WHAT INFLUENCES PEOPLE TO PURCHASE INGAME MOBILE ITEMS?: ANALYSIS OF MOTIVATIONAL DRIVERS TO USE INGAME MOBILE GAME ITEMS IN THE U.S.

By

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Telecommunication, Information Studies and Media - Master of Arts

2015

ABSTRACT

WHAT INFLUENCES PEOPLE TO PURCHASE INGAME MOBILE ITEMS?:
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TO USE INGAME MOBILE GAME ITEMS IN THE US

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Research shows that the mobile game industry has grown exponentially and many mobile game companies are exercising freemium strategies. Selling more in-app mobile items is a way to increase the revenue of the mobile game companies. This study investigates the determining factors of users' behavioral intention to use in-app purchase in mobile games by applying Unified Theory of Acceptance and Use of Technology (UTAUT) and UTAUT2. It examines the effects of five exogenous constructs (i.e., effort expectancy, social influence, hedonic motivation, price value, and habit) on one endogenous construct, behavioral intention to use in-app purchase. It also examines the moderating effects of gender. This study recruited survey participants from Amazon Mechanical Turk. The researcher uses Structural Equation Modeling (SEM) to analyze the responses from 402 respondents. The results showed that effort expectancy, hedonic motivation, price value and habit have positive effects on the formation of behavioral intention to use in-app purchase items. Social influence was not a significant factor influencing the behavioral intention. In order to check the moderating effect of gender, multi-group analysis was conducted. From the multi-group analysis, it was found that male users consider hedonic motivation more than female users do.

To my family: Donghyung, Seungha and Heesuk.

ACKNOWLEDGMENTS

This thesis was written with the support and help of many people around me. First of all, I would like to express my gratitude to my academic advisor Dr. Wei Peng. Words cannot describe how invaluable her efforts on my behalf have been. Every time I encountered difficulties in my academic or personal life, she aided me with kindness and compassion. She also encouraged me to be more confident and gave me precious feedback and comments that allowed me to grow. I cannot thank her enough for the support she has provided me to finish this research project.

I would like to further express my thanks to all my committee members for their valuable feedback and support. I am grateful to Dr. Robby Ratan and Dr. Casey O'Donnell for their careful advice and their willingness to sacrifice their time on my behalf.

I also appreciate my colleagues and all the alumni of Korea University. They have been steadfastly behind me during this period. My deepest appreciation goes to my family, relatives and friends who have continuously supported me through the endeavor of this research project.

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INTRODUCTION

Mobile device usage has become an integral part of our everyday lives. An average American citizen spends 158 minutes a day using mobile devices such as smartphones or tablets (Khalaf, 2013a). The mobile devices enable users to consume diverse content through the use of mobile applications. Innumerable mobile applications are listed in application markets such as Apple's App Store or Google Play. It is estimated that there are more than 1,000,000 mobile applications listed in the App Store, and the number is increasing continuously (Apple, 2014). The U.S. mobile application market growth rates were slower in 2013, but still reached 81% of the previous year's growth rates (Schoger, 2013).

Apple classifies the mobile applications in the App Store into 23 general categories ("iTuens Preview," 2014). Among these categories, users in the U.S. are spending the most time on game applications. The time spent playing mobile games accounts for 32% of the total usage time of all applications (Khalaf, 2013b). These figures show the intensive usage pattern of mobile games compared to that of other types of mobile applications. In September 2013, thirty-seven percent of all mobile applications downloaded from Google Play were mobile game applications (Khalaf, 2013b). This highlights the burgeoning market of mobile game applications.

Mobile game developers exploit various strategies in order to maximize their profits. Although there are many distinct strategies, 'freemium strategy' is the most prevalent (Müller, Kijl, & Martens, 2011). In the App Store, about 90% of the entire collection of mobile games is dependent on freemium strategy (Schoger, 2013). These freemium-based mobile game applications, in most cases, offer limited features or limited game items only. Mobile game

developers who try to take advantage of the freemium strategy expect users to spend money on in-app items during future usage.

The strategy is based on the notion that mobile games are experience goods. It is a tricky business selling experience goods through the Internet because they are intangible and what consumers can experience through the Internet is merely a part of the product. For example, consumers cannot easily surmise the quality of a burrito sold through Amazon before they actually eat it. This problem also applies to mobile games. Game users can judge whether the game is enjoyable only after they actually play the game. Therefore, mobile game providers give away a free version of the game to prospective players in order to offer more opportunities to experience their game content and promote purchase. If the potential users can play a free version of the mobile game application, the uncertainty level is lowered. This will facilitate actual game usage and consequently, purchase of in-app items.

The purpose of this study is to predict behavioral intention to use in-app purchase in mobile games using the second version of the Unified Theory of Acceptance and Use of Technology (UTAUT2) model. In the literature review section, previous studies related to item purchase in virtual worlds such as online computer games and mobile games will be reviewed. In addition, the applicability of the UTAUT2 to explain behavioral intention to purchase mobile game items will also be addressed later in the literature review section.

Previous studies on mobile games typically focused on predicting user intention to play the mobile games continuously. Little is known about what factors actually encourage mobile game users to purchase the in-app items when they play mobile games. If advertising were the main revenue source of the mobile game companies, it would be vital to capture the attention of game players in their mobile games; however, most companies realize their revenues by selling

in-app purchase items. Almost 92% of revenue generated by the top 400 mobile applications in Google Play came from mobile games usage in 2013 (Agten, 2013), and 98% of revenue by the top 200 mobile applications in Google Play was generated by in-app item sales (Schoger, 2013). Considering these data, this study aims to figure out the driving factors of mobile game users' behavioral intention to use in-app purchase feature in order to suggest a way to maximize the revenue of game developers. The result from this study will yield implications and subsequent questions for researchers as well as mobile game designers.

CHAPTER 1: RESEARCH CONTEXTS

This section deals with previous studies related to in-game purchase. It also presents the applicability of UTAUT2 to examine the intention to purchase virtual items. For the purpose of this section, previous studies will be classified into two categories (i.e., research about online game items and research about mobile game items). First, this section will present what has been done in previous studies regarding online game items. After that, I will introduce differences between online settings and mobile settings. Lastly, a few studies on mobile games will be described.

1.1. Virtual Item Purchase in Online World

To date, there have been many studies investigating virtual items. Hamari and Lehdonvirta (2010), in their qualitative research, explained how game developers design their games or items in an effort to create demands for virtual items. They investigated the environment and the rules embedded into massive multiplayer online games. They noted that developers adopt virtual currencies that can be used to buy other game items in a virtual world. Lehdonvirta (2009) stated that items have two attributes: functional attributes and decorative attributes. He also noted that the two attributes are not mutually exclusive; the two attributes can co-exist in a single item.

Several studies were conducted in order to discover determinants of intention to purchase virtual items. Huang (2012) explained the reason that SNS users purchase virtual items with a parsimonious model based on the Stimuli-Organism-Response model. With regard to online games, there have been several research studies conducted so far. Hsu and Lu (2007) found determinants of customer loyalty by extending the Technology Acceptance Model (TAM).

Park and Lee (2011) also examined driving factors of purchasing online game items from the view point of the Theory of Consumption Values. They suggested four motivational factors: character competency, enjoyment, visual authority and monetary gains. Marchand and Hennig-Thurau (2013) pointed out that game users purchase game items in order to enhance their game performance and make games more enjoyable. They also mentioned the hedonic characteristics of games. This means that users spend money on enhancing their game performances (i.e. strengthening characters' abilities) in order to enjoy the game more.

These studies offer insights and implications for both researchers and game developers; however, other constructs need to be added to models that researchers have used in order to predict behavioral intention to purchase mobile in-app items. A series of studies done by Guo and Barnes (2007; 2009; 2011; 2012) dealt with purchase behavior in online worlds. Guo and Barnes (2009), in the exploratory study, proposed a preliminary model conducting a meta-level analysis to predict intention to purchase online items. In the proceeding studies, Guo and Barnes (2011; 2012) performed two separate studies on purchase behavior in two distinct virtual worlds: World of Warcraft and SecondLife. In the studies, they applied UTAUT to predict intentions to purchase items in online games. Although a few constructs they used in their studies were slightly different from the constructs identified in the original UTAUT, they proposed a thorough model to explain their intentions. They viewed online item transaction systems as technology and measured intention to use the transaction system. The same logic will be applied to this study, investigating behavioral intention to purchase mobile in-app items. In other words, playing a mobile game without purchasing in-app items means a user has not adopted the in-app purchase feature in the mobile game.

1.2. Differences between Mobile Settings and Online Settings

Smartphones have been developed in parallel with desktop computers since their commercialization. Smartphones developed based on the advantage of smaller size while desktop computers developed based on desirability for better overall performance capability. People sometimes seem to misunderstand that the difference between the two types of devices is just mobility. This is partially correct; however, it does not necessarily mean that people play mobile games only when they are on the move. Rather, the biggest difference between smartphones and stationary desktop computers is that smartphones are an extremely personal device (e.g., some people use smartphones even when they use the restroom or in bed before falling asleep.)

There are other types of products such as tablet computers or laptops on the continuum between mobile phones and desktop computers, and the distinctions are becoming blurred. Although differences between mobile devices and computers are becoming obscured today, there are still some differences between mobile settings and online computer settings. The noticeable differences can be found on user interface (i.e., different types of input systems, different operating systems) and form factor (i.e., different screen sizes, extension availability).

Narrowing down the scope to the gaming domain, the structure of the payment platform of mobile game applications is also different from that of online computer games. Unlike computer games that have multiple alternative routes or channels to purchase different computer games, mobile game applications have a proprietary application market depending on the operating system such as Apple's App Store or Google's Google Play. When a user purchases a smartphone, he or she is automatically locked in a specific application market. This means that, although many games offer both iOS and Android versions, mobile game players usually

do not have other markets available when they look for mobile games to play. Consequently, the payment process occurs in a single payment platform. There are, of course, some alternative application markets such as Amazon Appstore; however, compared to the number of downloads of freemium mobile games in the two major application markets, they are still insignificant (Michaeli, 2015). As a result, once the consumer is locked in a specific application market, the element of choice among various alternative platforms is removed.

1.3. Mobile Games and Mobile Game Items

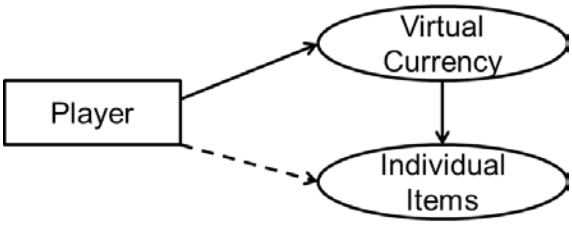
As stated above, there have been many studies about online game items. However, there have been few studies about mobile game items. Most studies about the mobile game domain are measuring intention to play mobile games continuously. There is little research about intention to purchase in-game items for mobile games.

