INFORMATION SYSTEMS CONTINUANCE INTENTION

IN GAMIFIED MOBILE APPLICATIONS:

EXPLORING BEHAVIORAL INHIBITION AND ACTIVATION SYSTEMS
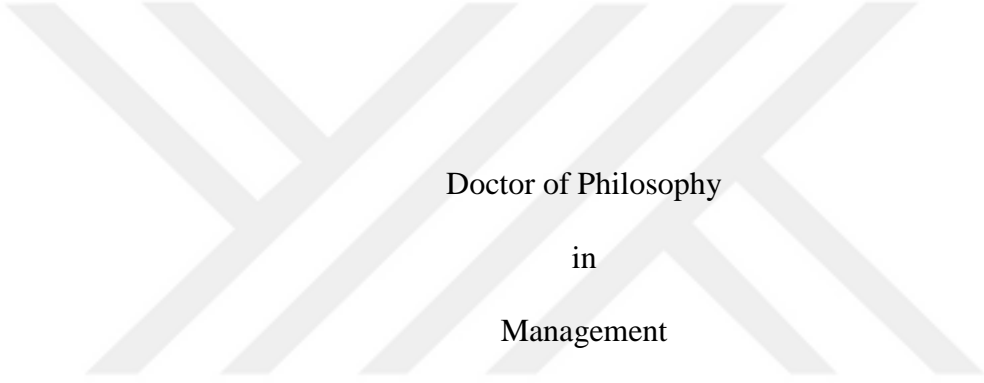
ELİF TUĞBA AYDINLIYURT

BOĞAZİÇİ UNIVERSITY

2019

INFORMATION SYSTEMS CONTINUANCE INTENTION

IN GAMIFIED MOBILE APPLICATIONS:

EXPLORING BEHAVIORAL INHIBITION AND ACTIVATION SYSTEMS

Thesis submitted to the

Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Management

by

Elif Tuğba Aydınlıyurt
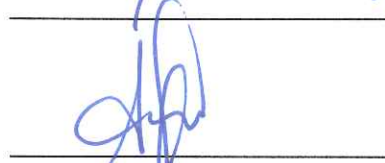
Boğaziçi University

May 2019

Information Systems Continuance Intention in Gamified Mobile Applications:

Exploring Behavioral Inhibition and Activation Systems

The thesis of Elif Tuğba Aydınlıyurt

has been approved by:

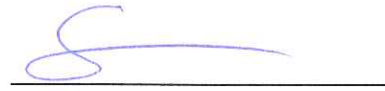Prof. Ayşegül Toker
(Thesis Advisor)

_____

Assoc. Prof. Asunur Cezar

_____

Assist. Prof. Hüseyin Sami Karaca

_____

Prof. Stefan Koch
(External Member)

_____

Prof. Özgür Özlük
(External Member)

_____

May 2019

DECLARATION OF ORIGINALITY

I, Elif Tuğba Aydınlıyurt, certify that

- I am the sole author of this thesis and that I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced or published by another person or institution;

- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;

- this is a true copy of the thesis approved by my advisor and thesis committee at Boğaziçi University, including final revisions required by them.

Signature...

Date ....28.05.2019.............

ABSTRACT

Information Systems Continuance Intention in Gamified Mobile Applications:

Exploring Behavioral Inhibition and Activation Systems

This thesis seeks to investigate the effects of Behavioral Activation System (BAS), known as approach motivation, and Behavioral Inhibition System (BIS), known as avoidance motivation, that are expected to influence individuals' post adoption behaviors in gamified mobile applications. The study uses a survey-based research methodology and examines the impacts of BAS and BIS on information systems continuance. The results show that confirmation, perceived usefulness and reward responsiveness have the biggest positive effect on user satisfaction. BIS has a significant and negative effect on satisfaction, but no effects were found related to information systems continuance intention. Satisfaction, perceived usefulness and reward responsiveness positively influence continuance intention. Fun-seeking plays an important role in continuance intention, however, it has no significant effect on satisfaction, as drive has no effect for neither. The findings of this thesis improve the understanding of the differences between these motivations related to information systems continuance. Significant practical implications that can be adopted by companies which offer gamified mobile applications are proposed.

ÖZET

Oyunsal İçerikli Mobil Uygulamalarda Bilişim Sistemleri Sürekliliği Niyeti:

Davranışsal Engelleme ve Aktivasyon Sistemlerinin Araştırılması

Bu tez, yaklaşım motivasyonu olarak bilinen Davranışsal Aktivasyon Sisteminin (DAS) ve kaçınma motivasyonu olarak bilinen Davranış Engelleme Sisteminin (DES) oyunlaştırılmış mobil uygulamalarda bireylerin teknolojiyi benimseme sonrası davranışlarını üzerindeki etkilerini araştırmayı amaçlamaktadır. Araştırmada ankete dayalı bir araştırma metodolojisi kullanılmış ve DAS ve DES'nin bilgi sistemlerinin sürekliliği üzerindeki etkileri incelenmiştir. Sonuçlar onaylama, algılanan fayda ve ödüllendirmenin kullanıcı memnuniyeti üzerinde en büyük olumlu etkiye sahip olduğunu göstermektedir. DES'nin memnuniyet üzerinde anlamlı ve olumsuz bir etkisi olduğu ortaya çıkmıştır ancak bilgi sistemlerini kullanmaya devam etme niyetiyle ilgili herhangi bir etki bulunamamıştır. Memnuniyet, algılanan fayda ve ödül hassasiyeti süreklilik niyetini olumlu yönde etkilemektedir. Eğlence arayışı, sürdürme niyetinde önemli bir rol oynamaktadır, ancak memnuniyet üzerinde anlamlı bir etkisi yoktur. Diğer taraftan amaç dürtüsünün hiçbiri üzerinde bir etkisi olmadığı görülmüştür. Bu tezin bulguları, bilgi sistemlerinin sürekliliği ile ilgili bu motivasyonlar arasındaki farkların anlaşılmasını sağlamaktadır. Oyunsal içerikli mobil uygulamalar sunan şirketler tarafından pratikte benimsenebilecek önemli uygulamalar öne sürülmüştür.

CURRICULUM VITAE

NAME: Elif Tuğba Aydınlıyurt

DEGREES AWARDED

Doctor of Philosophy in Management, 2019, Boğaziçi University, (3.77/4)

MBA, 2009, Koç University, Bocconi University (3.57/4)

Bachelor of Science in Tourism Administration, 2008, Boğaziçi University (3.09/4)

Robert College, 2004

AREAS OF SPECIAL INTEREST

Technology acceptance, information systems continuance, mobile technologies, online marketing, entrepreneurship

PROFESSIONAL EXPERIENCE

Research Assistant, Boğaziçi University, Department of Management, 2016-2019

Founder, Stilkolik.com & Stilkolik iOS and Android App, 2011-2018

Luxury Brand Management Part-time Lecturer, IFA Paris – Istanbul, 2014

Corporate Communication Specialist, Bahçeşehir K12 Schools, 2010-2011

AWARDS AND HONORS

Research Fellowship, Massey University, Auckland, New Zealand, 2018

JOURNAL PUBLICATIONS

Aydınlıyurt, E. T. (2018). Extrinsic and Intrinsic Motivations Affecting Information Systems Continuance Intention in Mobile Applications with Gamified Features. *Journal of Emerging Trends in Marketing and Management,* 1(1), 202-209.

JOURNAL PUBLICATIONS – UNDER REVIEW

Aydınlıyurt, E. T., Taskin, N., Toker, A. Brougham, D. (2019). Continuance Intention in Gamified Mobile Applications: A study of Behavioral Inhibition and Activation Systems, *Journal of Computer Information Systems*.

CONFERENCE PRESENTATIONS

Aydınlıyurt, E. T. Extrinsic and Intrinsic Motivations Affecting Information Systems Continuance Intention in Mobile Applications with Gamified Features, ETIMM Conference, Bucharest, 2018.

SEMINARS AND TALKS

Research Seminar - Massey University, New Zealand, 2018

Futuristic Fashion - Texworld Istanbul – Messe Frankfurt, 2015

Social Media, Blogging, and Fashion - Social Media Festival, 2014

To my beloved parents

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDIX TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Over the last decade, mobile internet consumption has increased exponentially and it is noted that mobile-only adoption rates increased from 9% to 20% between 2011 and 2015 due to increased smartphone ownership and enhancements in the available download speeds of mobile networks (Manlove & Whitacre, 2018). The growth of mobile industry is prominent and it is noted that in accessing social platforms, mobile internet takes the lead by 91%, compared to computer-based internet consumption 79% (Sukaini, Zhang & Albazooni, 2015). The rapid speed of technological developments brought considerable challenges, along with profitability concerns, depending on not just low levels of technology adoption by users but also because of high rates of discontinuation. In order to overcome these challenges and survive in the mobile world, achieving long-term relationships with existing users is more important than ever, since customer loyalty results in higher usage rates as well as lower costs through customer retention (Kim, 2010).

Several studies in the past have investigated and identified various motivational factors affecting individuals' decision of accepting a mobile technology. However, there still remains a gap in the literature regarding the motivators related to post-acceptance. This thesis intends to fill this gap by empirically investigating the effects of behavioral activation system (BAS) and behavioral inhibition system (BIS) on users' intention to continue using a mobile application. Furthermore, by gaining considerable attention both in theory and in management practice, gamification has proven its advantages in a number of ways:

increasing customer engagement; crowdsourcing innovation; improving employee performance (Salcu & Acatrinei, 2013); and efficiency of human resources (Vinichenko, Melnichuk, Kirillov, Makushkin & Melnichuk, 2016). For these reasons, companies embed gamified features into their mobile services and products in order to encourage engaged and continued use of a mobile technology. This study also aims, therefore, to investigate the effectiveness of gamification related to different elements of behavioral activation and behavioral inhibition systems on information systems continuance.

The determinants of technology acceptance have been one of the most researched topics in the information systems literature and technology acceptance model (TAM), theory of reasoned action (TRA) and theory of planned behavior (TPB) have established the basis for these studies. However, there is still a lot to discover in regard to post-acceptance behaviors of individuals since not just the adoption of a technology but also continued use of individuals play a distinctive role for firms such as internet service providers, online retailers and other online companies that wish to survive. Building on the technology acceptance model (TAM), theory of reasoned action (TRA) and theory of planned behavior (TPB), Bhattacherjee (2001) proposed a model; information systems continuance (IS continuance) to explain antecedents of post-adoption. To further elaborate on the difference between initial acceptance and continuance, it is critical to examine those psychological motivators that become effective after individuals accept a certain technology (Hong, Kim & Lee, 2008).

The objective of this thesis is to gather deep insights into what ways users of gamified mobile applications are motivated for continued use. Post-acceptance

motivators rather than initial adoption motivators are the main subject of this study. This thesis is a cross-disciplinary study of psychology and information systems and the aim is to focus on the motivational factors that are presumed to be the most effective in customers' continuance intention after they decide to adopt and use a gamified mobile application. Specifically, the goal of this study is to find meaningful answers to the research questions stated below:

Research Question 1: What is the different type of motivators that are closely related to individuals' satisfaction with a gamified mobile application?

Research Question 2: What is the different type of motivators that are closely related to individuals continued use behaviors in a gamified mobile application?

Research Question 3: Which motivators are the most effective in predicting individuals' satisfaction with a specific gamified mobile application?

Research Question 4: Which motivators are the most effective in predicting individuals' post-acceptance behaviors, namely; continuance intention with a specific gamified mobile application?

Research Question 5: Are there any differences between different type of motivators in relation to customers' satisfaction and information systems continuance?

The remainder of this thesis proceeds as follows. In Chapter 2, theoretical background will be presented and relevant literature related to gamification, information systems continuance and behavioral motivation systems will be surveyed. In Chapter 3, the qualitative study will be presented and its findings will be explained. Next, in Chapter 4, a series of hypotheses will be formulated and the

research model will be provided. In Chapter 5, the research design will be presented along with the selected data collection method. The result of the data analysis and hypotheses testing will be provided in Chapter 6. In chapter 7, the study's key findings will be discussed. Finally, in Chapter 8, the concluding remarks will be given, implications for managers and researchers will be provided and both future research ideas and limitations of the study will be outlined.

