ideal segment for an entertainment application. These users don't find entertainment apps entertaining or useful. These users are not happy using entertainment applications and therefor are unlikely users and not very likely to adapt entertainment apps.

3. **Superusers**

   These users find entertainment apps easy to use and are highly socially influenced. They feel that entertainment apps are enjoyable and well-priced. These users consider entertainment apps useful in their lives and use of an entertainment app has become a habit for them. Super-user –segment consists of expert young adult –users that use entertainment apps frequently.

4. **Users Under Social Pressure**

   This group consists of novice users that struggle with usability issues and do not find entertainment apps enjoyable or useful. They have a negative attitude towards pricing and are likely to use only free apps, however this group is highly socially influenced and ends up using entertainment apps quite frequently anyway.

5. **Paying Users Seeking Usefulness**

   These users are not after entertainment but rather seeking usefulness from the entertainment applications. This segment is happy to pay a price for their service if they find it useful.

Segmentation of existing user groups can provide important information for application developers out there. These user groups can help understanding and planning the life cycle

of the product. It is important to pay attention which users are those that are worth targeting for and in which state of the use curve.

7.2 Theoretical and Managerial Implications

From the theoretical perspective the results of this thesis support the latest model of technology acceptance by Venkatesh et al. (2012) in a consumer context, UTAUT2. There is a great amount of research conducted on mobile services and mobile games, yet there still seems to be a lack of research specifically on mobile applications. This is a welcomed area of research as the app economy is constantly growing and becoming more and more important in smartphone usage. This thesis succeeds in testing the theory of UTAUT2 in to different technologies, here entertainment mobile applications, like suggested by Venkatesh et al (2012).

When looking at the theory of UTAUT2, the thesis seemed to achieve what it was set out to do; testing the UTAUT2 into a new technology context. Tough the findings were not totally in line with UTAUT2 factors, these are however important findings to discuss. The thesis also provided clustering and cross-tabulation analysis which is rarely seen in technology adoption research, but very common and important in marketing in practice. Entertainment perspective in mobile services, when games are excluded, is very little studied and the findings this thesis offers can provide guidelines into further research in this area.

This thesis also provides important managerial implications especially for application developers and marketers. It is important to understand the six different factors that affect entertainment mobile application adoption; effort expectancy, social influence, hedonic motivation, performance expectancy, price value and habit. Entertainment mobile application users are looking for something that is easy and free of effort to use and at the same time useful. Developers should pay attention to delivering service quality, speed and simplicity in order to create a successful application.

Especially nowadays when there are ever increasing amount of apps published every day and the competition is fierce, it is important to pay attention to these factors that lead to

adoption and use. Important thing is to understand that users are looking for entertainment and usefulness at the same time, the critical thing for managers is to discover what it is that users see useful and entertaining in the application in question.

7.3 Limitations and Future Research

There are limitations to this study and one of them is that this thesis aims to test UTAUT2 and therefore is purely based on that theory. There would have been many other possible theories available to study entertainment application adoption and use besides TAM-based theories such as the Information Systems Success Model (DeLone &McLean 2003). The decision to only use UTAUT2 in this thesis might have resulted into ignoring some important other factors that might be important to consider when investigating mobile application adoption.

Another limitation is the data sample collected. The sample collection included 150 responses which is quite small. The sample also contained responses from various different countries so therefore to draw a unified conclusion of these responses can be questionable. Another limitation concerning the data is that it was collected from users of one entertainment application which again might bias the results of the analysis.

As what comes to future research it would be interesting to study country or culture specific data and to study whether the results differ from each other culture wise. Also correlations between different factors affecting entertainment mobile application adoption would be interesting to study to complement the findings of this thesis.

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Appendix

Survey Items

Performance Expectancy

1. I find entertainment mobile applications useful in my daily life

2. Using entertainment mobile applications helps accomplish things more quickly

3. Using entertainment mobile applications increase my productivity

Effort Expectancy

1. Learning how to use entertainment mobile applications is easy for me

2. My interaction with entertainment mobile applications is clear and understandable

3. I find entertainment mobile applications easy to use

4. It is easy for me to become skilfull using entertainment mobile applications

Social Influence

1. People who are important to me think that I should use entertainment mobile applications

2. People who influence my behavior think that I should use entertainment mobile applications

3. People whose oppinions that I value think that I should use entertainment mobile applications

Facilitating Conditions

1. I have resources necessary to use entertainment mobile applications

2. I have the knowledge necessary to use entertainment mobile applications

3. I can get help from others when I have difficulties using entertainment mobile applications

Price Value

1. Entertainment mobile applications are reasonably priced

2. Entertainment mobile applications are a good value for the money

3. At the current price, entertainment mobile applications provide a good value

Habit

1. The use of an entertainment mobile application has become a habit for me

2. I´m addicted to using entertainment mobile applications

3. I must entertainment mobile applications

Behavioral Intention

1. I intend to continue using entertainment mobile applications in the future

2. I will always try to use entertainment mobile applications in my daily life

3. I plan to use entertainment mobile applications frequently

Hedonic Motivation

1. Using an entertainment mobile application is fun

2. Using an entertainment mobile application is enjoyable

3. Using an entertainment mobile application is very entertaining

Use

1. How often do you use entertainment mobile applications

Note: Frequency ranged from "never" to "many times per day"