Mobile games generally refer to games that can be played on mobile devices. The concept of mobile devices can include not only telecommunication devices such as smartphones, tablet computers, and feature phones, but also portable video game devices such as PlayStation Vita or Nintendo 3DS XL. In this study, mobile games refer to game applications that can be downloaded onto smartphones or tablet computers through mobile application markets such as Apple's App Store or Google's Google Play. The study deals with mobile games that have an in-app purchase feature based on freemium strategies. In other words, mobile games that do not offer in-app purchasing features will not be considered in this study.

Mobile game items are virtual currencies used in mobile games (e.g., gold coins, gems, clovers and the like). Virtual currency can be purchased by real cash or credit cards. Players can also acquire virtual currency for free either by watching advertisements, consistent game

play, or spreading the game to their friends. Mobile game users purchase game items with the virtual currency. However, there are some variations of mobile game items besides virtual currencies. In some games, mobile game players can directly purchase the individual game items without having to use virtual currencies. Figure 1 shows the two ways of purchasing mobile items. For example, in Candy Crush Saga, players can buy virtual currency first and then buy individual items with the virtual currency. They can also directly purchase the individual items such as candies or cookies.

Figure 1: Two Ways of Purchasing Mobile Game Items



Game items can be used for several distinct purposes in mobile games (Lehdonvirta, 2009; Guo & Barnes, 2011; Guo & Barnes, 2012; Wohn & Na, 2012). First, they usually strengthen players' competencies. For instance, in 'Candy Crush Saga', players can purchase items that help them to complete missions in the game. Second, they can also let users proceed to the next stage of the game without waiting. For example, in the mobile game, 'Clash of Clans,' players must wait until their building constructs are completed before they build another building. In this case, players can use 'gems' to complete the construction instantly. In 'Candy Crush Saga,' players can acquire one 'life' by waiting 30 minutes; one 'life' means one try at the possibility of clearing a stage. Players also can purchase five hearts, which represent 'lives', for 99 cents. If they choose to purchase, players do not need to wait 30 minutes to receive one heart. Lastly, items can also be used to customize avatars (e.g., costumes) or decorate backgrounds or places (e.g., coffee shop decoration). Lehdonvirta (2009) pointed out

that an item can have both functional attributes and decorative attributes simultaneously. Although some decorative items do not have any functional attribute at all, some users still buy these decorative items to express themselves in a virtual world. Figure 2, Figure 3, and Figure 4 show screenshots of the game play and different kinds of currencies used in the games.

Figure 2: Screenshot of Clash of Clans

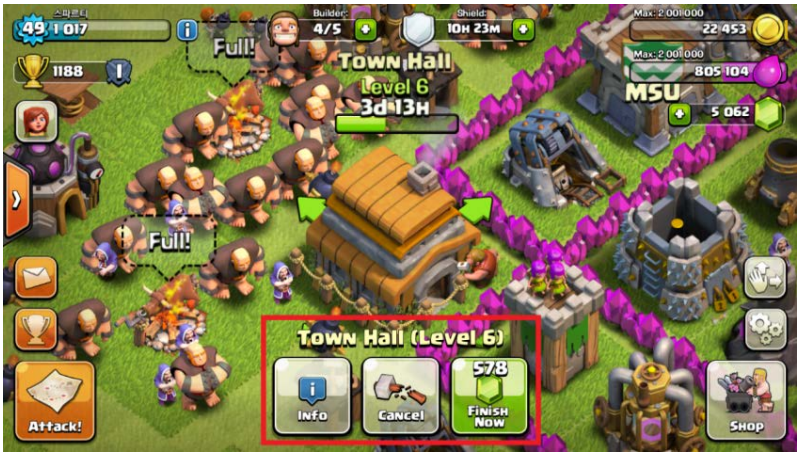


Figure 3: Screenshot of Candy Crush Saga

Wohn and Na (2012) conducted a study about users' virtual item purchase patterns with server level log data from an online game. They found that high spenders tend to purchase both functional items (i.e., "game-oriented") and decorative items (i.e., "avatar-oriented" and "space-oriented") while low spenders tend to purchase more on functional items. In other words,

Figure 4: Screenshot of Hay Day

players who have spent less money to purchase game items tend to focus more on performance expectancy than players who have spent more money. Wohn (2014) conducted a similar study with server level log data. She found that social factors are positively related to the likelihood of spending money in online games. This means that players who have strong social interactions in online games are more likely to spend real money on the games. Social factors were also positively, but not strongly, related to the amount of money spent in the games. She also discovered that game players tend to spend game currencies purchased with real money on purchasing items for character customization; while they tend to spend game currencies obtained through game play on performance-oriented items.

Han and Windsor (2013) investigated smartphone users' in-game purchase intention. In their article, researchers integrated the hedonic use perspective with value based theories to investigate the effects of influential factors on the smartphone users' in-game purchase intention. They found that both perceived playfulness and perceived added value of gaming applications have significant positive effect on in-game purchase intention. Game users also tend to select money as a way to overcome the difficulties (Yamakami, 2011). In his study conducted in Japan, Yamakami (2001) pointed out that there is a common pattern across mobile games. Most

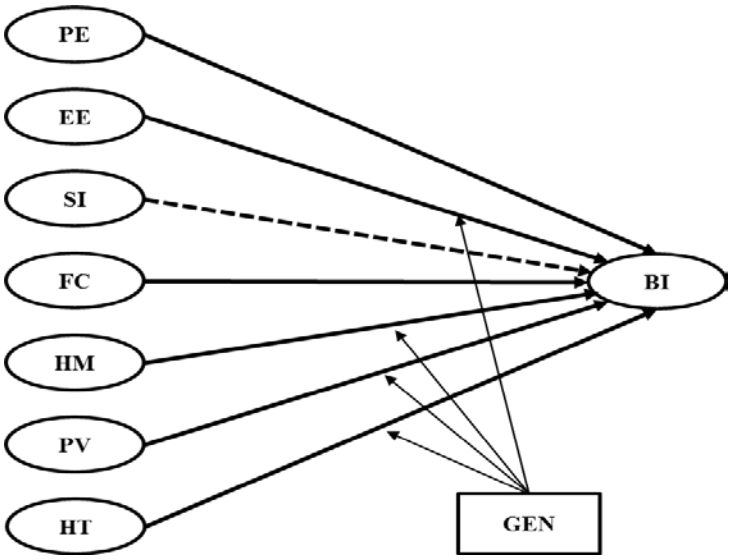
game content becomes more difficult to play as users proceed to higher stages. The game users usually have three options to overcome the difficulty: time, social interactions and/or money.

In the next section, UTAUT2 and other relevant theoretical models will be briefly reviewed as an umbrella theoretical framework. After that, hypotheses based on the framework will be proposed.

CHAPTER 2: THEORETICAL FRAMEWORK AND HYPOTHESES

As an umbrella theoretical framework, this study uses UTAUT2 (Venkatesh, Thong, & Xu, 2012). Figure 5 shows the research model of this study and Table 1 shows the hypotheses and the research question. Operational definitions of constructs are attached as Appendix A. This study is applying the UTAUT2 to a mobile game item purchase situation. Before UTAUT2 was proposed, Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) were proposed in an attempt to explain and predict whether a user adopts a certain new technology or rejects it at an organizational level (Davis, Bagozzi, & Warshaw, 1989; Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003). TAM and UTAUT will be reviewed first before UTAUT2 is discussed in this paper.

Figure 5: Hypothetical Research Model[1]



[1] The abbreviations mean, respectively: PE(Performance Expectancy), EE(Effort Expectancy), SI(Social Influence), FC(Facilitating Conditions), HM(Hedonic Motivation), PV(Price Value), HT(Habit), BI(Behavioral Intention) and GEN(Gender). All the constructs and variables will be explained later in this paper in greater detail.

Table 1: Hypotheses and Research Question

PE	H1	Performance expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.
EE	H2.1	Effort expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H2.2	Gender will moderate the effect of effort expectancy on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.
SI	H3	Social influence does NOT have significant influences on user's behavioral intention to use in-app purchase in mobile games[2].
FC	H4	Facilitating conditions is positively related to user's behavioral intention to use in-app purchase in mobile games.
HM	H5.1	Hedonic motivation is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H5.2	Gender will moderate the effect of hedonic motivation on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.
PV	H6.1	Price value is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H6.2	Gender will moderate the effect of price value on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.
HT	H7.1	Habit is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H7.2	Gender will moderate the effect of habit on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.
-	RQ	Which exogenous construct has the strongest effects on behavioral intention?

2.1. Review of Technology Acceptance Model

TAM was first introduced to find out the factors that affect a member's intention to accept a new Information Technology in organizational circumstances (Davis et al., 1989). TAM focused on identifying relationships among people's beliefs, attitudes, intention to use, and actual use. The authors proposed two constructs as important predictors of adopting and using new technologies: perceived ease of use and perceived usefulness. Davis (1989) argued that

[2] I conducted Power analysis to check the possibility of the type 2 error. This method was also used in the UTAUT2 article (Venkatesh, 2012).

these two constructs influence a user's attitude towards use, which consequently affects a user's intention to use and actual use.

Ha, Yoon and Choi (2007) examined the determinants of attitude towards mobile game adoption in the mobile broadband wireless access environment. They added, to the existing TAM, four additional constructs: flow experience, perceived enjoyment, perceived attractiveness of the game and perceived lower sacrifices. Results showed that flow experience, perceived ease of use, perceived enjoyment and perceived attractiveness were the main determinants of the attitude. In addition, perceived enjoyment had positive effect on perceived usefulness in their study. However, it is problematic to apply TAM directly to explain the intention to purchase in-app items because TAM was originally proposed to explain and predict technology adoption in organizational settings (Venkatesh & Brown, 2001), while mobile application usage usually takes place in individual settings. Therefore, there is a need to develop a theoretical model to better explain mobile game application item usage at an individual level.

2.2. Review of Unified Theory of Acceptance and Use of Technology Models

UTAUT explains the influences of performance expectancy, effort expectancy and social influence on behavioral intention. It also examines the influence of facilitating conditions on actual behavior (Venkatesh et al., 2003). Performance expectancy is the degree of a user's belief that technology usage would enhance task productivity. Effort expectancy is the degree of a user's belief that the technology is easy to use. Social influence refers to the degree to which the user believes that people around him think he should use the technology. These three constructs (i.e., performance expectancy, effort expectancy and social influence) were found to have positive effects on behavioral intention. Also, they found that facilitating conditions have

positive effects on actual technology use. There are contrasting results surrounding the effect of facilitating conditions on behavioral intention. In UTAUT, the construct of facilitating conditions, was not found to have significant effect on behavioral intention but, in UTAUT2, it was found to have significant effect on behavioral intention. It should be noted that the target technologies covered in the UTAUT article (Venkatesh et al, 2003) were utilitarian ones: online meeting manager, database application, portfolio analyzer, and accounting systems. The technology dealt with in this current study, in-app purchase in mobile games, is hedonic in nature. This distinction should be kept in mind as we proceed.