CHAPTER 2

THEORETICAL BACKGROUND

2.1 Gamification

Gamification emerged as a trend many years ago, and more and more companies have used gamification techniques to capture opportunities over recent decades. Gamification has many definitions in the literature, which have much in common. Deterding, Dixon, Khalled and Nacke (2011) define gamification as "the use of game design elements in non-game contexts" (p. 9). Dominguez et al. (2013) defines gamification as incorporating game elements into a non-gaming software application to increase user experience and engagement and Swan (2012) gives a general definition of gamification as the process of including game elements to various platforms, programs or processes that don't normally involve such concepts.

Focusing on added value, Huotari and Hamari (2017) propose the following definition: "Gamification refers to a process of enhancing a service with affordances for gameful experiences in order to support users' overall value creation" (p. 25). Kim (2015b) agrees on the clear difference between a game and gamification, by indicating that the latter does not exactly have the purpose of the creation of the former, but it involves the transferal of its positive qualities to a platform which is not a game and for this particular reason, it is called gami-"fy"-ing.

The concept of "gamification" has been introduced to our lives not many years ago, however we can't say that we were absolutely unfamiliar with the elements of gamification, since we are used to many examples of them in the past. We have seen many examples of gamification in everyday lives of individuals who

have not yet been introduced to online products and services. Military badges, newspaper coupons, educational rewards, marketing loyalty programs etc. laid the foundation of gamified features in our offline lives many decades ago. Rapid technological advancements fueled this involvement and, with the dramatic increase in smartphone adoption levels, mobile web usage and intensive social media influence on everyday lives, came the era of "gamified world". Examples of gamification can be seen back in ancient times, in the Olympic Games where winners earned an olive-leaf crown as a reward. Those who won the game three times achieved the honor of getting their own statues displayed in Olympia symbolizing their status (Kim, 2015b).

2.1.1 The tool kit of gamification

The tool kit of gamification consists of several components that are similar to the building blocks of a game. The interest in gamification was initially driven by the observation that people are highly engaged while playing games, and this enthusiasm continues for a significant amount of time (Insley & Nunan, 2014). Therefore, the same motivational techniques that are used in video games are commonly applied to a non-game context (Paharia, 2013). Users tend to feel so involved in games that they allocate a lot of time on them regardless of the amount of free time they actually have. Furthermore, during the time they spend on playing games, they tend to care less for anything else that happens in their surroundings. This high involvement and interest of individuals in games have eventually caught the attention of marketers and an opportunity to translate them into a non-game platform has been exploited.

Businesses are encouraged to leverage it to learn a lot from games since they are very powerful in engaging people (Paharia, 2013). Since gamification is a very powerful tool for increasing user engagement levels, the number of companies exploiting these techniques is increasing daily as part of their marketing and promotion activities (Kim, 2015b). It has been explained that gamification is most frequently used in marketing domains to enhance brand image and increase customer loyalty (Blohm & Leimeister, 2013). However, achieving positive results with its successful implementation presents many opportunities for various other types of business divisions as well.

By incorporating game design elements with interesting, IT oriented and other related features, gamification has come up with an innovation. New business alternatives have presented themselves as a consequence of improvements in digital technologies and the establishment of new mobile platforms where gamified elements can be added. Gamification aims to enhance the core-offer by delivering emotional and social experiences where game design elements are bundled with complex, IT-based services (Blohm & Leimeister, 2013). It intends to trigger individual's motives in a way which eventually influences their behaviors, and for this reason, it is accepted as quite persuasive (Petkov, Köbler, Foth, Medland & Krcmar, 2011).

Breaking automatized habits is never easy since individuals tend to stick to them for an incredible amount of time even though they sometimes bring no additional value in terms of enhancing their quality of life. Furthermore, in some cases, individuals are fully aware about the uselessness or even harmfulness of certain habits, but they are still unable to quit them easily even though they really

want to. Therefore, it would not be incorrect to say that habits have strong foundations, which are very hard to change. Gamification has a high potential for modifying habitual behaviors, and for supporting the addition of new behavior patterns as a result of positive emotional feedback (Blohm & Leimeister, 2013). With the appropriate stimuli, these behavioral changes are expected to occur; and by fostering positive emotions, gamification enables the breakage of present habits, replacing them with new ones and maintaining the newly established ones by continuously presenting suitable incentives (Ortiz de Guinea & Markus, 2009)

Increased usage of smartphones and social media as well as improved data services resulted in users adopting gamification elements very quickly and getting used to them very easily. Individuals' positive perceptions of gamified mobile applications and their good reactions to new game-like features made marketers realize an important opportunity for their businesses. Certain goals of marketers for adopting a gamification strategy include; fostering innovation, stimulating customer engagement, increasing frequency of usage and changing or modifying behaviors. It is stated that gamification supports and enables the transformation of organizational value creation processes and it's most frequently used in marketing domains to increase customer loyalty and improve brand image (Blohm and Leimeister, 2013).

2.1.2 Gamified mobile application examples

Humans are genetically coded as individuals who like to gather and collect items, look for ways to improve their social ranks, compete with others to earn the highest rewards as well as socialize and collaborate on certain occasions with others. By utilizing these characteristics, gamification has provided an incredible number of

8

success stories (Salcu & Acatrinei, 2013). There are many different examples in which gamified features are implemented in various contexts such as e-commerce, health, well-being, airline transportation, social media apps and so on.

Nike Run Club mobile application is a great example, providing a means for users to track their running progress, see their athletic performance history and rankings among friends, collect Nike Fuel as they practice, and earn badges and trophies when they reach milestones as a symbol for their achievements. Moreover, they are encouraged to share their running activities among their friends and socialize with them while competing for a better status in the leaderboard. In doing so, they can see each other's Nike fuel, track their weekly and monthly athletic progress, reach new levels as they continuously practice. These new levels can be distinguished by the color of their status. Each level in the app has a certain specified color which shows the user's current status in terms of the kilometers that have been run by the user. For instance, green level indicates that the user ran 250 kilometers in total, whereas blue level indicates that the user ran 1000 kilometers and so on. This way users of the app are encouraged to run more and reach new levels and colors.

Best accomplishments are recorded in Nike Run Club application and new awards and badges are unlocked as users earn certain achievements. For instance, best scores of users' runs are recorded and updated when the person achieves a better score. Some examples are; farthest run; which indicates the most kilometers the user has achieved in a single run, longest run; which indicates the longest time that the user ran in a single time, fastest 5K which indicates the shortest time the user spent running 5k in a single run. There are also badges that runners can earn such as; "40K Month" which indicates that the user ran 40 kilometers or more in a month, "3

Streak" which indicates that the user ran 3 times in a week, "6-Month Streak" which indicates that the user ran 6 months in a row.

There are also some special badges that are earned as a symbol for celebration times such as; "True Runmance" which can be earned only when the user runs on valentine's day, "Run the World" which can be earned only when the user runs on international women's day. Additionally, users can also join various challenges in which they try to complete certain tasks in a specified duration, and in which they compete not just with their friends but also the whole Nike community who are actively using the mobile application. Users of the Nike+ app can also congratulate each other for their achievements.

We see various other mobile applications in which gamification is exploited in order to increase customer engagement and capture users' interest in the products or the services. Foursquare Swarm, Facebook Places and Starbucks mobile app are some of the most famous examples in which users are motivated to do certain actions more often by being exposed to game-like features. For instance, in the Swarm app, individuals can check in at the places that they visit, create a personal record of their experiences, see where their friends have been to, and earn points and badges as a reward for being a more active user. Facebook Places on the other hand, rewards its editors' community for contributing to the information pool about the places that they are knowledgeable about. Users can see where they stand in the competition based on total points they have collected depending on their contribution in the community as well as earn badges and reach status levels as they move up the leaderboard.

Starbucks implements a similar gamification strategy where it offers not only intangible rewards but also tangible rewards such as free food or drinks that can be redeemed by the stars that users collect with each transaction they make. Users are encouraged to get a prepaid Starbucks card and continue using their mobile application each time they purchase something from Starbucks. Immediate rewards are presented to the users which fosters their sense of achievement and their loyalty is fueled in return.

Online and mobile platforms in different sectors are being discovered and experimented continuously in leveraging gamification as a way to motivate and encourage customers with intriguing game-like features and rewards for certain aims such as; marketing, promotions, customer loyalty and engagement (Kim, 2015b). It is highly recommended that companies should embrace and leverage the power of gamification in their loyalty systems (Paharia, 2013) and, as can be seen from the aforementioned examples, more and more industry giants are embedding game mechanics into their businesses with the aim of increasing engagement and boosting customer retention. Additionally, there is an increasing trend of online retailers' exploration of the application of game techniques to create reward mechanisms and position online shopping as an activity entailing an entertainment aspect (Insley & Nunan, 2014).

Some consumers like to track statistics related to their personal progress, receive rewards for their accomplishments, learn from their experiences, and compete and collaborate with others while socializing at the same time (Salcu & Acatrinei, 2013). Gamified software services and products are found to encourage individuals to complete specific tasks, with the following results: establishing

optimism, by means of an increased sense of achievement and positive feelings; boosted user satisfaction, which results from users' envisioning their own advancements and emotions related to individual progress of performance; fostering social interaction; a feeling of belonging to a community with similar purposes; facilitating the learning progress, as a result of skill improvement by completing specific subtasks of gamification and going even further up in reaching new difficulty levels; and finally improved problem solving, as a result of achieving higher status and going beyond personal goals (Harman, Koohang & Paliszkiewicz, 2014). Even though gamification has proven to be very successful in providing positive and effective results, it does not automatically trigger users' motivations or improve customer engagement (Kim, 2015a).

In effectuating the fundamentals of gamification, certain user motivations are activated by core offer providers with the aim of invoking particular behaviors and influencing the users towards pre-defined objectives (Blohm & Leimeister, 2013). Individuals' positive perceptions of gamified mobile applications and their highly involved reactions to game-like features made businesses realize an important opportunity. It is, however, crucial to aim for the right motivations that would trigger the right actions and target the required objectives. Including gamification in a mobile application with the sole purpose of including it, is likely to result in limited success. Companies should implement gamification very carefully with the aim of focusing on the motivations of the target group, and putting forth a strategy that is in alignment with the main business goals.

When the target group is presented with attractive rewards and other game elements that most appeal to their motivations, a significant increase in their interest

on gamification is expected (Kim, 2015a). Many companies consider implementing gamification in their core businesses, but it is crucial to exploit this opportunity in the right way, since applying it inadequately might entail difficulties and result in crushed profits as well as decreased customer satisfaction. Gartner (2012) predicted that 80% of the gamified mobile applications would result in failure because of insufficient adjustments and improper design. Now we see that this prediction has become an undeniable reality. When designing gamified platforms, it is therefore important to aim for the right motivational factors that will increase customer satisfaction as well as assure information systems continuance by individuals. This thesis aims to explore and bring light to this issue in order to help identify the right motivations for this purpose and suggest beneficial managerial implications on how to handle them.

2.2 Initial adoption and post-adoption of technology

Mobile services involve unique characteristics and mobile application providers are facing various problematic issues related to low levels of success in assuring a high rate of loyalty of its users. Low profits due to an inability to maintain customers' continued use challenge many different types of businesses to survive in the mobile world. In marketing and information systems disciplines, continuance usage is considered to be more critical rather than initial acceptance in terms of eventual success (Venkatesh & Davis, 2000). Maintaining existing relationships with customers in the long term is particularly important, not just because it is more likely to see loyal customers use the service more actively and continuously, but, also because of the lower cost to retain them (Thong, Hong & Tam, 2006). It has been

suggested that it costs five times more to retain an already existing customer than to acquire a new one (Reichheld & Schefter 2000).

The body of research related to post-adoption behaviors of mobile customers has received less attention in the past than initial adoption behaviors (Zhou, 2011). Research interest in IS continuance, however, is growing, and there is still a lot to discover in this respect. Since initial studies considered continuance as an extended part of adoption, they didn't focus on factors related to post-adoption. As a result, they failed to reveal the reasons behind individuals' abandonment following their initial technology acceptance (Jin, Lee & Cheung, 2010). According to mobile service providers, initial adoption reflects the acquisition of potential users who can be later converted to actual users; post-adoption, on the other hand, reflects retention of existing customers who can be converted to loyal users (Zhou, 2011).