Much of the previous research tried to apply TAM or UTAUT to examine the intention to use hedonic products (e.g., Hsu & Lu, 2004; Hsu & Lin, 2008; Liu & Li, 2011; Okazaki, Skapa, & Grande 2008; Zhou, 2013). UTAUT was also used in many studies in order to measure intention to purchase items in online computer games (Guo & Barnes, 2011; Guo & Barnes, 2012). The researchers considered the transaction system embedded in online games as a technology system and measured the intention to adopt the system. To overcome the limitation of TAM and UTAUT's application to hedonic and individual consumer context, UTAUT2 was proposed (Venkatesh et al., 2012). Also, the researchers argued that compared to the original UTAUT, UTAUT2 can better explain user intention. UTAUT2 has three additional constructs (i.e., hedonic motivation, price value and habit), in addition to the four constructs dealt with in the original UTAUT (i.e., performance expectancy, effort expectancy, social influence, and facilitating condition). Also, UTAUT2 assumes three moderators (i.e., age, gender and experience) which affect the consumers' behavioral intention and actual usage. In the study, the authors found that the moderators affect the relationships between the exogenous constructs and the endogenous constructs (Venkatesh et al., 2012). The technology dealt with

in the UTAUT2 article is mobile internet. Compared to the technologies dealt with in the original UTAUT, mobile internet has more hedonic attributes. The technologies in UTAUT are purposeful and proprietary technologies, while the mobile internet technology in UTAUT2 is a multi-purpose technology.

In this study, I focus on the effects of exogenous constructs on an endogenous construct: behavioral intention to use in-app purchase in mobile games. In other words, the study tries to measures users' willingness to purchase in-app mobile game items in the future. In addition, this paper also examines the effects of gender as a moderator. Gender was theorized to play a moderating role in previous articles such as UTAUT and UTAUT2. In UTAUT, the influences of PE, EE and SI on BI were shown to be moderated by gender. In UTAUT2, the influences of FC, HM, PV and HT on BI were shown to be moderated by gender as well. In the remaining part of this section, each hypothesis and the research question will be presented along with the constructs. The attributes of in-app purchase in mobile games will also be addressed.

2.2.1. Performance Expectancy: Performance expectancy is the degree of a user's belief that technology usage would enhance task productivity. The construct was incorporated in a previous study as "perceived usefulness". According to the previous research, perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis et al., 1989). Perceived usefulness was found to have positive effects on user's attitude and behavioral intention. In UTAUT and UTAUT2, the researchers found performance expectancy positively affects consumers' intention to adopt a technology. Accordingly, the present research hypothesizes:

H1: Performance expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.

2.2.2. Effort Expectancy: Effort expectancy is the degree of a user's belief that the technology is easy to use. The construct was incorporated in a previous study as "perceived ease of use" (Davis, 1989; Davis et al., 1989) and "ease of use" (Moore and Benbasat, 1991). According to TAM, effort expectancy was "the degree to which a person believes that using a system would be free of effort". In Innovation Diffusion Theory (IDT), "ease of use" was defined as "the degree to which using an innovation is perceived as being difficult to use". Both constructs, "perceived ease of use" and "ease of use" were found to have positive effects on user's attitude and intention.

In UTAUT and UTAUT2, the researchers found that effort expectancy positively affects consumers' intention to adopt a technology. There have been multiple studies about gender differences towards technologies (e.g., Krendl, Broihier & Fleetwood, 1989; Teo & Lim, 2000). According to the studies, normally, men are more inclined to use technologies and show more interests in learning technological skills when they are exposed to computer systems. This tendency will also be valid in using in-app purchase features. Therefore, the subjective perception of easiness of usage, effort expectancy, will be more salient in a female group than a male group. Accordingly, the present research hypothesizes:

H2.1: Effort expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.

H2.2: Gender will moderate the effect of effort expectancy on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.

2.2.3. Social Influence: Social influence refers to the degree to which the user believes that people around him think he should use the technology. It was, originally, incorporated as "subjective norm" (Fishbein and Azjen, 1975) in Theory of Reasoned Action (TRA). It

represents the normative or conjunctive norm formed among people around the user. According to TRA, subjective norm is "the person's perception that most people who are important to him think he should or should not perform the behavior". The construct was found to have positive effects on the user's intention.

However, in UTAUT, the researchers found that social influence positively affects consumers' behavioral intention to adopt a technology only in mandatory settings whereas it did not affect the intention in voluntary settings (Venkatesh et al, 2003). Therefore we should pay attention to the settings of mobile gaming. Gamers play mobile games in voluntary settings. Moreover, people usually play mobile games in extremely private and personal settings. Kamvar and Baluja (2006) stated that adult content searching queries are more commonly performed by cell phone users than by desktop computer users. It is hardly possible that smartphone users are always closely connected to people around them when using in-app purchase in mobile games. Some might argue that the players' friends would notice that they play mobile games through the postings on their SNS account; however, the friends, in most cases, still cannot see whether the players are actually purchasing the items or not. Accordingly, the present research hypothesizes:

H3: Social influence does *not* have significant effect on behavioral intention to use in-app purchase in mobile games.[3]

2.2.4. Facilitating Conditions: Facilitating condition was defined as the degree of a consumer's belief that the environment around the user is supportive and favorable to performing the behavior. Facilitating condition was found to have a positive influence on the actual behavior.

[3] I also conducted power analysis to check the possibility of the Type 2 error. The result will be presented later in this paper.

It was, incorporated as “perceived behavioral control (PBC)” (Ajzen, 1991) in Theory of Planned Behavior (TPB). According to TPB, PBC is defined as “perceptions of internal and external constraints on behavior and encompasses self-efficacy, resource facilitating conditions, and technology facilitating conditions”. The construct was found to positively affect user’s intention and actual behavior. Accordingly, the present research hypothesizes:

H4: Facilitating conditions is positively related to user’s behavioral intention to use in-app purchase in mobile games.

2.2.5. Hedonic Motivation: Many previous studies attempted to measure hedonic attributes of the target products or services with latent variables named as enjoyment, fun, flow, or playfulness (Guo & Barnes, 2011; Guo & Barnes, 2012; Han & Windsor, 2013; Ha et al., 2007; Van der Heijden, 2004; Yamakami, 2011). While the original UTAUT focused on extrinsic motivation (i.e., utilitarian value) rather than intrinsic motivation (i.e., hedonic motivation), UTAUT2 considered both the intrinsic motivation and hedonic motivation. In the UTAUT2 study, the intrinsic motivation was found to have a positive influence on behavioral intention along with the extrinsic motivation. Compared to the other technologies that have been dealt with in articles about UTAUT and UTAUT2, in-app purchase in mobile games can be considered as extremely hedonic technology. Therefore, I expect that hedonic motivation would have positive influence on behavioral intention to use in-app purchase in mobile games.

Several studies dealing with hedonic motivation show that gender moderates the effects of hedonic motivation on behavioral intention. Men, while using the Internet, put more emphasis on fun or pleasure compared to women (Dholakia, 2006). Also, in an online shopping situation, men were shown to regard entertainment factors more than women do (Richard, Chebat, Yang, & Putrevu, 2010).

Women tend to perceive purchasing behavior, in a conventional shopping situation, as a process which has hedonic value (Arnold & Reynolds, 2003), and they value hedonic attribute of shopping behavior. However, we should note that in-game items are extremely hedonic products. In this case, hedonic attribute itself becomes the purpose of purchasing behavior. It is usually considered that men are more goal-oriented than women are (Anderman & Anderman, 1999; Roeser, Midgley, & Urdan, 1996); therefore, hedonic motivation will be more salient among men than women. Accordingly, this research hypothesizes:

H5.1: Hedonic motivation is positively related to user's behavioral intention to use in-app purchase in mobile games.

H.5.2: Gender will moderate the effect of hedonic motivation on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.

2.2.6. Price Value: Price factor, in academic literatures, has been considered one of the primary factors in the marketing domain as well as in the information science domain; price factor has also been called "perceived price", "perceived sacrifice", and "usage cost" in previous studies (Chang & Wildt, 1994; Zeithaml, 1988; Zhou 2013).

Cost factor or price factor are not major concerns for adopters if the adoption is taking place in organizational settings because the companies or organizations usually pay for the incurred cost. However, in individual settings, comparison between cost and subsequent benefit is inevitable because individual adopters pay for the cost derived from adopting and using a technology or a product on their own. Price value was found to have a positive influence on actual behavior in previous studies, especially when potential adopters were exposed to individual settings. For example, Chang and Wildt (1994) argued that purchase intention was negatively influenced by perceived price. Zhou (2013) also found out that usage cost

negatively affected the usage intention of mobile games. This thesis investigates factors influencing users' intention to purchase mobile game items at an individual level; therefore, the pricing factor will be a meaningful construct in this study.

In UTAUT2, gender was found to be a significant moderator between price value and behavioral intention. The researchers argued that females, compared to males, tend to pay more attention to the pricing factor (Deaux & Lewis, 1984; Garbarino & Strahilevitz, 2004; Venkatesh et al., 2012). Accordingly, this research hypothesizes:

H6.1: Price value is positively related to user's behavioral intention to use in-app purchase in mobile games.

H6.2: Gender will moderate the effect of price value on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.

2.2.7. Habit: Habit is another construct newly added to UTAUT2. Habit, in most cases, has been defined in two ways. According to Limayem, Hirt, and Cheung (2007), a habit forms when one automatically behaves a certain way. They insisted that this automaticity can be formed through repeated behavior. Similarly, research by Kim, Malhotra and Narashimhan (2005) defined habit as prior behaviors. Wohn (2012) also pointed out that habit needs to be considered when conducting research on online games. Habit in UTAUT2 follows this definition. UTAUT2 argues that habit can affect future behavior.

UTAUT2 also elaborates on how people behave based on their habits. Venkatesh et al. (2012) suggested that activated habit can result in preference toward a target technology. Borrowing their logic, users who have acquired the habit of using a certain technology will likely have a positive attitude and intention to use it. Accordingly, this research hypothesizes:

H7.1: Habit is positively related to user's behavioral intention to use in-app purchase in mobile

games.

In UTAUT2, gender was also found to be a significant moderator between habit and behavioral intention. Many studies have shown that men, as compared to women, tend to pay less attention to details when they are engaging in diverse purchasing situations (Krugman, 1966; Meyers-Levy & Maheswaran, 1991). In other words, men tend to be influenced by the 'automaticity' in purchasing situations, while women take more consideration before purchasing. Therefore, the influence of habit on intention to purchase in-game mobile items will be more salient among men than women. Accordingly, this research also hypothesizes:

H7.2: Gender will moderate the effect of habit on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.