2.2.1 Technology acceptance model

In explaining user acceptance of technology, significant developments have been proposed in the past and technology acceptance model (TAM) (Davis, 1989, Davis, Warshaw & Bagozzi, 1989) strengthened its establishment as the basis for most of these studies. According to TAM, perceived usefulness and perceived ease of use determine individuals' attitude towards using a system, whereas their attitude and perceived usefulness jointly determine their behavioral intention (BI). Finally, the degree of BI determines individuals' actual system use as can be seen in Figure 1.
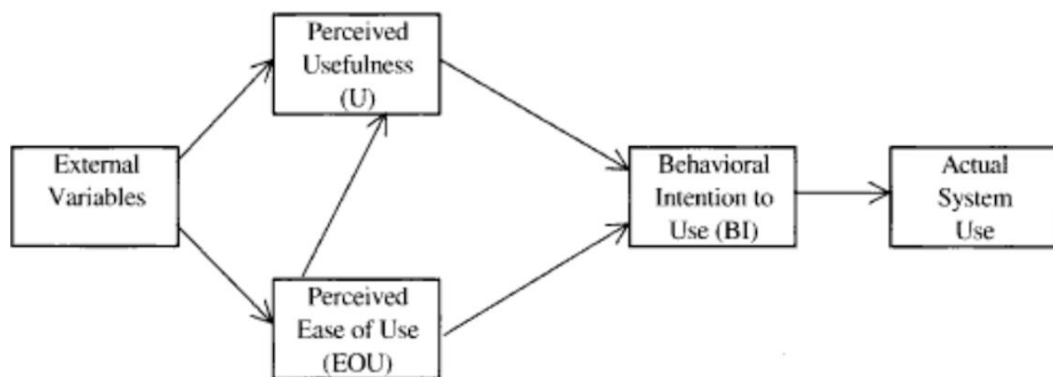
Figure 1. Technology acceptance model

2.2.2 Expectation-confirmation theory

Expectation-Confirmation Theory (ECT), first developed by Oliver (1980) as shown

in Figure 2, is commonly acknowledged in marketing literature in order to explain

customers' satisfaction and their purchase intentions (Venkatesh, Thong, Chan, Hu,

& Brown, 2011). ECT indicates that satisfaction, confirmation related to initial

expectations, and perceived performance of the product determine individuals'

behavioral intention to reuse it. In the early stages, consumers have an initial

expectation of a product before they actually have the chance to use it. After they use

the product, they compare their former expectations to the performance of the

product and this evaluation phase is defined as the confirmation stage, where they

assess whether their initial expectations are met and to what extent. The level of their

15

confirmation determines their satisfaction, which later plays an important role in repurchase intention.
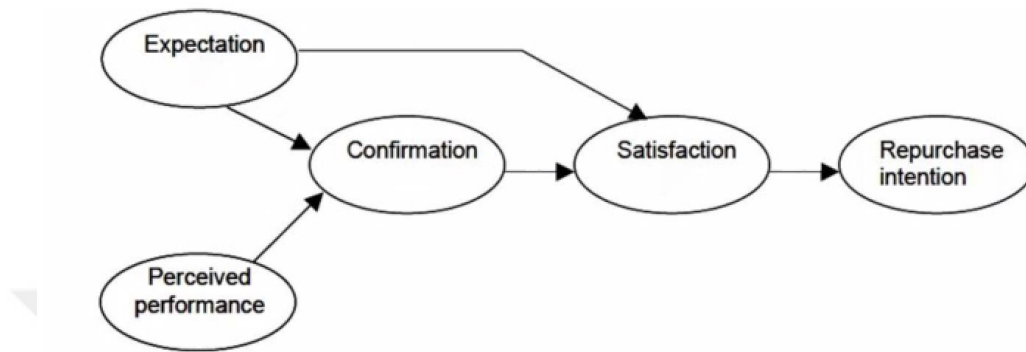
Figure 2. Expectation – confirmation theory

2.2.3 Information systems continuance

Customers' technology acceptance is a pre-condition for achieving IS success, but their continuance intention is a must to assure the permanence of this success in the long term. Bhattacharjee's model of IS continuance which adapted Expectation-Confirmation Theory (ECT), postulated by Oliver (1980) from consumer behavior literature, is actually similar to the model of information systems acceptance, also known as technology acceptance model (TAM), which adapted the theory of reasoned action (TRA), formulated by Davis, Bagozzi and Warshaw (1989) from social psychology (Bhattacharjee, 2001). TRA as shown in Figure 3 suggests that an individual's behavioral intention determines his or her performance related to the behavior in question, and the individual's attitude and subjective norms determine his or her behavioral intention (Al Gahtani & King, 1999). Drawing on TRA, the

technology acceptance model was first formulated by Davis (1986) with the goal of explaining users' initial acceptance behavior of information systems.
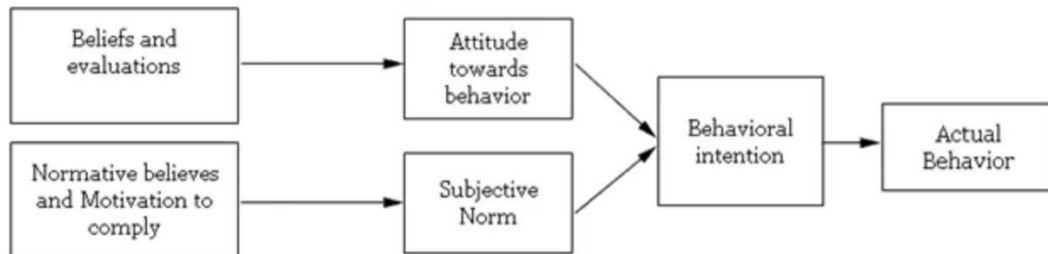
Figure 3. Theory of reasoned action

According to Bhattacherjee (2001), information systems continuance and consumers repurchase behaviors illustrate similar decision paths. However, information systems continuance is in a way different from ECT since the emphasis is only on the factors related to post-adoption behaviors of consumers. The information systems continuance model, proposed by Bhattacharjee (2001) introduced a new theoretical framework as an extension of expectation-confirmation theory including four different constructs; perceived usefulness, confirmation, satisfaction and IS continuance intention as shown in Figure 4.
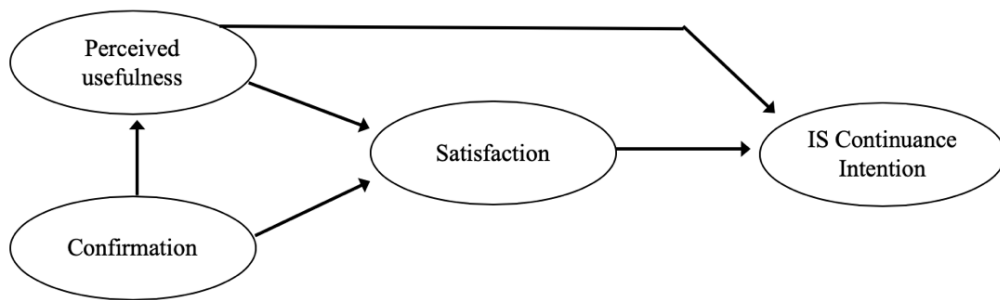
Figure 4. Information systems continuance model

This model explains the post-acceptance behaviors of individuals related to their intention to continue using a particular information system. In the confirmation stage, consumers evaluate whether their initial expectations have been sufficiently met after they accept and use the technology. The degree of their confirmation affects their satisfaction with the system as well as their perception of its usefulness. Thus, perceived usefulness and satisfaction jointly determine their intention to continue using the system.

2.3 Behavioral motivation systems

Behavioral motivation systems have been researched in the literature thoroughly in various contexts but there is still a lot more to discover about motivations in the field of information systems. Gray's (1987) theory posits that there are two distinct dimensions of personality: "anxiety," which indicates sensitivity of the behavioral inhibition system (BIS) in response to stimuli associated with punishment; and "impulsivity" which indicates sensitivity of the behavioral activation system (BAS)

in response to stimuli associated with reward. BAS, which is also referred to as "approach motivation", is mostly related to positive consequences whereas BIS which is also referred to as "avoidance motivation", is mostly related to negative consequences (Arnold & Reynolds, 2012).

According to Gray (1978, 1981, 1990) BIS triggers negative feelings such as fear, anxiety and frustration; whereas BAS triggers positive feelings, such as hope, elation and happiness provided that the person is exposed to given cues. Since BAS and BIS reflect different structures in the nervous system, it is expected that individuals with a variety of combinations of high and low BIS and BAS sensitivity levels would exist in a given population (Carver & White, 1994). It is also expected that high BAS sensitive individuals would be responsive to rewarding cues and experience positive affect as a result, whereas high BIS sensitive individuals would be responsive to punishment cues and experience negative affect as well as anxiety as a result.

Many types of addictive behaviors have been researched in the literature with respect to behavioral inhibition system and behavioral activation system and it has been found that BAS was associated with addictive behaviors such as alcohol and drug use, whereas BIS was associated with the frequency of self-reported drug use (Voigt, Dillard, Braddock, Anderson, Sopory, & Stephenson, 2009). Both motivations have been found to correlate highly with Internet addiction of college students (Yen, Ko, Yen, Chen & Chen, 2009).

In contrast, gamification has the aim of establishing some sort of a positive addiction in individuals. However, since behavioral inhibition system and behavioral activation system have been closely linked to addictive behaviors in the literature, it

can be expected that they also might play an important role in continued use of

gamified mobile applications.

CHAPTER 3

QUALITATIVE STUDY

In order to gather insights deeper into the concept of gamification, qualitative interviews with 5 respondents were conducted. These 5 respondents were selected randomly to participate in the interviews. In these interviews, the general aim was to have a better understanding of mobile application users' perceptions related to gamified features of a mobile application and in return establish a better basis for formulating the hypotheses for the quantitative analysis. The questions that were included in the qualitative interviews can be found in Appendix A. All answers from the respondents for the qualitative interviews can be found in Appendix B.

As can be understood from the interviews, participants classify gamified mobile applications as mobile applications that offer users a platform where they can earn points, badges, coins and where there is usually a ranking between other users, a target to be achieved and competition. Interviewees indicated that they mostly prefer mobile applications as the gamified platform and iOS as the operating system for using it. Respondents stated varying perceptions about gamified mobile applications, some thinks of them as fun whereas some others don't like the commercial aspect of it:

"They are fun."

"Easy and fun to use."

"I am ok with it as long as the targets are more for my benefit than revenue flow for the app. When I feel that the gamification is used to rip money, then I stop using it. Such was the case for Kardashian. But Nike+ was good, because it made me compete with other friends and there was no obvious commercial benefit for Nike."

During the interviews, participants claimed that they had different reasons for their satisfaction with the gamified features, such as competition, rewards, etc. whereas some of them believed that gamification had no effect on their satisfaction:

"I get satisfied from competition. That is why competitive features are the most important for me."

"I don't think the gamified features have an effect of my satisfaction."

"Gamified apps make me more addictive and loyal to the app. The motivation increases more when there is gamification and even competition between users. This is my satisfying."

"Gaining coins and the sound it makes." (referring to the sound cue in Swarm app when the user earns coins)

One of the participants thinks that drive has a positive effect on her/his satisfaction which happens when the app sets a purpose or a target for the user:

"I get the satisfaction when I reach my set target, and when I believe that target is for my benefit or for my pleasure rather than the app owner's."

On the contrary, another participant stated that gamification has a negative effect on her/his satisfaction which can be linked to behavioral inhibition system:

"I haven't experienced any satisfaction on the contrary I feel pressured when I look at the leaderboard and see myself behind my friends."

The same participant continued and stated the following in regard to his/her continuance intention:

"Gamification discourage me to use the app because of the reason I specified earlier."

However, on the other hand, another interviewee stated the following related to her/his continuance intention with the mobile application:

"Gamification increases the frequency of my usage. Motivation comes from constant urge to check where I am against competition. Competitiveness creates the motivation."

We can conclude that some of the gamified features have a positive effect on some users' satisfaction and continuance intention but for some others they tend to have a negative effect.

In general, participants evaluated gamified mobile applications positively most of the time and stated that they were mostly motivated by sending challenges to friends, earning coins and other types of rewards and competition in a gamified mobile application. On the contrary, negative comments were made by some of the respondents related to certain elements of gamified mobile applications. These

elements such as intense competition was noted as a factor that could affect their decision to avoid using these applications.

In depth interviews were conducted before the quantitative analysis to gather initial insights related to the research questions provided in the introduction section and the intention was to have a deeper understanding of the subject in question before moving on to formulating the hypotheses. In-depth interviews were conducted with 5 randomly selected individuals and valuable insights were gathered as a result.

CHAPTER 4

RESEARCH MODEL AND HYPOTHESES

4.1 Behavioral activation system

BAS is associated with individuals' sensitivity to rewards and positive stimuli and it is linked to positive emotions which influence actions toward positive outcomes (Carver & White, 1994). We can say that gamification, as previously explained, involves elements that are closely related to these motivations and it has the aim of establishing some sort of a positive addiction in individuals which intends to foster continued use of a technology.

Given that individuals with high BAS are more sensitive to positive and rewarding stimuli, it is expected that there might be a positive association between BAS and users' satisfaction as well as their intention to continue using gamified mobile applications. BAS has three subscales, namely Reward Responsiveness, Fun Seeking and Drive.

Reward Responsiveness indicates the anticipation of a reward and a positive response to it when achieved, drive denotes the expectation of achieving a rewarding goal and it is indicated as "the persistent pursuit of the desired goals" (Carver and White, 1994, p. 322). Fun Seeking on the other hand reflects the motivation to seek out novel rewards (Chen, Zhang, Gong, Zhao, Lee & Liang, 2017) and "a willingness to approach a potentially rewarding event on the spur of the moment" (Carver & White, 1994, p. 322). As it is expected that sub-scales of behavioral activation system will positively influence satisfaction and continuance intention, related to research questions 1 and 2, the following hypotheses are stated:

25

Research Question 1: What is the different type of motivators that are closely related to individuals' satisfaction with a gamified mobile application?

Research Question 2: What is the different type of motivators that are closely related to individuals continued use behaviors in a gamified mobile application?

H1: Reward Responsiveness will be positively related to satisfaction.

H2: Reward Responsiveness will be positively related to IS Continuance Intention.

H3: Drive will be positively related to satisfaction.

H4: Drive will be positively related to IS Continuance Intention.

H5: Fun Seeking will be positively related to satisfaction.

H6: Fun Seeking will be positively related to IS Continuance Intention.

4.2 Behavioral inhibition system

Behavioral inhibition system reflects sensitivity to punishment, and anxiety proneness. Individuals with high BIS tend to be more sensitive to negative stimuli and they try to avoid negative feelings and outcomes (Carver & White, 1994). Previous research has revealed that individuals with high avoidance motivation search for experiences that decrease their level of anxiety and negative emotions (Carver & White, 1994). For instance, a study by Arnold and Reynolds (2012) indicated that both approach and avoidance motivation led to positive emotions and evaluations by shoppers in a retail context. The reason for this was explained by shopping being recognized as an activity which has an "escapist" quality that individuals seek in order to avoid problems in their life for a certain period of time.

Gamified mobile applications tend to provide users a platform where they can clear their heads by enjoying themselves with game-like mechanisms. Since it is offered in a virtual environment, however, it may not have the same "escapist" value that a retail shop has, since the users' actual environment does not actually change by engaging in a gamified mobile application. Additionally, some individuals like competition, try to get to the top of a leaderboard, and gain more points than others, while others try to avoid it whenever they can. This is because they have a fear of losing the respect or affection of others at the end of a competition either by losing or winning it (Ryckman, Thornton & Gold, 2009). For these individuals, the repelling features of a competitive platform might bring in frustration, anxiety, feelings of being left out, feelings of incompetence and so on. Consequently, since individuals with high avoidance motivation tend to avoid unwanted situations we can also expect that there might be a negative association between BIS and users' satisfaction as well as their intention to continue using gamified mobile applications.

To clarify the distinction between difference between different behavioral motivators and to further elaborate on the research questions 3, 4 and 5, the following hypotheses are stated:

Research Question 3: Which motivators are the most effective in predicting individuals' satisfaction with a specific gamified mobile application?

Research Question 4: Which motivators are the most effective in predicting individuals' post-acceptance behaviors, namely; continuance intention with a specific gamified mobile application?

Research Question 5: Are there any differences between different type of motivators in relation to customers' satisfaction and information systems continuance?

H7: BIS will be negatively related to satisfaction.

H8: BIS will be negatively related to IS Continuance Intention.

4.3 Research model

This study is cross-disciplinary where information systems continuance model developed by Bhattacherjee (2001) and Gray's theory of behavioral motivation systems (1987) are integrated to find which motivators are most influential in predicting individuals' satisfaction with a gamified mobile application as well as their continuance intention. Since it is hypothesized that these motivators could be affecting customers' satisfaction as well as their continuance intention, the following research model in Figure 5 is developed.
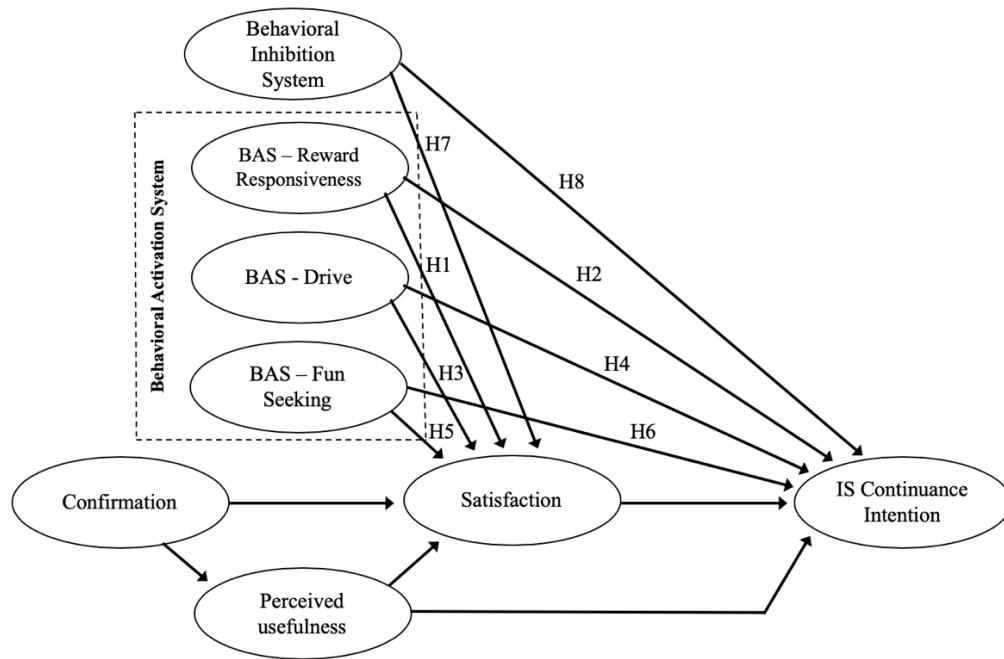
Figure 5. Research model

CHAPTER 5

RESEARCH DESIGN AND DATA COLLECTION

5.1 Research design

This study intends to measure BAS and BIS sensitivities of individuals in addition to their perceived usefulness, confirmation, satisfaction and continuance intention related to a gamified mobile application service. This thesis utilizes in depth interviews for the initial qualitative section of the study and survey-based methodology for the quantitative section. For the interview part of the study, interviewees were selected randomly and their written answers were recorded to gather valuable insights. Later, for the quantitative part of the study, survey method was used where the respondents were again selected randomly. To establish the survey, BIS-BAS scale developed by Carver and White (1994) was used to assess the various sensitivity levels of BAS and BIS of people. Behavioral inhibition system scale has seven items related to the anticipation of punishment whereas behavioral activation system has thirteen items in total related to the anticipation of a reward. Out of thirteen items, drive has four items, fun seeking has four items and reward responsiveness has five items.

To assess individuals' levels of confirmation, perceived usefulness, satisfaction and continuance intention in a gamified mobile application, information systems continuance model scale was used, developed by Bhattacherjee (2001). Information systems continuance intention has three items related to individual's intention to continue using an information technology. Satisfaction has four items related to individuals' level of satisfaction with the mentioned information systems.

Perceived usefulness has four items related to individuals' perception of the gamified mobile application as improving their performance and effectiveness. Confirmation has four items related to individuals' level of confirmation based on their previous expectations and experience with the selected information systems. The original scales were reworded to adapt to a gamified mobile application context as the selected information technology. A pre-test was conducted with randomly selected respondents to ensure the clarity of the modified scales. Respondents selected the items in a likert scale which had anchors ranging from strongly disagree to strongly agree. Several reverse coded items were recorded in the survey. The original scales can be found in Appendix C and D.

5.2 Data collection

Empirical data to test the research model was collected from university students from various faculties; including engineering, social sciences, arts and sciences and education faculties. The sample was from Boğaziçi University which is located in Eastern Europe with over 17000 students. The reason behind choosing university students was that millennial consumers' accessibility and technology acceptance are relatively high compared to mature consumers (Hur, Lee & Choo, 2017). Millennials are identified as individuals who were born between the years 1980 and 2000 (Donnison, 2007), and they are seen as a generation with increased accessibility to and familiarity with mobile technologies.

The survey was conducted offline and students were selected randomly. The sampling frame consisted of 40-50 students for each class section and up to 90 students in mass-exam sessions. The surveys were handed out at the beginning of

these sessions and they were completed in about 15-20 minutes. The participation for the survey was voluntary, there was no fee or prize offered to the participants. The answers to the questionnaire were kept confidential and they were collected anonymously. Information such as name, surname, date of birth, identity number, sex, age, marital status, child status, household income and education level were not requested from the participants in the survey. For this reason, participation did not involve any risk of involvement confidentiality.

Out of 400 surveys that were distributed, a total of 314 responses were received out of which 12 (3.8%) of them were excluded. These respondents were not included in the analysis since they indicated that they had never used a gamified mobile application before. According to their first answer related to their experience with a gamified application, their further answers were considered. Since our research model is focused on post-adoption behavior of individuals, only the responses that have already accepted this technology before, were included in the analysis.

5.3 Pre-test

In order to make sure that all items were clearly understood, a pre-test was conducted to eliminate any type of ambiguities. First, the original scale items were reworded to adapt to the context of a gamified mobile application as the selected technology. These rewordings included only minor changes and synonyms of words to improve clarity as well as the replacement of the selected information technology to fit with the gamified mobile application context. Later, ten respondents were selected randomly to participate in the pre-test.

Participants were told to fill in the survey and while answering the survey questions they were asked to identify any of the items that they had a problem with in understanding. The respondents were also encouraged to give suggestions on clearing out ambiguities or improving the nature of the survey. As a result, there were no comments that lead to major changes in the survey. There were some suggestions on changing the wording of some of the items and as a result only minor updates were made to the survey items.

CHAPTER 6

DATA ANALYSIS AND HYPOTHESES TESTING

6.1 Data screening

6.1.1 Data examination

To start examining the data, the shape of the distributions was examined by looking at histograms of the variables and normal probability plots. The histograms were used to examine the metric variables. According to these, no major issue in terms of deviation from normality was identified. Descriptive statistics was also produced and it was found that all kurtosis values were between -7 and + 7 as well as all skewness values were between -2 and +2. Since there was no problematic issue related to nonnormality, no transformation was applied as a remedy.

6.1.2 Missing data

The survey was conducted offline and there were only a few cases where there was missing data. Since the number of observations with missing data was lower than 10 percent of the whole data, the missing values were candidates for deletion. The sample size was large enough (319) so that complete case approach was considered. Firstly, some of the missing data occurred in the dependent variable; information systems continuance and since it is recommended that cases that have missing data in dependent variables should be deleted to eliminate any possible false effect in relationships between independent variables (Hair Jr., Black, Babin & Anderson, 2009) these cases were deleted. Also, for the other few cases, the extent of missing data per case was larger than 90 percent (respondents either answered only the first

question or the first page and left the remaining of the survey as blank), complete

case approach was used again, therefore only the cases with complete answers were

included in the study. The number of cases left after deletion of the cases with

missing data were considered as sufficient for the SEM analysis.

6.1.3 Outliers

In order to identify outliers that are distinctly different from other variables in the

sample, univariate detection method was used. Standard scores of the variables were

calculated and they were filtered in ascending and descending orders to compare

across variables and detect the ones that are outliers. It is indicated that the threshold

value of standard scores are +-4 for sample sizes larger than 80 (Hair Jr., Black,

Babin & Anderson, 2009). According to this value, only 3 cases were identified as

outliers that were above this standard score and they were candidates for deletion

from the sample.

It is recommended that they should be kept in the sample unless they don't

establish a significant risk of distorting the analysis since deleting them would limit

the generalizability of the study even though it would enhance the multivariate

analysis (Hair Jr., Black, Babin & Anderson, 2009). Moreover, the analysis was

conducted with and without the outliers and there was not much difference related to

the R square values, therefore the outliers were kept in the analysis.