2.2.8. Research Question: This paper is also interested in confirming the construct that has the strongest effect on behavioral intention so that it can be discussed more appropriately with managers and game designers. Thus, this research proposes a research question:

RQ: Which exogenous construct has the strongest effects on behavioral intention?

CHAPTER 3: RESEARCH METHOD

3.1. Measurement

A survey questionnaire with items adapted from previous studies was devised to answer the hypotheses and the research question. All items will be rated on a seven-point Likert scale from “strongly disagree (1)” to “strongly agree (7).” All measurements were borrowed and adapted from the previous studies (e.g., TPB, TAM, UTAUT, UTAUT2) as shown in Appendix B.

Performance expectancy was measured with three items: ‘I find in-app purchase in mobile games useful when I play mobile games,’ ‘Using in-app purchase in mobile games helps me accomplish things in mobile games more quickly,’ and ‘Using in-app purchase in mobile games increases my competencies in mobile games.’

Effort expectancy was measured with four items: ‘Learning how to use in-app purchase in mobile games is easy for me,’ ‘My interaction with in-app purchase in mobile games is clear and understandable,’ ‘I find in-app purchase in mobile games easy to use when I play mobile games,’ and ‘It is easy for me to become skillful at using in-app purchase in mobile games when I play mobile games.’

Social influence was measured with three items: ‘People who are important to me think that I should use in-app purchase in mobile games,’ ‘People who influence my behavior think that I should use in-app purchase in mobile games,’ and ‘People whose opinions that I value prefer that I in-app purchase in mobile games.’

Facilitating conditions was measured with three items: ‘I have the resources necessary to know how to use in-app purchase in mobile games,’ ‘I have the knowledge necessary to use in-app purchase in mobile games,’ and ‘I can get help from others when I have difficulties using in-

app purchase in mobile games.' One of the items used in the previous study was dropped since it was not applicable to this study: 'The mobile game item is compatible with other technologies I use.'

Hedonic motivation was measured with three items: 'In-app purchase in mobile games is fun to use,' 'Using in-app purchase in mobile games is enjoyable,' and 'Using in-app purchase in mobile games is entertaining.'

Price value was measured with three items: 'In general, in-app purchase in mobile games is reasonably priced,' 'In-app purchase in mobile games is a good value for the money in mobile games,' and 'in-app purchase in mobile games provides good values.'

Habit was measured with four items: 'The use of in-app purchase in mobile games has become a habit for me,' 'I am addicted to using in-app purchase in mobile games,' 'I must use in-app purchase in mobile games,' and 'Using in-app purchase in mobile games has become natural to me.'

Behavioral intention was measured with three items: 'I intend to use in-app purchase in mobile games in the future,' 'I will try to use in-app purchase in mobile games,' and 'I plan to use in-app purchase in mobile games in the future.'

3.2. Data Collection and Analysis

An online survey questionnaire was administered to anonymous online internet users. The online internet users participated in the survey through Amazon Mechanical Turk (MTurk). According to Buhrmester and his colleagues (2011), 'MTurkers' are more diverse than American normal college samples from the US. They also found that the data collected through Amazon MTurk are as reliable as the data collected from traditional survey methods. Another study also

supports Amazon MTurk as a useful and reliable tool for recruiting samples. The researchers replicated a study and said there is a statistical difference between the two distinct studies but it is relatively small (Berinsky et al., 2012). They also argued that the demographics of MTurk do not completely match with the U.S. population but they are not severely distorted compared to the U.S. population. Considering the fact that mobile games, in most cases, are not specifically targeted only at the U.S. population, Amazon MTurk is a viable method for recruiting respondents for this survey. The descriptive statistics of survey respondents is attached as Appendix C.

Several questions were presented as screening questions. As a screening process, this survey asked questions to participants in order to determine whether they have played freemium mobile games and whether they have purchased in-app items in the game. The actual survey questionnaire is attached as Appendix D. A small amount of monetary incentive was granted to the respondents in reward for their participation. The participants remained anonymous.

The actual questionnaire was uploaded onto Qualtrics, an online survey service provider. The link to the survey was provided to participants through Amazon MTurk. After collecting the data, outliers were identified and removed based on the Mahalanobis d-squared scores (>50) by using SPSS AMOS version 22. I was able to collect 402 sets of responses after removing outliers and incomplete responses. A sample size consisting of between ten and twenty times the number of observed variables is usually considered to be adequate (Mitchell, 1992; Stevens, 1996). Therefore, to analyze this model, which has 26 observed variables, 402 samples is a proper number of samples. Before analyzing the data, I conducted a confirmatory factor analysis (CFA) in order to check convergent validity and discriminant validity. This paper also presents the results from the analysis and discusses them.

3.3. Data Preparation

This study examines the reliability and validity of the study. The construct PE was dropped due to low validity, and FC was combined with EE due to the high correlation between those two constructs. The reasons will be explained in more detail later in this chapter. Two observed variables (EE4, FC4) were also dropped due to low factor loadings. I conducted reliability analysis using Cronbach's α coefficient to check the internal consistency of items comprising constructs before conducting structural equation modeling analysis. Reliability analysis is generally used to check the internal consistency among observed variables connected to a latent variable. Confirmatory factor analysis (CFA) was also employed to check the reliability and the validity of all indicators and factors. This paper uses a two-step approach proposed by Anderson and Gerbing (1988). The two step approach tests validity and reliability of the measurement model in the first step; and estimates the structural model in the second step. I checked standardized factor loadings and Cronbach's alpha values in order to assessing the item reliability and internal consistency.

The assessments of convergent validity and discriminant validity are shown in Table 2 and Table 3, respectively. Convergent validity was assessed with four indices: Factor loadings, Cronbach's alpha values, Average Variance Extracted, and Construct Reliability. All items were loaded significantly ($p<.01$) with the loadings over .70 in general except for PE2 (.548) and PE3 (.576), which are still marginally acceptable. Also, all Cronbach's alpha values were exceeding .7 except for PE (.633). In social science domains, it is generally understood that Cronbach's alpha values exceeding .6 are acceptable and exceeding .7 are good. Convergent validity was also assessed by Average Variance Explained (AVE) scores. Most constructs exceed the recommended rule of thumb of .50 while HT was close to the cut-off point which

is .50[4]. Construct reliability were all satisfactory, exceeding the rule of thumb of .7, except PE (.505). The construct PE was removed from the study due to low AVE score and low construct reliability[5].

Table 2: Convergent Validity Assessment

	Standardized Factor Loading		Cronbach's Alpha	AVE	Construct Reliability
~~PE~~	~~PE1~~	~~.768~~	~~.633~~	~~.258~~	~~.505~~
	~~PE2~~	~~.548~~			
	~~PE3~~	~~.576~~			
EE	EE1	.867	.893	.702	.876
	EE2	.858			
	EE3	.846			
SI	SI1	.900	.900	.597	.816
	SI2	.787			
	SI3	.914			
FC	FC1	.783	.789	.594	.745
	FC2	.834			
HM	HM1	.860	.905	.552	.787
	HM2	.902			
	HM3	.857			
PV	PV1	.806	.912	.559	.791
	PV2	.916			
	PV3	.920			
HT	HT1	.880	.892	.459	.772
	HT2	.822			
	HT3	.786			
	HT4	.805			
BI	BI1	.883	.896	.503	.752
	BI2	.823			
	BI3	.876			

[4] According to Ping (2009), AVE is related to the sample size as it can be enhanced by dropping cases. Considering the adequate sample size of the study, the marginally low AVE scores were accepted in this study.

[5] One of the characteristics of TAM based models such as UTAUT or UTAUT2 is that they are additive. There are many studies replicating these models while lacking some of the constructs from the original models. If the construct PE is removed from the model, it is against one of the original purposes of this study; however, the model cab still be regarded as exhaustive because, without the construct PE, the model can explain almost 82% of the endogenous construct BI.

To assess discriminant validity, following the proposition by Fornell and Larcker (1981), correlations between the pairs of two exogenous constructs were compared with the square root of AVE of individual constructs. The value of the square root of AVE should be higher than the absolute values of the correlations between the two constructs. Table 3 shows the factor correlation matrix. All absolute values of correlations were lower than the square root of AVE except for the correlation between EE and FC (.863).

Table 3: Factor Correlation Matrix and Discriminant Validity Assessment

	EE	SI	FC	HM	PV	HT
EE	**0.838**[6]					
SI	-0.240	**0.773**				
FC	~~0.863~~	-0.243	**0.771**			
HM	0.146	0.409	0.042	**0.743**		
PV	-0.038	0.532	-0.123	0.676	**0.748**	
HT	-0.166	0.626	-0.163	0.588	0.639	**0.677**

Since the correlation between EE and FC was high, I conducted exploratory factor analysis (EFA) using SPSS version 22 with six exogenous constructs in order to check whether the two constructs (i.e. EE and FC) are independent (Principal Component Analysis, VARIMAX). I set the program to extract six constructs from the entire 18 observed variables. As a result, the eigenvalue of FC was extremely low (.556), which means that the construct does not have enough power to predict the behavioral intention. I reran EFA after changing the settings to extract five constructs from the same number of variables. FC and EE emerged as the same component. The results of the EFAs are attached as Appendix E.

After conducting the EFA, I implemented a reliability test between FC and EE to see whether these constructs are actually the same or not. The result showed that the two constructs

[6] The figures in the diagonal cells of the table are the square root of AVE. In order to show the discriminant validity, the values of correlations should be lower than the square root of AVE.

are measuring practically the same phenomenon (Cronbach's α=.90). This was not foreseen in the hypotheses development phase of this study; however, it coincides with the opinion of Venkatesh (2000). He found that EE starts to capture the core part of FC as experience accumulates and as time elapses[7]. He clarified that PBC positively affects behavioral intention in the early stage of technology adoption but the influence becomes less noticeable as experience increases. Considering the results from the EFAs and the opinion of Venkatesh (2000), I decided to combine those two constructs: EE and FC. The new construct combining EE and FC is named EE'. Table 4 on the next page shows the final set of hypotheses and a research question.

After assessing the validity and reliability, I modified the final model using modification indices to retain better model fits. To check whether the measurement model had a good fit, absolute fit indices and incremental fit indices were reviewed: RMSEA (.054) , SRMR(. 0482), CFI (.970), GFI (.917), TLI (.963), NFI (.946), RFI (.934). Also, the parsimonious indices of two models were compared to confirm whether the modified model had a better fit: PGFI(.675>.673), PNFI(.766<.771), PCFI(.785<.790), AIC(490.285<559.546), CAIC(795.069<849.340), BCC(497.367<566.280). Although the value of PGFI was slightly increased after the modification, considering the other indices were decreased, I could see the figures indicating the overall model fit were improved as compared to the figures before modification. Following the criteria proposed by previous research (Bentler & Hu, 1999;

[7] Once they become familiar with the usage of the technology, 'effort expectancy' starts to capture a part of 'facilitating conditions' (Venkatesh, 2000). Considering the mean age of samples in the survey 29.7, it is arguably possible to infer that the respondents are familiar with purchasing in-game mobile items. Also, in-app purchasing is a repetitive task of the same procedure; users can become familiar with using the technology from relatively low number of repetitions. We can infer that the respondents are already familiar with the technology because of comparatively high mean values of items measuring effort expectancy. The means of EE1, EE2 and EE3 were 5.86, 5.77 and 5.77 respectively.

Hooper et al., 2008), it was shown that the measurement model of this study has a good fit and the data was adequate for the next analysis step.

Table 4: Final set of hypotheses and research question

~~PE~~ ***(Deleted)***	~~H1~~	~~Performance expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.~~
EE'	H2.1	Effort expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H2.2	Gender will moderate the effect of effort expectancy on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.
SI	H3	Social influence does NOT have significant influences on user's behavioral intention to use in-app purchase in mobile games.
~~FC~~ ***(Combined with EE)***	~~H4~~	~~Facilitating conditions is positively related to user's behavioral intention to use in-app purchase in mobile games.~~
HM	H5.1	Hedonic motivation is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H5.2	Gender will moderate the effect of hedonic motivation on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.
PV	H6.1	Price value is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H6.2	Gender will moderate the effect of price value on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.
HT	H7.1	Habit is positively related to user's behavioral intention to use in-app purchase in mobile games.
	H7.2	Gender will moderate the effect of habit on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.
-	RQ	Which exogenous construct has the strongest effects on behavioral intention?

CHAPTER 4: ANALYSIS

This chapter is comprised of three sets of statistical analyses. First, it evaluates the effects of exogenous constructs on the endogenous construct. The R^2 value for the endogenous construct, behavioral intention, was .82. Second, in order to answer the research question raised in the study, I compared the effects and the significance of pairs of path coefficients by constraining the regression weights of the paths. Third, in order to test the moderating effects of the non-metric variable, gender, I conducted multiple group analysis (Male=252, Female=150).

4.1. Structural Model Analysis

The result of the structural model analysis is shown in Figure 6. The model achieved R^2 value of .822 for behavioral intention, which means that exogenous constructs explain almost 82% of the total variance of the endogenous construct, behavioral intention. Overall, the model successfully explained constructs influencing behavioral intention.

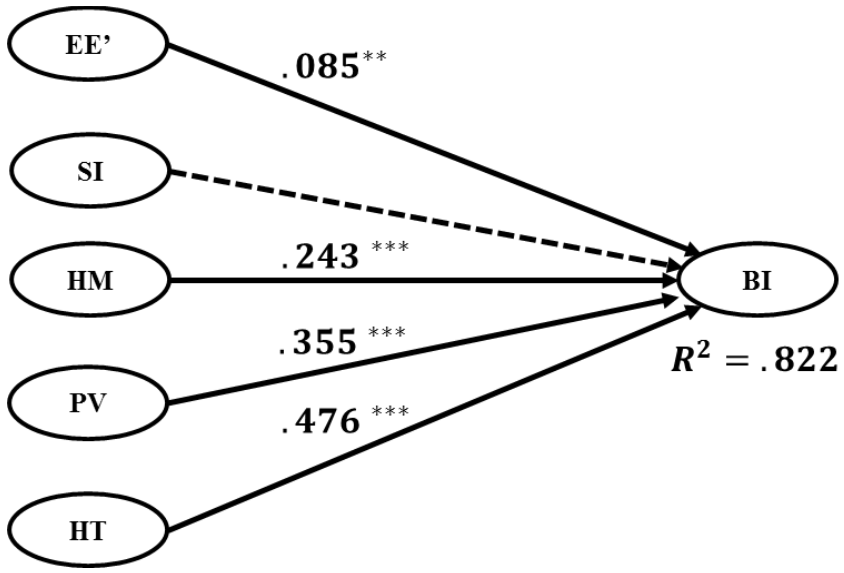
The construct EE' combining Effort expectancy (EE) and Facilitating conditions (FC) was shown to have a significant effect on the behavioral intention (BI) (β= .085, p <.01). Therefore, H2.1 was marginally supported[8]. The relationship between social influence (SI) and BI was not significant, as hypothesized (β= -.051, p =.217). Since H2.1 was hypothesized such that SI is not expected to have an effect on BI; a power analysis was implemented to check the possibility for type II error. Considering the number of samples (N=402) and the R^2 value

[8] H2.1 was marginally supported (p=.008), thus it needs to be interpreted with caution. Also, it should be noted that neither male nor female group showed significant result when each group was analyzed separately in multiple group analysis which is presented later in this paper.

of .822 for behavioral intention (p=.05), statistical power of this model was almost 100%[9]. Therefore, H3 was supported. H5 was also supported. Hedonic motivation (HM) also exhibited positive effect (β=.243, p <.001) on BI. Price value (PV) was also found to be positively associated with BI (β=.355, p <.001). Thus, H6 was also supported. Habit also has positive influence on BI (β=.476, p <.001). H7.1 was also supported.

The values of β indicate the degree of effect on BI. The research question of this study is: "Which exogenous construct has the 'strongest' effects on behavioral intention?" It is possible to compare two β values when a significant difference is found between the paths. The research question will also be discussed later in this paper.

Figure 6: Structural Model Analysis



[9] Soper, D.S. (2015). Post-hoc Statistical Power Calculator for Multiple Regression [Software]. Available from http://danielsoper.com/statcalc3/calc.aspx?id=9

Table 5: Hypotheses and Results

H2.1	EE'	Effort expectancy is positively related to user's behavioral intention to use in-app purchase in mobile games.	Marginally Supported (< .01)
H3	SI	Social influence does **NOT** have significant influences on user's behavioral intention to use in-app purchase in mobile games.	Supported (> .05)
H5.1	HM	Hedonic motivation is positively related to user's behavioral intention to use in-app purchase in mobile games.	Supported (<.001)
H6.1	PV	Price value is positively related to user's behavioral intention to use in-app purchase in mobile games.	Supported (<.001)
H7.1	HT	Habit is positively related to user's behavioral intention to use in-app purchase in mobile games.	Supported (<.001)

4.2. Path Coefficients Comparison

In order to answer the research question raised in the study, I compared the size of effects and the significance of pairs of path coefficients by constraining the regression weights of paths between pairs of constructs to the same value. The research question of this study is "Which exogenous construct has the strongest effects on behavioral intention?" I conducted path coefficient comparison to answer to the research question. This method compares the $\chi 2$ of the non-constrained model and the $\chi 2$ of the equal constrained model that fixes each pair of path parameters as the same value. If the value of $\Delta\chi 2$ is over 3.84, it is possible to say that a path that has a larger path coefficient has stronger effect than a path that has a smaller path coefficient. Table 6 and Table 7 show that HT was shown to have the strongest effect on BI as compared with other constructs.

Table 6: Significance of Path Coefficients

EE'&HM Constrained Model		EE'&PV Constrained Model		EE'&HT Constrained Model	
Δχ2	Δdf	Δχ2	Δdf	Δχ2	Δdf
1.51 (<3.84)	1	7.25 **(>3.84)**	1	22.95 **(>3.84)**	1
HM&PV Constrained Model		HM&HT Constrained Model		PV&HT Constrained Model	
Δχ2	Δdf	Δχ2	Δdf	Δχ2	Δdf
1.17 (<3.84)	1	9.38 **(>3.84)**	1	4.38 **(>3.84)**	1

Table 7: Path Coefficients Comparison

	EE' (β=.085)	HM (β=.243)	PV (β=.355)
HM (β=.243)	Non-Significant	-	-
PV (β=.355)	**Significant**	Non-Significant	-
HT (β=.476)	**Significant**	**Significant**	**Significant**

From Table 6, it is impossible to directly compare the size of effects of EE' and HM because there is no significant difference (1.51 < 3.84) between the constrained model and the non-constrained model. It is also impossible to directly compare the size of effects of HM and PV for the same reason (1.17 < 3.84). Table 7 shows that HT (β=.476) has the strongest effect on BI as compared with other constructs EE' (β=.085), HM (β=.243), or PV (β=.355).

4.3. Moderating Effects of Gender

4.3.1. Multiple Group Confirmatory Factor Analysis: This study also assesses the moderating effect of gender. SPSS AMOS 22.0 provides a feature for researchers to check the moderating effect of both non-metric variables and metric variables. It is also often called Simultaneous Analysis. In order to see if there is a moderating effect of a non-metric variable (i.e., gender), I applied data collected from the male group and data collected from the female group to the same

path model. In order to check the measurement equivalence between the male group and the female group, multi-group confirmatory factor analysis was conducted to check cross-validation. Kline (2005) argues it is less meaningful to assess the difference of path coefficients without checking the measurement equivalence. Cross-validation is used to assess the homogeneity between one group and another from the same population. In other words, this is to see whether different groups (i.e., male group and female group) perceive the survey questionnaire in the same way or not. Table 8 shows the measurement equivalence between the male group and the female group.

Table 8: Goodness-of-fit indices of unconstrained and constrained models[10]

Model	$\chi 2$	Df	GFI	CFI	RMSEA	$\Delta\chi 2$	Δdf	Sig. (p=.01)
Model 1	722.915	348	0.852	0.944	0.052	-	-	-
Model 2	751.840	363	0.849	0.942	0.052	28.925	15	**No (<30.578)**
Model 3	821.913	374	0.839	0.933	0.055	88.998	26	Yes (>45.642)
Model 4	843.163	389	0.837	0.932	0.054	110.248	41	Yes (>64.950)
Model 5	881.978	410	0.832	0.93	0.054	149.063	62	Yes (>90.802)

The χ^2 difference for the 'unconstrained model' (Model 1) versus the 'factor loading constrained model' (Model 2) was not statistically significant. Therefore, it was shown that factor loading equivalence was not a concern for the multiple group analysis. In other words, the male group and the female group perceived the survey items in the same way.

4.3.2. Multiple Group Analysis: In order to check the effects of the non-metric moderator, gender, I divided the sample group into two sub groups: a male group and a female group. Path coefficients of each group were checked and compared with each other. After that, multiple

[10] I follow the 5-step procedure (Mullen, 1995).