6.2 Methodology

In order to understand individuals' intention to continue using gamified mobile applications, this study measured BAS and BIS sensitivities as well as the degree of perceived usefulness, confirmation, satisfaction and continuance intention. The measures that were used in this thesis were adapted from previous studies. BIS-BAS scale proposed by Carver and White (1994) was used to assess the different sensitivity levels of BAS and BIS among individuals. BIS has a seven-item scale related to anticipation of punishment, whereas BAS has three sub-scales: Reward Responsiveness, which includes five-items related to anticipation of a reward; Drive, which includes four-item scale related to the pursuit of goals; and Fun Seeking, which includes four-item scale related to seeking novel rewards on impulse (Carver & White, 1994; Smits & Boeck, 2006). The original scales can be found in Appendix C and D.

Items in the original scales were changed slightly to fit with the context, and a pre-test was conducted to avoid any possible ambiguities. To make sure that all the survey items were fully coherent, ten students were randomly selected and they were asked to complete the final survey and comment on any of the items if they had any type of difficulty in understanding them. As a result, no major conflict appeared and only minor adjustments were found necessary to improve clarity. The resulting survey can be found in Appendix E.

All items in the survey were assessed including BAS and BIS items (Carver & White, 1994) based on a seven-point Likert scale (Park, Van Dyne & Ilgen, 2013) as well as IS continuance items (Bhattacherjee, 2001) in order to gather sufficient psychometric results.

36

Structural equation modeling (SEM) was used in this study since it enables researchers to get answers for several interrelated research questions in a single, systematic and comprehensive method by simultaneously modeling the relationships between several independent and dependent constructs (Tarka, 2018). Covariance-based SEM (CB-SEM) and Partial Least Squares SEM (PLS-SEM) are commonly used as different approaches in analyzing the relationships between multiple variables. Both methods have advantages and disadvantages due to their varying estimation procedures and outcomes, therefore it is crucial to select the right method depending on the type of the study.

When choosing PLS or CB-SEM, it is important to determine if the research to be conducted is exploratory or confirmatory and PLS should be used for the former, whereas both methods can be used for the latter (Lowry & Gaskin, 2014). PLS fits better for a study that aims to develop theory rather than test it (Urbach & Ahlemann, 2010), and since in this study I had the aim of advancing theory rather than theory confirmation, PLS-SEM was used.

In order to conduct PLS-SEM analysis, I used Warp PLS software introduced by ScriptWarp Systems in 2009. This software entails various characteristics which are actually different than other similar software that offers equivalent analysis. For instance, it is stated that Warp PLS is the first and only software for structural equation modeling analysis that offers traditional PLS algorithms along with factor-based algorithms which allows to account fully for measurement error (Kock, 2018). This software also is the first and only of its kind that identifies couples of latent variables that are linked to nonlinear functions (Kock, 2018). Additionally, it is also indicated that factor-based algorithms are similar to CB-based SEM algorithms but

they offer additional value by bringing the "best of both worlds" together (Kock, 2018).

6.3 Assumptions

Covariance-based SEM method demands a number of assumptions to be met including normality of the distribution, required minimum sample size and so on, however, on the contrary PLS-SEM method is indicated as being very flexible, with high statistical power and almost no limiting assumptions (Hair, Ringle & Sarstedt, 2011).

Even though PLS-SEM method proves to be very flexible, the assumptions related to normality and outliers were nonetheless tested before starting the data analysis process. Normality is indicated to have serious influence in small sample sizes however when the sample size increases and becomes more than 200 cases, this effect decreases (Hair Jr., Black, Babin & Anderson, 2009). First of all, to conduct graphical analysis of normality, histograms were produced to examine the shape of the distributions of the variables. It was observed from the histograms that there was no major deviation from normality. According to these, it was stated that normality assumption was met and there was no need for data transformation.

Multicollinearity is essential to be checked to see if any of the independent variables in the model can be used to predict the other ones in the study. Even though PLS-SEM does not require this assumption to be met before running the analysis, since multicollinearity would have caused a problem in a multiple regression, nonetheless it was checked to see if there was a problematic issue. AVIF (average

block variance inflation factor) and AFVIF (average full collinearity variance inflation factor) were evaluated. These indexes increase when there is an addition of new latent variables to the model that might be overlapping and it is unacceptable when there is more than one latent variable that measure the same construct, therefore these variables should be united (Kock, 2018). Accordingly, this way predictive and explanatory quality of the study is expected to improve. It is recommended that both AVIF and AFVIF should be checked in a PLS-SEM study and they are acceptable if they are below 5 and ideal if they are below 3.3 (Kock, 2018). In this study AVIF was reported as 1.176 and AFVIF was reported as 1.361, therefore no problematic issue was detected.

Univariate detection of outliers was used in order to detect the ones that could prove to be problematic. To do this, standard scores of the variables were found and the ones that are distinctly different from other variables in the sample were identified. Boxplots were also examined to see if the results were similar related to the detected outliers, however there was no correspondence between the identified outliers.

The threshold value for outliers is +-4 for sample sizes above 80 (Hair Jr., Black, Babin & Anderson, 2009) and to identify the ones that are outside this limit, the standard scores were filtered in ascending and descending order, and the cases that met this criterion were detected. Finally, 3 outliers were identified, however, they were kept in the study since it is recommended to keep them if they are not truly aberrant and if they do not pose a risk of not being representative of any cases in the population in order to improve the generalizability of the study (Hair Jr., Black,

Babin & Anderson, 2009). Running the analysis with or without the outliers did not distort the analysis seriously and for this reason this assumption was also met.

6.4 Results

6.4.1 Measurement model

Composite reliability and Cronbach's alpha were used to assess the reliability of the measurements. According to Nunnally (1978) the threshold for Cronbach's alpha is 0.7, but it is also noted that values between 0.50 to 0.70 are an indication of moderate reliability (Hinton, Brownlow, McMurray & Cozens, 2004), while 0.6 and above is considered as marginally acceptable and sufficient for preliminary research (Hair, Anderson, Tatham, & Black, 2006; Gliner, Morgan & Leech, 2017). Since only two constructs had alphas slightly below 0.7 (BASD; 0.686 and BASF; 0.674) I decided to move on with this data for this research since composite reliability values were above 0.7 and the average variance extracted values were above 0.50 (Bogozzi & Yi, 1988). The variance explained for the constructs were as the following; R-squared coefficients of Perceived Usefulness (0.210), Satisfaction (0.197) and Continuance Intention (0.282). Latent variable coefficients including R-squared coefficients can be seen in Appendix F.

6.4.2 Confirmatory factor analysis

The statistical significance of the factor loadings of each of the constructs were verified using a confirmatory factor analysis. Table 1 shows that the factor loadings of the items, composite reliability and average variance extracted values were

sufficiently high in the measurement model indicating convergent validity, reliability and discriminant validity. The resulting table includes only the items that were kept in the analysis after evaluating the convergent validity and discriminant validity.

The table including all the combined loadings and cross-loadings for each of the constructs resulting from the confirmatory factor analysis can be found in Table 2. Loadings in the table are indicated as rotated and cross-loadings are oblique-rotated.

Table 1. Measurement validity and reliability

Factor	Items	Factor Loadings	α	AVE	CR
Perceived Usefulness	Using the mobile application, improves my performance in achieving my aim	0.918*	0.919	0.804	0.943
	Using the mobile application, increases my productivity in achieving my aim	0.888*			
	Using the mobile application, enhances my effectiveness in achieving my aim	0.919*			
	I find the mobile application to be useful in achieving my aim	0.862*			
Confirmation	My experience with using the mobile application was better than what I expected.	0.878*	0.794	0.710	0.880
	The service level provided by the mobile application was better than what I expected.	0.863*			
	Overall, most of my expectations from using the mobile application were confirmed.	0.784*			
Satisfaction	Please rate your feeling about the mobile application: very dissatisfied/very satisfied	0.747*	0.821	0.652	0.882
	Please rate your feeling about the mobile application: very displeased/very pleased	0.824*			
	Please rate your feeling about the mobile application: very frustrated/very contented	0.840*			
	Please rate your feeling about the mobile application: absolutely terrible/absolutely delighted	0.816*			
IS Continuance Intention	I intend to continue using the mobile application rather than discontinue its use	0.848*	0.706	0.632	0.837
	My intentions are to continue using the mobile application than use any alternative means (such as websites with similar offerings)	0.827*			
	If I could, I would like to discontinue using the mobile application.	0.703*			
BAS - Reward Responsiveness	When I'm doing well at something I love to keep at it	0.762*	0.849	0.624	0.892
	When I get something I want, I feel excited and energized	0.843*			
	When I see an opportunity for something I like I get excited right away	0.782*			
	When good things happen to me, it affects me strongly	0.812*			
	It would excite me to win a contest	0.746*			
BAS - Drive	I go out of my way to get things I want	0.622*	0.686	0.517	0.810
	When I want something I usually put my all energy to get it	0.747*			
	If I see a chance to get something I want I move on it right away	0.770*			
	When I go after something I use a "no limits" approach	0.728*			
BAS - Fun Seeking	I'm always willing to try something new if I think it will be fun	0.759*	0.674	0.508	0.804
	I will often do things for no other reason than that they might be fun	0.735*			
	I often act on impulse, without planning	0.607*			
	I crave excitement and new sensations	0.738*			
Behavioral Inhibition System	Criticism or scolding hurts me quite a bit	0.625*	0.755	0.509	0.837
	I feel pretty worried or upset when I think or know somebody is angry at me	0.739*			
	If I think something unpleasant is going to happen I usually get pretty "anxious"	0.830*			
	I feel worried when I think I have done poorly at something important	0.668*			
	I worry about making mistakes	0.687*			

Notes: * p < 0.001

Table 2. Confirmatory factor analysis

	BASD	BASF	BASR	BIS	C	PU	S	CI	Type (a	SE	P value
	0.622	0.174	-0.296	0.124	0.124	0.01	-0.032	-0.029	Reflect	0.052	<0.001
BASD2	0.747	-0.234	0.233	-0.027	-0.012	0.01	0.047	-0.12	Reflect	0.051	<0.001
BASD3	0.77	-0.02	0.239	-0.006	-0.019	-0.007	-0.038	0.095	Reflect	0.051	<0.001
BASD4	0.728	0.113	-0.239	-0.073	-0.074	-0.011	0.02	0.047	Reflect	0.052	<0.001
BASF1	0.14	0.759	0.227	0.023	0.025	0	-0.051	-0.016	Reflect	0.051	<0.001
BASF2	-0.011	0.735	-0.196	-0.066	-0.058	-0.058	-0.003	0.128	Reflect	0.052	<0.001
BASF3	-0.202	0.607	-0.237	-0.03	0.086	-0.005	0.009	-0.037	Reflect	0.053	<0.001
BASF4	0.032	0.738	0.157	0.067	-0.038	0.061	0.048	-0.081	Reflect	0.051	<0.001
BASR1	-0.142	0.022	0.762	-0.08	-0.012	-0.073	0	0.117	Reflect	0.051	<0.001
BASR2	-0.028	0.073	0.843	0.01	0.011	0.008	0.044	-0.068	Reflect	0.051	<0.001
BASR3	0.194	-0.038	0.782	-0.007	0.01	0.028	0.07	-0.071	Reflect	0.051	<0.001
BASR4	0.009	0.022	0.812	0.101	0.035	0.02	-0.087	0.03	Reflect	0.051	<0.001
BASR5	-0.036	-0.088	0.746	-0.032	-0.049	0.014	-0.028	-0.001	Reflect	0.051	<0.001
BIS2	0.027	0.066	-0.234	0.625	-0.069	0.178	0.046	-0.103	Reflect	0.052	<0.001
BIS3	-0.181	0.051	0.06	0.739	-0.116	0.109	0.12	-0.039	Reflect	0.051	<0.001
BIS4	-0.008	0.049	0.013	0.83	0.128	-0.082	-0.005	-0.06	Reflect	0.051	<0.001
BIS5	0.048	-0.036	0.333	0.668	-0.041	-0.047	-0.033	0.03	Reflect	0.052	<0.001
BIS7	0.135	-0.139	-0.191	0.687	0.073	-0.134	-0.133	0.179	Reflect	0.052	<0.001
C1	0.018	0.025	-0.038	0.033	0.878	-0.044	-0.019	0.038	Reflect	0.05	<0.001
C2	-0.062	-0.027	0.085	-0.047	0.863	-0.003	-0.08	-0.126	Reflect	0.05	<0.001
C3	0.048	0.002	-0.051	0.014	0.784	0.052	0.109	0.096	Reflect	0.051	<0.001
PU1	-0.016	0.017	0.015	0.033	-0.016	0.918	0.054	-0.034	Reflect	0.05	<0.001
PU2	0.03	-0.007	-0.083	0.006	-0.074	0.888	0.01	-0.062	Reflect	0.05	<0.001
PU3	-0.027	-0.009	0.039	-0.054	0.046	0.919	-0.033	-0.006	Reflect	0.05	<0.001
PU4	0.015	-0.002	0.029	0.016	0.044	0.862	-0.032	0.106	Reflect	0.051	<0.001
S1	0.123	-0.012	-0.087	0.072	0.183	0.031	0.747	0.162	Reflect	0.051	<0.001
S2	-0.022	0.053	-0.056	0.012	-0.065	0.075	0.824	0.117	Reflect	0.051	<0.001
S3	-0.03	-0.045	0.064	-0.045	-0.056	-0.061	0.84	-0.12	Reflect	0.051	<0.001
S4	-0.06	0.003	0.07	-0.031	-0.044	-0.041	0.816	-0.143	Reflect	0.051	<0.001
CI1	-0.004	0.032	0.057	0.027	0.073	0.022	0.021	0.848	Reflect	0.051	<0.001
CI2	0.012	0.033	-0.047	0.056	0.051	0.097	-0.04	0.827	Reflect	0.051	<0.001
CI3	-0.009	-0.078	-0.013	-0.098	-0.148	-0.14	0.022	0.703	Reflect	0.052	<0.001

It can also be seen in Table 3 that discriminant validity was verified since AVE of all constructs exceeded the squared correlation coefficients. Only two items from the BIS scale were removed to improve convergent validity and discriminant validity.