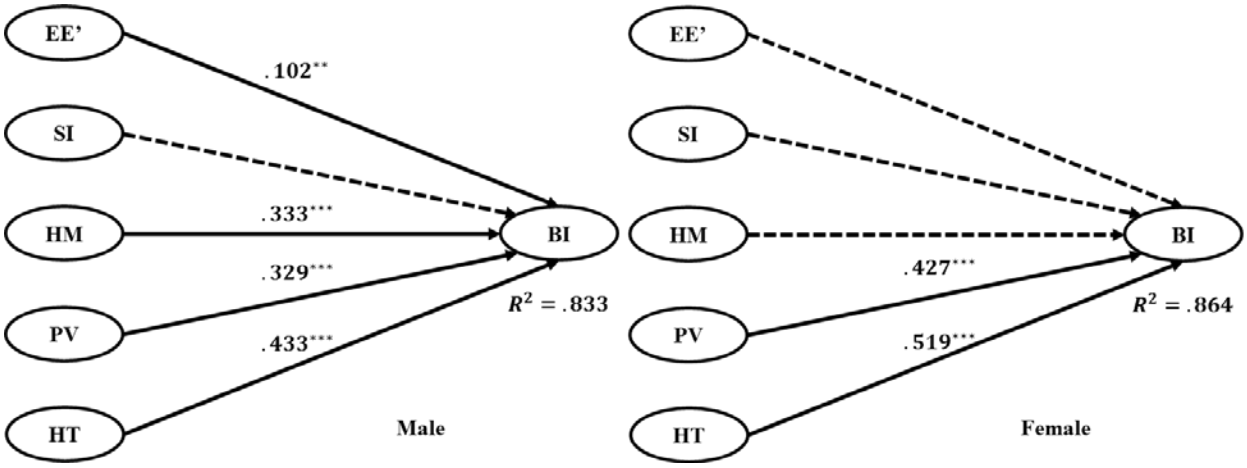
group analysis was conducted. Multiple group analysis shows a statistically significant difference of path coefficients between sub groups. Table 9 and Figure 7 show the result of the analyses. In the male group, EE', HM, PV and HT were shown to have statistically significant influences on BI, while only PV and HT were shown to have statistically significant influences on BI in the female group.

I also checked critical ratios (C.R.) for differences in the parameters of each group in order to see whether the difference of significance of HMs' effects in each group is statistically significant or not (see Table 10). It is statistically different when an absolute value of C.R. is higher than 1.965.

Table 9: Sub-Group Analysis

Male (N=252)	β	Significant	Female (N=150)	β	Significant
EE'	0.102	Yes**	EE'	0.055	No
SI	-0.081	No	SI	-0.006	No
HM	0.333	Yes***	HM	0.132	No
PV	0.329	Yes***	PV	0.427	Yes***
HT	0.433	Yes***	HT	0.519	Yes***

Figure 7: Path Coefficients in Male and Female group



The table shows that only the paths between HM and BI in each group are significantly different (|-2.323| > 1.96), which means only the paths between HM and BI in each group are directly comparable among the paths between all the exogenous constructs (i.e. EE', SI, HM, PV and HT) and the endogenous construct, BI. In conclusion, the effect of HM on BI in the male group is statistically stronger than the effect in the female group (M=.333 > F=.132).

Table 10: Critical Ratios for Differences between Parameters

C.R.	EE' (Male)	SI (Male)	HM (Male)	PV (Male)	HT (Male)
EE' (Female)	-0.48	-	-	-	-
SI (Female)	-	0.827	-	-	-
HM (Female)	-	-	**-2.323**	-	-
PV (Female)	-	-	-	1.107	-
HT (Female)	-	-	-	-	0.026

Table 11: Hypotheses and the Result of Multiple Group analysis

H2.2	Gender will moderate the effect of effort expectancy on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.	Not supported
H5.2	Gender will moderate the effect of hedonic motivation on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.	Supported
H6.2	Gender will moderate the effect of price value on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.	Not Supported
H7.2	Gender will moderate the effect of habit on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.	Not Supported

CHAPTER 5: DISCUSSION

5.1. Key Findings

This thesis examined the motivational factors affecting behavioral intention to purchase in game mobile items among mobile game users in the United States. The number of mobile game applications downloaded is on the increase. Although there have been studies about motivational factors affecting behavioral intention to play mobile games continuously, there is still a shortage of research about users' intention to spend their money on the game.

Considering that most mobile games are dependent on in-app purchasing item sales, this thesis tried to fill the gaps between telecommunication researchers and the mobile game practitioners using the well-known theory of UTAUT and UTAUT2. This paper also attempted to better understand the moderating effects of gender between the exogenous constructs and the endogenous construct. I had to remove a factor, PE, because of the low convergent validity. I also combined two constructs (i.e., EE and FC) into a single construct, EE'. It suggests that there is a need to develop more proper items measuring PE and FC especially when it comes to extremely hedonic products such as mobile games.

Table 12 shows the results of the hypotheses about the relationships between the exogenous constructs and the endogenous construct. As hypothesized in this paper, it was confirmed that behavioral intention to purchase in-game items is driven by the exogenous constructs (i.e., EE', HM, PV and HT). In particular, HT had the strongest effects among the exogenous constructs. Although some previous studies focusing on other information technologies argued social influence (SI) is one of the significant predictors of formation BI; it was, as hypothesized, not a statistically significant factor predicting BI in this study. That is probably due to the voluntary and private nature of mobile game play and subsequently the users'

disinterest in subjective norms, unlike when they are using other technologies.

Table 12: Summary of Results

Main UTAUT Model		
H2.1	Effort expectancy (EE') is positively related to user's behavioral intention to use in-app purchase in mobile games.	Marginally Supported (< .05)
H3	Social influence (SI) does NOT have significant influences on user's behavioral intention to use in-app purchase in mobile games.	Supported (> .05)
H5.1	Hedonic motivation (HM) is positively related to user's behavioral intention to use in-app purchase in mobile games.	Supported (< .01)
H6.1	Price value (PV) is positively related to user's behavioral intention to use in-app purchase in mobile games.	Supported (< .01)
H7.1	Habit (HT) is positively related to user's behavioral intention to use in-app purchase in mobile games.	Supported (< .01)
Moderating Effect of Gender		
H2.2	Gender will moderate the effect of effort expectancy (EE') on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.	Not Supported
H5.2	Gender will moderate the effect of hedonic motivation (HM) on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.	Supported
H6.2	Gender will moderate the effect of price value (PV) on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for female players.	Not Supported
H7.2	Gender will moderate the effect of habit (HT) on behavioral intention to use in-app purchase in mobile games, such that the effect will be stronger for male players.	Not Supported
Research Question		
RQ	Which exogenous construct has the strongest effects on behavioral intention?	HT

The moderating effects of gender in the model were also examined by implementing multiple group analysis. However, only hedonic motivation was found to be moderated by

gender. The moderating effects of gender on EE', PV and HT were not identified. From the results of the sub-group analysis, I confirmed EE' (.102), HM (.333), PV (.329) and HT (.433) are statistically significant factors predicting BI in the male group (N=252). In the case of the female group (N=150), only PV (.427) and HT (.519) were shown to be significant factors predicting BI.

Lastly, this paper compared the effect sizes and the significance of pairs of path coefficients in order to find out which factor is the strongest one among those affecting the formation of BI. The result showed that HT has stronger effects than other exogenous constructs.

5.2. Research Implications

Although this thesis has some limitations, it contributes to the existing literature about mobile games and behavioral intention to purchase mobile game items. Since the main revenue source of mobile game applications has been shifting to the freemium strategy, the paper tried to explain the relatively unexplored product of in-app purchase mobile items. Despite the necessity of academic exploration of the topic, it has been understudied so far. The thesis employed the well-known academic models, UTAUT and UTAUT2, to explain the behavioral intention to use in-game mobile items. The data used for the statistical analyses were collected via Amazon MTurk. Although Amazon MTurk does not exactly represent the US population, it proved that it is a convenient and economic way for collecting data which contains diversity. Considering the Internet territories usually do not have borders, the diverse demographics of Amazon MTurk can be a legitimate recruiting tool. The thesis draws several implications for both researchers and practitioners.

For researchers, items measuring people's perceptions towards hedonic products need to be developed. In this study, some items adopted from UTAUT were found not to be accurately measuring perceptions towards extremely hedonic products such as mobile game items. In the case of using hedonic products (e.g., mobile game), enjoying the hedonic attribute of the products itself becomes a goal. In this case, the distinction between performance expectancy and hedonic motivation is not clear; therefore, it would be interesting to see the relationship between PE and HM in the case of hedonic products in a future study.

Also, in this study I found facilitating conditions and effort expectancy are grouped together as the same construct. It coincides with what Venkatesh (2000) argued; however, it is still unclear whether it is because of the accumulated experience of in-app purchase features or because of the easy nature of usage. UTAUT researchers should later conduct further research on the relationship between EE and FC.

The research also leaves space for future research. Although it revealed the relationships between factors and behavioral intention, more research is needed to figure out how each of the constructs is formed in order to enrich the understanding of purchasing in-game mobile items. For example, studies about the cognitive process of the formation of hedonic motivation or about sub-factors influencing the formation of habit and the likes are required.

The thesis also draws implications for practitioners and mobile game designers by identifying important constructs forming behavioral intention. This study found that effort expectancy, hedonic motivation, price value and habit were significantly associated with behavioral intention. Among the effects of construct on BIs, the effect of habit was shown to be the strongest. In this study, habit was operationalized as "The extent which game users tend to use in-app purchase in mobile games automatically because of repeated using behaviors in the

past." Considering the operational definition, by understanding and inventing ways to promote repetitive usage of in-app purchase features, game companies would be able to attain more profits. In practice, they can give out some kind of complimentary and exclusive rewards.

For example, game companies can offer free additional game money to users who make more than a certain number of item purchases. Another example would be that the game companies offer limited items that can only be obtained through a certain number of item purchases and let users know that the reason they received the item is due to their repetitive purchases. This notification could be sent via email or as a comment on the item thanking them for their purchases and promising other rewards in the future. Through this process, users will figure out that they can receive more items from repetitive item purchases than from a single item purchase.

Game companies can broaden this strategy to increase their profit. In most cases, game companies run multiple games simultaneously. To maximize the profit from selling in-game items at a company level, they can implement these promotions in conjunction with other mobile games that are run by them. For example, 'Supercell', which is running 'Clash of Clans', is also running other games such as 'Hay Day' and 'Boom Beach'. They can proffer free 'Clash of Clan' items as reward when users purchase items in 'Hay Day' or 'Boom Beach' repetitively.

Next, price value was also shown to positively affect the formation of behavioral intention in a relatively strong manner. However, this does not to suggest that game companies simply distribute and sell the game items at a lower price. Price value not only measures the price itself; it also measures the actual value of the items. According to Venkatesh (2012), price

value means "consumers' cognitive tradeoff between the perceived benefits of the applications[11] and the monetary cost of using them." In this regard, an item which is sold at an excessively low price would not necessarily lead to higher behavioral intention to purchase the item in mobile games in which users play against other players. In other words, an extremely low price of an in-game item will lead to a situation where almost every user owns the item. In turn, it will degrade the benefits of using the item, which means the price value of the in game item would go down. For example, let's say that there is a sword that has a high level special ability, and at the same time, let's say that the price of the sword is very low. Then, too many players will have the sword. It will lead to a situation in which the relative advantage of having the sword will go down despite the essential benefits of its use. Players will not purchase the sword because using the item does not offer enough relative benefits to them in comparison with other players. Therefore, companies need to put effort into estimating the proper price range of game items, and making sure that game players feel that the benefits of using game items will be worth the purchase. In this manner, game companies will be able to maximize the price value of the game items.

Lastly, differences depending on gender were also identified in the study. In the male group, the constructs of effort expectancy, hedonic motivation, price value and habit, were shown to have statistically positive effects on behavioral intention. In the female group, only price value and habit were significant factors of formation of behavioral intention. Also, statistically, men are shown to be more concerned about hedonic motivation than women are. Game designers can use the information on players' gender to determine what kinds of items they

[11] In this case, price value means the tradeoffs between the benefits of using game items and the monetary cost for using them.

should advertise to their consumers. If the gender of the consumer is known then the game designers can determine their male audience and advertise game items that will increase the fun of the player. In this way the designers can hone in on their consumer desires more efficiently and create advertisements that bring more profits.

5.3. Limitations and Further Research

This thesis contains many limitations. First, this paper recruited survey respondents via Amazon MTurk. The sample collected cannot represent the entire US population. There are several research studies saying that Amazon MTurk is a suitable recruiting method to collect data; however, delicate caution needs to be taken when interpreting and generalizing the results.

Second, although it tried to replicate the previous model explaining users' intention to use a certain technology, the final model used in this study does not retain all the constructs used in the original study. A construct from the original model, PE, had to be removed due to low convergent validity. This means the observed variables measuring the latent variable are not in fact related. One possibility is that some of the respondents were basing their answers off of functional items used to enhance performance, in which case all answers should be the same, while others were imagining non-performance enhancing items such as decorative items. If a respondent were thinking of these decorative items it is possible that the questions would be understood differently than intended. For the first question "I find in-app purchase in mobile games useful when I play mobile games", a user may find that the item is useful in their expression but for the second question "Using in-app purchase in mobile games helps me accomplish things in mobile games more quickly", they would find the item to be of no use in terms of their speed of accomplishment. The third question "Using in-app purchase in mobile

games increases my competencies in mobile games" could be understood as discussing functional competencies or other kinds of competencies such as social and therefore the responses may be variant. Thus, in order to get a reliable response for this construct, the type of item being discussed must be considered or the questions must be reformed to attend to this difference in the functionality of items. Further study may develop more suitable items for measuring respondents' perception on game items.

Also, facilitating conditions and effort expectancy were grouped together as a single construct because the results from the reliability test and the exploratory factor analysis showed that the constructs are actually the same. This is perhaps because most of the survey respondents already experienced using in-app purchase features in mobile applications as Venkatesh (2000) found in his research. Considering that using in-app purchase features is a repetitive task with similar processes across the genre of mobile applications, mobile game users might not need a lot of knowledge or skills to use the in-app purchase system. It will be interesting to see, in further research, in what ways FC and EE can be defined in technologies or systems which have as low level of difficulties to use as the in-app purchase feature does.

Third, this paper explains behavioral intention to purchase mobile game items. However, there are various types of items and game genres. It will be interesting to classify the types of items (i.e., functional items and decorative items) or game genres (i.e., Casual, Mid-core, Hard-core) in future research.

APPENDICES

Appendix A: Operational Definitions used in the Study

Table 13: Operational Definitions used in the Study

	Operational definition from literature	Operation definition in the study
Performance expectancy	"the degree to which using a technology will provide benefits to consumers in performing certain activities" (Venkatesh et al., 2003)	The degree to which using in-app purchase in mobile games will provide benefits to users in playing mobile games
Effort expectancy	"the degree of ease associated with consumers' use of technology" (Venkatesh et al., 2003)	The degree of ease associated with consumers' use of in-app purchase in mobile games
Social influence	"the extent to which consumers perceive that important other (e.g., family or friends) believe they should use a particular technology" (Venkatesh et al., 2003)	The extent to which game users perceive that important others believe they should use in-app purchase in mobile games
Facilitating conditions	"consumers' perceptions of the resources and support available to perform a behavior" (Brown and Venkatesh, 2005; Venkatesh et al., 2003)	Consumers' perceptions of the resources and support available to use in-app purchase in mobile games
Hedonic motivation	"the fun or pleasure derived from using a technology" (Brown and Venkatesh, 2005)	The fun or pleasure derived from using in-app purchase in mobile games
Price value	"consumers' cognitive tradeoff between the perceived benefits or the applications and the monetary cost for using them" (Dodds et al., 1991)	Players' cognitive tradeoff between the perceived benefits of the in-app purchase in mobile games and the monetary cost for using it
Habit	"the extent to which people tend to perform behaviors automatically because of learning" (Limayem et al., 2007)	The extent which game user tend to use in-app purchase in mobile games automatically because of repeated using behaviors in the past
Behavioral intention	described as a function of multiple exogenous constructs	The level of a user's intention to use in-app purchase in mobile games in the future

Appendix B: Measurement Items

Table 14: Measurement Items

		Adapted from
PE1	I find in-app purchase in mobile games useful when I play mobile games.	(Davis, 1989; Davis et al., 1989; Venkatesh et al., 2003)
PE2	Using in-app purchase in mobile games helps me accomplish things in mobile games more quickly.	
PE3	Using in-app purchase in mobile games increases my competencies in mobile games.	
EE1	Learning how to use in-app purchase in mobile games is easy for me.	(Davis, 1989; Davis et al., 1989; Venkatesh et al., 2003)
EE2	My interaction with in-app purchase in mobile games is clear and understandable.	
EE3	I find in-app purchase in mobile games easy to use when I play mobile games.	
EE4	It is easy for me to become skillful at using in-app purchase when I play mobile games.	
SI1	People who are important to me think that I should use in-app purchase in mobile games.	(Davis et al., 1989; Ajzen, 1991; Venkatesh et al., 2012)
SI2	People who influence my behavior think that I should use in-app purchase in mobile games.	
SI3	People whose opinions that I value prefer that I use in-app purchase in mobile games.	
FC1	I have the resources necessary to know how to use in-app purchase in mobile games.	(Ajzen, 1991; Taylor and Todd, 1995; Venkatesh et al., 2012)
FC2	I have the knowledge necessary to use in-app purchase in mobile games.	
FC3	The mobile game item is compatible with other technologies I use. (Dropped)	
FC4	I can get help from others when I have difficulties using in-app purchase in mobile games.	
HM1	In-app purchase in mobile games is fun to use.	(Brown and Venkatesh, 2005; Venkatesh et al., 2012)
HM2	Using in-app purchase in mobile games is enjoyable.	
HM3	Using in-app purchase in mobile games is entertaining.	
PV1	In general, in-app purchase in mobile games is reasonably priced.	(Dodds et al., 1991; Venkatesh et al., 2012)
PV2	In-app purchase in mobile games is a good value for the money.	
PV3	In-app purchase in mobile games provides good value.	
HT1	Using in-app purchase in mobile games has become a habit for me.	(Venkatesh et al., 2012)
HT2	I am addicted to using in-app purchase in mobile games.	
HT3	I must use in in-app purchase in mobile games.	
HT4	Using in-app purchase in mobile games has become natural to me.	
BI1	I intend to continue to use in-app purchase in mobile games in the future.	(Venkatesh et al., 2012)
BI2	I will try to keep using in-app purchase in mobile games.	
BI3	I plan to use in-app purchase in mobile games frequently.	

Appendix C: Descriptive Statistics of Survey Respondents

Table 15: Descriptive Statistics of Survey Respondents

Gender		**Age**		**Money spent on purchasing items**	
Male	252 (37.3%)	Min	18	Min	$1
Female	150 (62.7%)	Max	72	Max	$400
		Mean	29.7	Mean	$19.2
Type of items used		**Ethnic background**		**Education level**	
Decorative items	23 (5.7%)	American Indian/Alaska Native	4 (1%)	Less than High School	3 (0.7%)
Functional items	327 (81.3%)	Asian/Pacific Islander	53 (13.2%)	High School Diploma	146 (36.3%)
Both	52 (12.9%)	Black	21 (5.2%)	Undergraduate Degree	212 (52.7%)
		Hispanic	29 (7.2%)	Master’s Degree	39 (9.7%)
		White	285 (70.9%)	PhD	2 (0.5%)
		Multi-racial	10 (2.5%)		

Appendix D: Survey Questionnaire

CONSENT FORM

Determinants of intention to use in-app purchase in mobile games

Thank you for your participation in this survey. The goal of this study is to investigate why people do or do not purchase in-app mobile game items.

Background Information and Procedures: You are being asked to participate in this research study today. The session in which you are about to participate should take approximately 15 minutes to complete. You will be asked to think about your mobile game application usage experience and then complete a series of questions. If you are uncomfortable with answering any questions, you may withdraw from the study at any time. You will not be penalized for withdrawing from the study before it is completed.
Please note that in order to be eligible to participate in this study you have to **a) be 18 years of age or older, b) have played a freemium game with your smartphone, and c) have used in-app purchase in the freemium mobile games.**

Benefits and Risks of Being in the Study: There are no obvious physical, legal or economic risks associated with participating in this study. However, you will be asked questions about yourself and these questions can sometimes make people uncomfortable. You do not have to answer any questions that you do not wish to answer. This study is not expected to yield any immediate benefit to the individual participants apart from the monetary incentive offered for participation.

Confidentiality: Your privacy will be protected to the maximum extent as allowable by law. No personally identifiable information will be reported in this survey.
Voluntary Nature of the Study: Participation in this study is voluntary, and you may choose not to participate at all, or you may refuse to participate in certain procedures or answer certain questions or discontinue your participation at any time without penalty or loss of benefits. You may also withdraw your consent to participate at any time without penalty.

Contacts and Questions: If you have any questions about this research, please contact the investigator, Donghui Cho at 517-488-9800, or email chodongh@msu.edu. If you have any questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail irb@msu.edu or regular mail at 207 Olds Hall, MSU, East Lansing, MI 48824.

If you agree to the statement below, please select 'Yes'. If you do not agree to the statement, please select 'No'. The survey will be terminated immediately.

BY selecting “Yes” BELOW, I give my consent that I am over 18 years old and I am willing to participate in this study.

- Yes
- No

(Page break)

To enhance legibility, if you are participating in this survey using a mobile device, such as a smartphone or tablet, please turn it to the horizontal position.

You may move on to the next page after a certain amount of time elapses, which depends on the number of questions on the page. Some of the pages have timers, with a short minimum time, built in to allow you time to fully consider your answers.

There is no time limit. But once you move on to a next page, you may NOT go back to a previous page. Therefore, please take your time while answering the questions.

(Page break)

Please read below carefully.