Table 3. Discriminant and convergent validity of constructs

	BASD	BASF	BASR	BIS	Confirmation	Perceived Usefulness	Satisfaction	Continuance Intention
BASD	**0.719**							
BASF	0.286	**0.712**						
BASR	0.403	0.310	**0.790**					
BIS	0.004	0.011	0.384	**0.713**				
Confirmation	0.148	0.067	0.216	0.055	**0.843**			
Perceived Usefulness	0.241	0.176	0.252	0.045	0.457	**0.897**		
Satisfaction	0.107	0.047	0.116	-0.042	0.370	0.310	**0.807**	
Continuance Intention	0.150	0.169	0.339	0.095	0.428	0.349	0.312	**0.795**

Notes: Square roots of average variances extracted (AVEs)are shown on diagonal

6.4.3 Structural model

PLS-SEM analysis was conducted in this study to understand the effects of BIS and BAS sensitivities on satisfaction and IS continuance intention in a gamified mobile application. The path coefficients for the research model are illustrated in Figure 6. All coefficients related to IS Continuance model (Bhattacherjee, 2001) were significant in the expected direction.
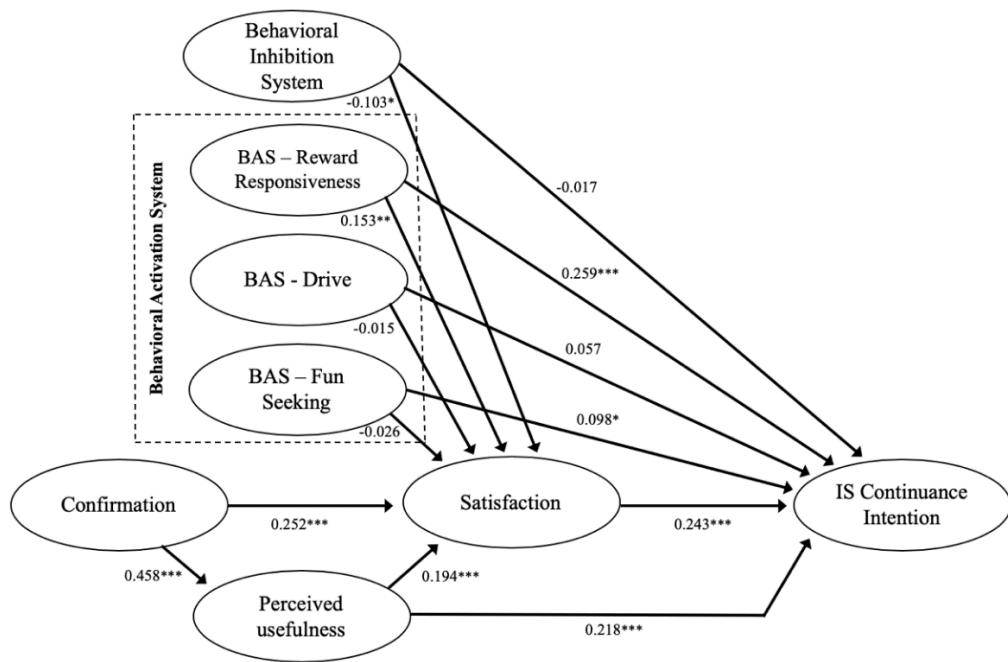
Figure 6. SEM analysis of the research model

The relationship between IS continuance intention and BAS-Reward Responsiveness, Satisfaction, BAS-Fun seeking and Perceived Usefulness were positive and significant ($\beta = 0.259$, $p < 0.001$, $\beta = 0.243$, $p < 0.001$, $\beta = 0.098$, $p < 0.05$, and $\beta = 0.218$, $p < 0.001$, respectively). The dependent variable did not have any significant relationship between Behavioral Inhibition System or BAS-Drive. While BIS had negative and significant association with Satisfaction ($\beta = -0.103$, $p < 0.05$), BAS-Reward Responsiveness, Confirmation and Perceived Usefulness had positive association ($\beta = 0.153$, $p < 0.01$, $\beta = 0.252$, $p < 0.001$, and $\beta = 0.194$, $p < 0.001$, respectively), whereas BAS-Drive and BAS-Fun Seeking did not have any significant association with Satisfaction. Finally, the results show that Confirmation had positive association ($\beta = 0.458$, $p < 0.001$) with Perceived Usefulness. All path coefficients and p values, standard errors for path coefficients and effect sizes for path coefficients can be found in Appendix G (see Table G1, Table G2 and Table G3).

Consistent with H1 and H2, BAS Reward Responsiveness was positively related to satisfaction and IS Continuance Intention. Results in Figure 3 indicate that BAS Drive was not significantly related to either satisfaction nor IS continuance intention, and this is contrary to our predictions, H3 and H4 were not supported. H5 predicted that BAS Fun Seeking will affect satisfaction positively. H5 was not supported, but since BAS Fun Seeking was significantly related to IS Continuance Intention, H6 was supported. Results indicated that BIS was negatively associated with satisfaction, thus providing support for H7, but BIS was not significantly associated with IS Continuance Intention, so H8 was not supported. Table 4 summarizes the status of the hypotheses.

Table 4. Summary of hypotheses

Hypotheses	Result
H1: Reward Responsiveness will be positively related to satisfaction.	Supported
H2: Reward Responsiveness will be positively related to IS Continuance Intention.	Supported
H3: Drive will be positively related to satisfaction.	Not Supported
H4: Drive will be positively related to IS Continuance Intention.	Not Supported
H5: Fun Seeking will be positively related to satisfaction.	Not Supported
H6: Fun Seeking will be positively related to IS Continuance Intention.	Supported
H7: BIS will be negatively related to satisfaction.	Supported
H8: BIS will be negatively related to IS Continuance Intention.	Not Supported

6.4.4 Model fit and quality indices

It is recommended that the *p* values for APC and ARS should be both significant at the 0.05 level and AVIF is acceptable if it is lower than 5 and ideal if it is lower than 3.3 (Kock, 2018). Adequate model fit was indicated as *p* values of both APC and ARS were lower than 0.05 (*p = 0.001* and *p < 0.001* respectively) and AVIF was 1.176. An acceptable Q-squared coefficient is indicated as the coefficient being greater than zero (Kock, 2018). Accordingly, predictive validity was assessed by confirming that the Q-squared coefficients for endogenous latent variables were all above zero. All model fit and quality indices from the PLS SEM analysis can be found in Table 5.

Table 5. Model fit and quality indices

	Value
Average path coefficient (APC)	0.161
Average R-squared (ARS)	0.229
Average adjusted R-squared (AARS)	0.218
Average block VIF (AVIF)	1.176
Average full collinearity VIF (AFVIF)	1.361
Tenenhaus GoF (GoF)	0.377
Sympson's paradox ratio (SPR)	0.769
R-squared contribution ratio (RSCR)	0.992
Statistical suppression ratio (SSR)	1
Nonlinear bivariate causality direction ratio (NLBCDR)	0.923

CHAPTER 7

DISCUSSION OF RESULTS

The findings of this study suggest that out of all BAS sub-scales, BAS reward responsiveness has the biggest effect on users' satisfaction and their intention to continue using a gamified mobile application. This means that individuals with a high degree of BAS reward responsiveness are more satisfied and willing to continue using the mobile application when they are presented with attractive rewards. This result was consistent with the hypotheses related to BAS reward responsiveness construct.

Unlike the expected outcome, BAS drive was found to have no significant effect on individuals' satisfaction nor their information systems continuance intention therefore the hypotheses related to BAS drive construct were not supported. Even though setting a goal for consumers in a mobile service can presumably be identified as a reasonable strategy in order to attract them for a revisit and increase customer retention as a result, this does not necessarily seem to be the case in gamified mobile platforms. This may be because individuals might be more focused on other elements of the mobile service relating to fun and rewards, rather than achieving a certain goal in this gamified context. Another reason could be that, users might not be associating a gamified mobile application as a service where there should be a specific purpose for them to achieve, and rather they might be perceiving it as a platform that solely offers elements of fun which is also similar to the case in games.

BAS fun seeking was expected to positively influence customers' satisfaction and their continuance intention, but the results indicated that it only affects continuance intention in a positive way but has no effect on satisfaction. The fun aspect of using information systems has a significant effect on technology adoption of individuals (Van der Heijden, 2004) and it plays an important role in post-adoption behaviors as well. Even though those who seek fun, however, tend to be addicted to the gamified elements and use the mobile application continuously, they are not satisfied simply because they perceive the mobile application as "fun". Both users' confirmation related to the evaluation of the difference between their initial expectations and perceived performance after using it, and their perception of the usefulness of the mobile application, seem to play bigger roles in this respect. Users might be encouraged to continue using a gamified mobile application because they are having fun, but this result shows that this doesn't guarantee their satisfaction with the mobile product or service.

BIS was found to have a negative impact on satisfaction but no significant effect on IS continuance intention was found. This result supports the initial prediction that even though some individuals like gamified platforms and become motivated to earn the highest points by defeating others in a competition, others are predisposed to be dissatisfied in such circumstances. When individuals with high BIS outperform others, they might feel distressed and frustrated because of an expectation of resentment from others, or they might be prone to feel anxious or incompetent when they cannot perform as well compared to others or even maintain their own previous scores.

Even though avoidance motivation may not have an effect on individuals' intention for discontinuance, dissatisfaction of individuals with high BIS may lead to other negative consequences such as negative reviews, lower customer engagement, decreased purchase intention, etc. Further research should be conducted to understand these possible negative consequences that may result from dissatisfaction related to avoidance motivation as they may be crucial in assuring the success and profitability of the mobile product or service.

With the aim of improving convergent and discriminant validity, two items from the BIS scale were removed in this study. Even though there is a general support for the performance of the BIS/BAS scale in recent literature, there is also a debate about them having certain limitations in accurately measuring the constructs they are intended to measure (Haws, Dholakia & Bearden, 2010; Demianczyk, Jenkins, Henson & Conner, 2014; Gray, Hanna, Gillen & Rushe, 2016), especially the BIS scale (Poythress et al., 2008). It has been proposed previously that the items from the BIS scale that refer to lack of fear should be deleted (Poythress et al., 2008; Levinson, Rodebaugh & Frye, 2011). This is consistent with the items that were also excluded in this study. It has been suggested that the deleted items represent a different construct rather than the BIS, namely Fight Flight and Freezing System; FFFS (Gray & McNaughton, 2000).

The resulting measure in this study excluded references to fear and emphasized worry and anxiety for the behavioral inhibition system scale in particular. As a result, in accordance with the previous research in the literature (Poythress et al., 2008; Levinson, Rodebaugh & Frye, 2011), this thesis provided a contribution confirming the update of the BIS scale, which as a result put forth a

suggestion about the establishment of two different constructs rather than the existing one. This result indicates that further studies should be conducted in the future in order to improve the behavioral inhibition system scale in particular.