This survey is interested in ‘freemium’ mobile games and their ‘in-app purchase’ features. Freemium mobile games have two characteristics. (1) They can be downloaded for free. (2) They offer in-app game items for purchase such as hearts, coins, clovers, or gems. You can either get the items for free or buy the items with your app market account or credit card.
For example, "Candy Crush Saga", "Clash of Clans" or "Hay Day" falls into the category of freemium mobile games. Of course, there are many different freemium games in the app-store markets.
*Paid mobile game applications that require initial one-time transaction are NOT considered as freemium mobile games.

(Page break)

The following examples show what in-app game items in freemium mobile games are.

- Items being used to customize your characters or decorate game interior (ex: costumes, ornaments, etc.)
- Items enhancing your character's competencies (ex: offering additional powers, offering more bullets, etc.)
- Items enabling you to play continuously without waiting (ex: hearts, clovers, keys, etc.)
- Items shortening times required to complete certain processes (ex: instant building construction, instant upgrade completion)
- Items that are used to obtain items described above (ex: virtual currencies such as gems or coins, etc.)

There is no right or wrong answer. Please think over your experiences with these types of games, and answer the following questions.

(Page break)

Q1) Have you played any 'freemium' mobile games in the past?

- Yes
- No (**If a respondent mark this, the survey terminates immediately, this instruction is not displayed to the respondent*)

Q2) Have you ever used in-app purchase in a freemium game?

- Yes
- No (**If a respondent mark this, the survey terminates immediately, this instruction is not displayed to the respondent*)

(Page break)

Q3) What is the name of the 'freemium' mobile game in which you played the most frequently? Please enter only one [1] game.

- Response: _____

Q4) Have you purchased mobile items in the game?

- Yes (**If a respondent mark this, Q6 will be displayed to the respondent, this instruction is not displayed to the respondent*)
- No (**If a respondent mark this, Q5 will be displayed to the respondent, this instruction is not displayed to the respondent*)

(Page break)

Q5) What is the name of a 'freemium' mobile game in which you purchased mobile items? Please enter only one [1] game.

- Response: _____

(Page break)

Q6) How much money have you spent on purchasing in-app game items in the mobile game so far? (in USD)

- Response: _____

Q5) How many times have you purchased in-app game items in the game so far?

- Response: _____

(Page break)

Q6) What kinds of items <u>have you bought</u> for use in the game? (Please check all that apply)

- Items being used to customize your characters or decorate game interior (ex: costumes, ornaments, etc.)
- Items enhancing your character's competencies (ex: offering additional powers, offering more bullets, etc.)
- Items enabling you to play continuously without waiting (ex: hearts, clovers, keys, etc.)
- Items shortening times required to complete certain processes (ex: instant building construction, instant upgrade completion)

- Items that are used to obtain items described above (ex: virtual currencies such as gems or coins, etc)
- Others: please specify _____

Q7) What kind of items have you used the most frequently in the game? (Please check only one)

- Items being used to customize your characters or decorate game interior (ex: costumes, ornaments, etc.)
- Items enhancing your character's competencies (ex: offering additional powers, offering more bullets, etc.)
- Items enabling you to play continuously without waiting (ex: hearts, clovers, keys, etc.)
- Items shortening times required to complete certain processes (ex: instant building construction, instant upgrade completion)
- Others: please specify _____

(Page break)

Q8) These questions below ask about your opinions about mobile game experience. Please select the choices that most closely match your opinion. *(Strongly Disagree – Strongly Agree, 7 Likert Scale)*

- People who influence my behavior think that I should use In-app purchase in mobile games.
- I can get help from others when I have difficulties using In-app purchase in mobile games.
- Using In-app purchase in mobile games has become a habit for me.
- I have the resources necessary to know how to use In-app purchase in mobile games.
- People whose opinions that I value prefer that I use In-app purchase in mobile games.

(Page break)

Q9) These questions below ask about your opinions about mobile game experience. Please select the choices that most closely match your opinion. *(Strongly Disagree – Strongly Agree, 7 Likert Scale)*

- I am addicted to using In-app purchase in mobile games.
- I have the knowledge necessary to use In-app purchase in mobile games.
- People who are important to me think that I should use In-app purchase in mobile games.
- Using In-app purchase in mobile games has become natural to me.
- I feel that I must use In-app purchase in mobile games.
- Please choose the answer of ‘Strongly Disagree’.

(Page break)

Q10) These questions below ask about your opinions about mobile game experience. Please select the choices that most closely match your opinion. (Strongly Disagree – Strongly Agree, 7 Likert Scale)

- Using In-app purchase in mobile games increases my competencies in mobile games.
- It is easy for me to become skillful at using In-app purchase in mobile games when I play mobile games.
- Learning how to use In-app purchase in mobile games is easy for me.
- Using In-app purchase in mobile games helps me accomplish things in mobile games more quickly.
- My interaction with In-app purchase in mobile games is clear and understandable.
- I find In-app purchase in mobile games useful when I play mobile games.
- I find In-app purchase in mobile games easy to use when I play mobile games.

(Page break)

Q11) These questions below ask about your opinions about mobile game experience. Please select the choices that most closely match your opinion. (Strongly Disagree – Strongly Agree, 7 Likert Scale)

- I will try to use In-app purchase in mobile games.
- Using In-app purchase in mobile games is entertaining.
- I intend to continue to play mobile games in the future.
- In general, in-app purchase in mobile games is reasonably priced.
- Using In-app purchase in mobile games is enjoyable.
- I will try to keep playing mobile games.
- Please select the answer of ‘Strongly Agree’.

(Page break)

Q12) These questions below ask about your opinions about mobile game experience. Please select the choices that most closely match your opinion. (Strongly Disagree – Strongly Agree, 7 Likert Scale)

- In-app purchase in mobile games is fun to use.
- I plan to use In-app purchase in mobile games frequently
- In-app purchase in mobile games is a good value for the money.
- I plan to play mobile games frequently.
- I intend to continue to use in-app purchase in mobile games in the future.
- In-app purchase in mobile games provides good value to the user.

(Page break)

The few next questions are for classification of participants in this study. These are very important questions for this research. Please answer carefully.

Q13) What is your gender?

- Male
- Female

Q14) What is your ethnic or cultural background?

- American Indian/Alaska Native
- Asian/Pacific Islander
- Black, non-Hispanic
- Hispanic
- White, non-Hispanic
- Other/Unknown/Multi-racial: please specify _____

Q15) What is the highest level of education you have completed?

- Less than High School
- High School Diploma
- Undergraduate Degree
- Master's Degree
- PhD

Q16) What year were you born in?:

- Response: _____

Q17) What is your current household income in U.S. dollars?

- Response: _____

(Page break)

Q18) How often do you use the computer for the following activities:

	Less than a month	Once a month	A few times a month	A few times a week	About once a day	Several times a day
Emails	o	o	o	O	o	o
Information / News	o	o	o	O	o	o
Online Shopping / Auctions	o	o	o	O	o	o
Work / Business / Studies	o	o	o	O	o	o
Games	o	o	o	O	o	o
Downloading and/or enjoying Music, Films, etc	o	o	o	O	o	o
Chatting / Social Network Sites	o	o	o	O	o	o

(Page break)

Q19) How many hours per day do you use a computer?

- Response: _____

(Page break)

Q20) How often do you play the following types of games?

	Less than a month	Once a month	A few times a month	A few times a week	About once a day	Several times a day
Mobile games	o	o	o	O	o	o
Computer games	o	o	o	O	o	o
Console games (PlayStation, Wii, Xbox, etc)	o	o	o	O	o	o

Q21) How much do you normally spend per game session playing the following types of games without taking any break? (in minutes)

- Mobile games:_____
- Computer games: _____
- Console games: _____

(Page break)

This is the end of this survey. Thank you so much for your participation!

Appendix E: Results of Exploratory Factor Analysis

Table 16: Eigenvalues of Extracted Components

	Initial Eigenvalues		
Component	Total	% of Variance	Cumulative %
HT	6.935	38.526	38.526
EE	3.801	21.118	59.644
HM	1.496	8.309	67.953
PV	1.158	6.435	74.388
SI	.948[12]	5.265	79.653
FC	.556	3.089	82.742

[12] According to the K-1 method proposed by Kaiser (1960), factors show an eigenvalue over 1 are usually considered as distinct factors. Although the eigenvalue of SI was slightly below 1 (.948) in this EFA, I decided to leave SI as a distinct factor because the purpose of this EFA was to check whether EE and FC are different from each other. SI was not shown to be highly correlated with other constructs from the matrix.

Table 17: Rotated Component Matrix (6 components extracted)

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
HT2	**.849**	-.100	.141	.145	.198	-.075
HT3	**.790**	-.059	.146	.171	.249	-.113
HT1	**.780**	-.101	.256	.266	.202	-.002
HT4	**.739**	.002	.263	.245	.204	.126
EE2	-.062	**.923**	.058	.058	-.062	.098
EE3	-.061	**.891**	.128	.003	-.068	.133
EE1	-.079	**.811**	.033	-.038	-.133	.342
HM3	.193	.078	**.862**	.197	.148	.063
HM2	.219	.089	**.824**	.325	.136	-.022
HM1	.269	.098	**.820**	.246	.107	-.026
PV1	.225	.077	.225	**.842**	.114	-.025
PV2	.274	-.063	.269	**.817**	.222	-.038
PV3	.248	-.010	.317	**.812**	.213	-.031
SI2	.176	-.092	.131	.101	**.865**	.004
SI1	.274	-.097	.136	.187	**.849**	-.002
SI3	.301	-.101	.115	.219	**.822**	-.150
FC1	.054	.515	-.004	-.078	-.043	**.733**
FC2	-.133	.524	.027	-.012	-.086	**.728**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 6 iterations.

Table 18: Rotated Component Matrix (5 components extracted)

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
EE1	**.876**	-.085	.037	-.023	-.127
EE2	**.849**	-.096	.084	.100	-.062
EE3	**.840**	-.089	.151	.039	-.067
FC2	**.820**	-.089	-.008	-.045	-.068
FC1	**.813**	.097	-.040	-.111	-.025
HT2	-.130	**.844**	.143	.147	.195
HT1	-.095	**.784**	.252	.259	.202
HT3	-.115	**.780**	.153	.178	.246
HT4	.059	**.751**	.253	.233	.207
HM3	.100	.203	**.856**	.190	.151
HM2	.067	.221	**.825**	.326	.136
HM1	.073	.269	**.822**	.248	.107
PV1	.049	.227	.227	**.844**	.114
PV2	-.080	.280	.267	**.812**	.222
PV3	-.030	.253	.316	**.809**	.213
SI2	-.087	.180	.127	.096	**.865**
SI1	-.096	.278	.133	.182	**.849**
SI3	-.173	.292	.123	.226	**.818**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 6 iterations.

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