CHAPTER 8

CONCLUSION

8.1 Summary and conclusion

The present study empirically analyzed the effects of behavioral inhibition system / behavioral activation system on information systems continuance intention of individuals in a gamified mobile application. My anticipation was that this study would be consistent with Gray's (1987) and Carver and White's (1994) studies, according to which approach motivation is expected to be associated with desirable behaviors whereas avoidance motivation is expected to be associated with undesirable behaviors. In the context of a gamified mobile application, desirable outcomes from the mobile application owner's perspective can be understood as users' high level of satisfaction and addictive usage; while undesirable outcomes can be understood as users' low level of satisfaction and their decision to abandon the application or even delete it completely from their smartphones.

In addition to providing support in accordance with previous research, this study further elaborated this issue in a gamified mobile context and provided a contribution by indicating the different effectiveness levels of behavioral activation and inhibition systems related to the information systems continuance model. BAS and BIS have been researched before in the context of the adoption of a technology (TAM) (Vella, Caruana & Pitt, 2012; Park, Kim, Shon & Shim, 2013), but there are some gaps in research related to individuals' post-adoption behavior. By associating the addictive aspects of gamified features with continuance intention, a different perspective on the issue was provided in this cross-disciplinary study.

While formulating the hypotheses, initial expectation was that all sub-constructs of behavioral activation system would positively influence customers' satisfaction and their intention of continued use of the specific mobile application. However, the results showed us that, there were some differences between the sub-constructs of BAS related to the consequences. First of all, reward responsiveness proved to be the most important and significant influencer out of all the other behavioral activation system sub-constructs. Following reward-responsiveness, fun seeking can be stated as another important factor affecting individuals' intention to continue using a gamified mobile application, however it has no significant effect on users' satisfaction. In contrast to what was hypothesized about the drive construct, it turned out that it had no significant effect on neither satisfaction nor continuance intention.

Again, in contrary to what was expected about behavioral inhibition system, it turned out that it had no significant effect on continuance intention of individuals, however, it has a significant negative effect on customers' satisfaction. Thus, we can conclude that in order to positively increase customer satisfaction, gamified mobile application owners should search for ways to offer users captivating rewards, but at the same time they should be careful about minimizing repelling features such as competition to eliminate the negative effects of avoidance behaviors of individuals. As a conclusion, we can also say that in order to assure continued use of individuals, gamified mobile application owners should again provide their users interesting rewards but they should also introduce fun elements that would maintain their interest in using the application.

Gamification is a trending concept which has been tested in various contexts before. Some users found it to be very effective in achieving certain results, while others still question its benefits. There is an ongoing debate about its usefulness and its relationship with business profitability. The aim of this study was to shed more light on the role of individuals' psychological motivations in this context. An effective strategy is critical for gamification to succeed eventually and this study provides valuable insights on which elements to emphasize and which ones to consider carefully when implementing gamified features on a mobile application.

8.2 Managerial implications

The results of this study have significant implications in regards to understanding how individuals differ in their behavioral motivations related to their satisfaction with a gamified mobile service and their intention whether or not to use it continuously. These findings may prove to be very beneficial for managers when starting a new business based on a gamified mobile application, or when adding gamified features for the first time to an existing mobile product or service as a strategy to increase customer retention and profits.

According to the results of this study, it is suggested that in order to create a highly preferred and frequently used application, managers should focus on ways to build attractive rewarding mechanisms as well as various elements of fun for the users. Since the sub-construct of behavioral activation system; reward responsiveness was found to be the most important antecedent of customers' satisfaction and information systems continuance intention compared to other motivational constructs, managers should try to assure and maintain individuals' continual usage

by improving their expectations and beliefs on how the mobile application can provide them with captivating and useful rewards.

The distinction between tangible and intangible rewards was not made in this study, however the effectiveness of the varying types of rewards may prove to have dissimilar results. Customers may respond differently to tangible rewards compared to intangible ones. For instance, they might be more satisfied when they can touch, feel or taste a reward rather than just see it. Future studies can be conducted in order to clarify this distinction and further elaborate this subject.

Presenting customers an environment in which they encounter new and exciting rewards in a continued manner, is expected to capture their interest and maintain it for the long term. Fun seeking, on the other hand, is found to be influential in increasing customers' continued usage, but it seems to be less effective in increasing customer satisfaction compared to reward responsiveness. Keeping this distinction in mind, managers should also consider including fun elements in the mobile application they are in charge of, but they should not rely on them as their primary focus since customer satisfaction seems to stay neutral for any change in this respect. According to the results of this study, it can be stated that gamified mobile application owners should not expect to increase their customers' satisfaction solely based on adding fun elements. Additionally, including rewards seems to play a bigger role in influencing continuance intention rather than presenting features related to fun.

Setting goals for the users of the mobile application was also found to be ineffective for increasing customer satisfaction and continued use. In conclusion, in order to increase satisfaction of the users, managers first should emphasize perceived

usefulness; which is related to the expectation of individuals that the specific mobile application will improve their performance and confirmation; which is related to their initial expectations and later evaluation of the service. It can be stated that initially focusing on perceived usefulness and confirmation would be the better strategy in this regard. Following this strategy, managers should also find ways to attract customers by presenting them attractive rewards and fun ways to spend their time while using the mobile application.

Managers should also be aware of a substantial percentage of users in their customer base whose BIS might be strongly influential in determining their levels of satisfaction. In addition to focusing on rewards for positive reinforcement, it is also important to mitigate the negative cues that might result in avoidance by the users. Since BIS is found to negatively affect customer satisfaction, managers should find ways to emphasize an environment which is welcoming and comforting and not received as highly competitive or repulsive in any way. They should constantly monitor the presence of negative cues in the mobile application and eliminate them or minimize their intensity in order to avoid losing customers and profits in return.

8.3. Limitations and future research

This study has a number of limitations. First of all, in this study, I analyzed the effects of behavioral inhibition system/behavioral activation system on university students and not all millennials in general. Therefore, additional research on a more general millennial population could improve the generalizability of the findings of this thesis.

Secondly, this study was conducted by using a survey, which indicates a snapshot of users' perception at a certain time. In order to support the validity of the findings for the information systems continuance model, a longitudinal study can be recommended to enhance insights on different variables that may change over time. Users might have varying perceptions in different phases of their usage of the gamified mobile application. These variations should be emphasized in order to develop a better understanding of their continuance intention.

Lastly, in this study, all mobile gamified applications were evaluated as a single category, regardless of which group they belonged to, such as, social media, e-commerce, health applications, etc. Thus, future studies could classify gamified mobile applications in a more specific and detailed way. Differences between different categories of mobile applications with gamified features may prove to have varying results. Detailed analysis on this respect could provide deeper insights into the subject in question.

One of the results in this study was that reward responsiveness was positively significant with both satisfaction and continuance intention, however in terms of reward types no distinction was made. For this reason, as a future study, the difference between intangible rewards such as virtual points, badges, coins etc. and tangible rewards such as a cup of coffee as in the case of Starbucks mobile application, can be examined.

Additionally, another result in this study was that avoidance motivation does not have a significant effect on individuals' intention for discontinuance however it negatively influences their satisfaction. Dissatisfied individuals with high BIS might

not quit using the mobile application however, they might bring in other kinds of negative consequences such as negative reviews, lower customer engagement, decreased purchase intention, etc. Future research can be conducted to further elaborate on these possible negative consequences that may appear as a consequence from dissatisfaction related to avoidance motivation as they may be crucial in maintaining the success and profitability of the mobile product or service.

Which features of a mobile application do you consider as "gamified"?

Have you ever used a mobile application / website that has gamified features? Gamified features may include; points system, badges, status levels, leaderboards, etc. Gamified platform examples are: Nike+ Run Club, SuperBetter, eBay, Foursquare, Swarm, Samsung Nation, etc.

Which platform do you prefer while using gamified platforms? Mobile application vs website. If you prefer mobile applications, please specify which one of the following operating systems you prefer: iOS vs Android.

What do you think and feel about using gamified mobile applications?

How often do you use gamified mobile applications? Please specify specific mobile app/s and your usage frequency per week and duration (for 3 months etc.).

Do you think that gamified features in a mobile application have an effect on your satisfaction with that specific mobile application? What satisfies you the most in using gamified mobile app/s?

Do you think that gamified features in a mobile application have an effect on your willingness to continue using that specific mobile application? What motivates you the most to continue using gamified mobile app/s?

What kind of additions or exclusions related to the gamified features do you think can be done that might increase your satisfaction with this app?

What kind of additions or exclusions related to the gamified features do you think can be done that might increase your willingness to continue using this app?

Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) motivate you the most in your willingness to continue using this app and why? (Please list 3 of them, 1st being the most important.)

Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) increases your satisfaction with this app the most and why? (Please list 3 of them, 1st being the most important.)

APPENDIX B

QUALITATIVE INTERVIEW RESPONDENT ANSWERS

Respondent 1

Question: Which features of a mobile application do you consider as "gamified"?

Answer: Apps that give points, badges etc. for the activities that you do in real life.

Question: Have you ever used a mobile application / website that has gamified features? Gamified features may include; points system, badges, status levels, leaderboards, etc. Gamified platform examples are: Nike+ Run Club, SuperBetter, eBay, Foursquare, Swarm, Samsung Nation, etc.

Answer: I am using Swarm, Nike+, Runtastic apps (Runtastic, Butt Trainer, Six Pack)

Question: Which platform do you prefer while using gamified platforms? Mobile application vs website. If you prefer mobile applications, please specify which one of the following operating systems you prefer: iOS vs Android.

Answer: Mobile applications, iOS

Question: What do you think and feel about using gamified mobile applications?

Answer: I like the apps that I am using but I don't think I get motivated with the scores, badges etc. too much. I don't generally follow up my score.

Question: How often do you use gamified mobile applications? Please specify specific mobile app/s and your usage frequency per week and duration (for 3 months etc.).

Answer: Swarm: daily, I've been using it probably for around 5 years

Nike+ and Runtastic apps: once in a month, it's been around 1 year for Nike+ and 6 months for Runtastic

Question: Do you think that gamified features in a mobile application have an effect on your satisfaction with that specific mobile application? What satisfies you the most in using gamified mobile app/s?

Answer: I don't think the gamified features have an effect of my satisfaction. I like the historical data keeping and seeing my development where applicable. I also like commenting and/or receiving comments from friends – so social part is more important for me.

Question: Do you think that gamified features in a mobile application have an effect on your willingness to continue using that specific mobile application? What motivates you the most to continue using gamified mobile app/s?

Answer: I don't think that gamified features affect my willingness.

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your satisfaction with this app?

Answer: Nothing :)

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your willingness to continue using this app?

Answer: Nothing :)

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) motivate you the most in your willingness to continue using this app and why?
(Please list 3 of them, 1st being the most important.)

Answer: 1) sending challenges to friends 2) leaderboards 3) earning scores

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending

challenges to friends, contests, etc.) increases your satisfaction with this app the most

and why? 65

(Please list 3 of them, 1st being the most important.)

Answer: 1) sending challenges to friends 2) leaderboards 3) earning scores

Question: Which features of a mobile application do you consider as "gamified"?

Answer: Gaining coins and having competitors.

Question: Have you ever used a mobile application / website that has gamified features? Gamified features may include; points system, badges, status levels, leaderboards, etc. Gamified platform examples are: Nike+ Run Club, SuperBetter, eBay, Foursquare, Swarm, Samsung Nation, etc.

Answer: Swarm.

Question: Which platform do you prefer while using gamified platforms? Mobile application vs website. If you prefer mobile applications, please specify which one of the following operating systems you prefer: iOS vs Android.

Answer: Mobile. IOS.

Question: What do you think and feel about using gamified mobile applications?

Answer: It is fun. However, sometimes I think to myself, "Why am I using this? What does it have to do with me?"

Question: How often do you use gamified mobile applications? Please specify specific mobile app/s and your usage frequency per week and duration (for 3 months etc.).

Answer: 1-2 times per week.

Question: Do you think that gamified features in a mobile application have an effect on your satisfaction with that specific mobile application? What satisfies you the most in using gamified mobile app/s?

Answer: Gaining coins and the sound it makes. :)

Question: Do you think that gamified features in a mobile application have an effect on your willingness to continue using that specific mobile application? What motivates you the most to continue using gamified mobile app/s?

Answer: Yes, it has an effect. But still, I don't know what and why I am using them.

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your satisfaction with this app?

Answer: If there is a useful way to spend the coins in real life. Like having collaborations with some coffee shops (let's say) where you can have free coffee.

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) motivate you the most in your willingness to continue using this app and why? (Please list 3 of them, 1st being the most important.)

Answer: Coins, status level, coupons.

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) increases your satisfaction with this app the most and why? (Please list 3 of them, 1st being the most important.)

Answer: Same above.

Question: Which features of a mobile application do you consider as "gamified"?

Answer: Earning badges, ranking, earning points

Question: Have you ever used a mobile application / website that has gamified features? Gamified features may include; points system, badges, status levels, leaderboards, etc. Gamified platform examples are: Nike+ Run Club, SuperBetter, eBay, Foursquare, Swarm, Samsung Nation, etc.

Answer: Nike+ Run Club, Foursquare

Question: Which platform do you prefer while using gamified platforms? Mobile application vs website. If you prefer mobile applications, please specify which one of the following operating systems you prefer: iOS vs Android.

Answer: Mobile application

IOS

Question: What do you think and feel about using gamified mobile applications?

Answer: They are fun

Question: How often do you use gamified mobile applications? Please specify specific mobile app/s and your usage frequency per week and duration (for 3 months etc.).

Answer: I was using Nike + a couple of times a week but now I am not using it, same thing happened for Foursquare

Question: Do you think that gamified features in a mobile application have an effect on your satisfaction with that specific mobile application? What satisfies you the most in using gamified mobile app/s?

Answer: I haven't experienced any satisfaction on the contrary I feel pressured when I look at the leaderboard and see myself behind my friends.

Question: Do you think that gamified features in a mobile application have an effect on your willingness to continue using that specific mobile application? What motivates you the most to continue using gamified mobile app/s?

Answer: Gamification discourage me to use the app because of the reason I specified earlier

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your satisfaction with this app?

Answer: Earning badges instead of listed in leaderboards

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your willingness to continue using this app?

Answer: I can't specify anything right now

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) motivate you the most in your willingness to continue using this app and why? (Please list 3 of them, 1st being the most important.)

Answer:

1. Earning status levels
2. coupons / gifts
3. sending challenges to friends

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) increases your satisfaction with this app the most and why?

(Please list 3 of them, 1st being the most important.)

Answer:

1. Earning status levels

2. coupons / gifts

3. sending challenges to friends

Question: Which features of a mobile application do you consider as "gamified"?

Answer: If there is an aim and lots of visuality. Competition based apps become more competitive and gamified.

Question: Have you ever used a mobile application / website that has gamified features? Gamified features may include; points system, badges, status levels, leaderboards, etc. Gamified platform examples are: Nike+ Run Club, SuperBetter, eBay, Foursquare, Swarm, Samsung Nation, etc.

Answer: Nike +, foursquare, eBay

Question: Which platform do you prefer while using gamified platforms? Mobile application vs website. If you prefer mobile applications, please specify which one of the following operating systems you prefer: iOS vs Android.

Answer: Mobile & iOS

Question: What do you think and feel about using gamified mobile applications?

Answer: More and addictive. Easy and fun to use.

Question: How often do you use gamified mobile applications? Please specify specific mobile app/s and your usage frequency per week and duration (for 3 months etc.).

Answer: Nike + everyday, foursquare max 3 days a week, I do not continue to use swarm so I do not know the duration but Nike + over a year.

Question: Do you think that gamified features in a mobile application have an effect on your satisfaction with that specific mobile application? What satisfies you the most in using gamified mobile app/s?

Answer: Gamified apps make me more addictive and loyal to the app. The motivation increases more when there is gamification and even competition between users. This is my satisfying.

Question: Do you think that gamified features in a mobile application have an effect on your willingness to continue using that specific mobile application? What motivates you the most to continue using gamified mobile app/s?

Answer: Yes

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your satisfaction with this app?

Answer: Rewarding system, ranking between users

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your willingness to continue using this app?

Answer: ?!

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) motivate you the most in your willingness to continue using this app and why? (Please list 3 of them, 1st being the most important.)

Answer:

   1- Sending challenges, 2- gifts, 3- badges

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) increases your satisfaction with this app the most and why? (Please list 3 of them, 1st being the most important.)

Answer:

   1- Sending challenges, 2- gifts, 3- badges

Question: Which features of a mobile application do you consider as "gamified"?

Answer: When it sets targets for you to make sure you use the app consistently

Question: Have you ever used a mobile application / website that has gamified features? Gamified features may include; points system, badges, status levels, leaderboards, etc. Gamified platform examples are: Nike+ Run Club, SuperBetter, eBay, Foursquare, Swarm, Samsung Nation, etc.

Answer: Yes. Nike+, Kardashian, Runtastic

Question: Which platform do you prefer while using gamified platforms? Mobile application vs website. If you prefer mobile applications, please specify which one of the following operating systems you prefer: iOS vs Android.

Answer: App, iOS

Question: What do you think and feel about using gamified mobile applications?

Answer: I am ok with it as long as the targets are more for my benefit than revenue flow for the app. When I feel that the gamification is used to rip money, then I stop using it. Such was the case for Kardashian. But Nike+ was good, because it made me compete with other friends and there was no obvious commercial benefit for Nike.

Question: How often do you use gamified mobile applications? Please specify specific mobile app/s and your usage frequency per week and duration (for 3 months etc.).

Answer: I don't use them very often. It's been more than a month since I used Kardashian and more than 3 months since Nike+. However, in the interims that I used them, I used them 3 times per week.

Question: Do you think that gamified features in a mobile application have an effect on your satisfaction with that specific mobile application? What satisfies you the most in using gamified mobile app/s?

Answer: I get the satisfaction when I reach my set target, and when I believe that target is for my benefit or for my pleasure rather than the app owner's.

Question: Do you think that gamified features in a mobile application have an effect on your willingness to continue using that specific mobile application? What motivates you the most to continue using gamified mobile app/s?

Answer: Gamification increases the frequency of my usage. Motivation comes from constant urge to check where I am against competition. Competitiveness creates the motivation.

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your satisfaction with this app?

Answer: If Nike+ was used for general fitness other than running, then I would keep using it. I stopped using it because I do not run anymore. Cannot comment about Kardashian app as I used it for business related testing purposes, not because I was really interested.

Question: What kind of additions or exclusions related to the gamified features do you think can be done that might increase your willingness to continue using this app?

Answer: Addition could be other sports types. Exclusions could be advertisements

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending challenges to friends, contests, etc.) motivate you the most in your willingness to continue using this app and why? (Please list 3 of them, 1st being the most important.)

Answer: Challenges to friends, leaderboards, points
Because competing with others is measurable whereas earning badges is not measurable. Moreover, I do not believe in coupons / gifts, I always think that they are tricks into making you spend more. Therefore, competition is one level ahead for me.

Question: Which example of the gamified features in a mobile app (earning status levels, badges, virtual currency / points, leaderboards, coupons / gifts, sending

challenges to friends, contests, etc.) increases your satisfaction with this app the most and why? (Please list 3 of them, 1st being the most important.)

Answer: I get satisfied from competition. That is why competitive features are the most important for me. Again, I will say challenges to friends, leaderboards and then points.

BIS/BAS SCALES

Original scale by Carver & White (1994)

BIS

If I think something unpleasant is going to happen I usually get pretty "worked up."

I worry about making mistakes.

Criticism or scolding hurts me quite a bit.

I feel pretty worried or upset when I think or know somebody is angry at me.

Even if something bad is about to happen to me, I rarely experience fear or

nervousness.

I feel worried when I think I have done poorly at something.

I have very few fears compared to my friends.

BAS Reward Responsiveness

When I get something I want, I feel excited and energized.

When I'm doing well at something, I love to keep at it.

When good things happen to me, it affects me strongly.

It would excite me to win a contest.

When I see an opportunity for something I like, I get excited right away.

BAS Drive

When I want something, I usually go all-out to get it.

I go out of my way to get things I want.

If I see a chance to get something I want, I move on it right away.

When I go after something I use a "no holds barred" approach.

BAS Fun Seeking

1 will often do things for no other reason than that they might be fun.

I crave excitement and new sensations.

I'm always willing to try something new if I think it will be fun.

I often act on the spur of the moment.

INFORMATION SYSTEMS CONTINUANCE SCALE

Original scale by Bhattacharjee (2001)

IS Continuance Intention:

I intend to continue using OBD rather than discontinue its use.

My intentions are to continue using OBD than use any alternative means (traditional banking).

If I could, I would like to discontinue my use of OBD. (reverse coded)

Satisfaction:

How do you feel about your overall experience of OBD use?

Very dissatisfied / Very satisfied.

Very displeased / Very pleased.

Very frustrated / Very contented.

Absolutely terrible / Absolutely delighted.

Perceived Usefulness:

Using OBD improves my performance in managing personal finances.

Using OBD increases my productivity in managing personal finances.

Using OBD enhances my effectiveness in managing personal finances.

Overall, OBD is useful in managing personal finances.

Confirmation:

My experience with using OBD was better than what I expected.

The service level provided by OBD was better than what I expected.

Overall, most of my expectations from using OBD were confirmed.

SURVEY

Gamification is defined as; "the use of game elements and game design techniques in a non-game context" Deterding et al. (2011). Have you ever used a mobile application which included gamified features? (Some examples are; Swarm, Yemeksepeti, Nike+, eBay, etc.)

Yes

No

Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Please respond to all the items; do not leave any blank. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following seven response options:

7 = Strongly Agree

6 = Agree

5 = Somewhat Agree

4 = Undecided

3 = Somewhat Disagree

2 = Disagree

1 = Strongly Disagree

1. I go out of my way to get things I want.

1   2   3   4   5   6   7

2. When I want something I usually put my all energy to get it.

1   2   3   4   5   6   7

3. If I see a chance to get something I want I move on it right away.

1   2   3   4   5   6   7

4. When I go after something I use a "no limits" approach.

1   2   3   4   5   6   7

5. I'm always willing to try something new if I think it will be fun.

1   2   3   4   5   6   7

6. I will often do things for no other reason than that they might be fun.

1   2   3   4   5   6   7

7. I often act on impulse, without planning.

1   2   3   4   5   6   7

8. I crave excitement and new sensations.

1   2   3   4   5   6   7

9. When I'm doing well at something I love to keep at it.

1   2   3   4   5   6   7

10. When I get something I want, I feel excited and energized.

1   2   3   4   5   6   7

11. When I see an opportunity for something I like I get excited right away.

1   2   3   4   5   6   7

12. When good things happen to me, it affects me strongly.

1   2   3   4   5   6   7

13. It would excite me to win a contest.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

14. Even if something bad is about to happen to me, I rarely experience fear or nervousness.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

15. Criticism or scolding hurts me quite a bit.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

16. I feel pretty worried or upset when I think or know somebody is angry at me.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

17. If I think something unpleasant is going to happen I usually get pretty "anxious".

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

18. I feel worried when I think I have done poorly at something important.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

19. I have very few fears compared to my friends.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

20. I worry about making mistakes.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Some examples of gamified mobile applications are;

Foursquare or Swarm app in which you can earn points, status levels, rewards and compete in the leaderboard with your friends.

Nike+ running app in which you can earn Nike fuel as you run, compete with your friends and track your progress in the leaderboard and earn badges for your performance.

Yemeksepeti app in which you can earn points and badges and compete with your friends to become the mayor of your town.

Modacruz shopping app in which you can earn virtual coins to win special discounts.

Asos shopping app in which you can enter contests, compete in the leaderboard to win prizes as well exclusive entrances to flash sales.

eBay app in which you can compete to earn titles such as Top-Rated Seller, Top

Rated Reviewer, etc.

For the following questions please consider a specific gamified mobile application

that you have used before. It could be one of the above examples or an entirely

different gamified mobile application.

21. I intend to continue using the mobile application rather than discontinue its use.

1   2   3   4   5   6   7

22. My intentions are to continue using the mobile application than use any

alternative means (such as websites with similar offerings).

1   2   3   4   5   6   7

23. If I could, I would like to discontinue using the mobile application.

1   2   3   4   5   6   7

How do you feel about your overall experience of the mobile application?

24.   Please rate your feeling about the mobile application:

very

dissatisfied   very satisfied

1	2	3	4	5	6	7

very

displeased   very pleased

1	2	3	4	5	6	7

very frustrated   very contented

1	2	3	4	5	6	7

absolutely   absolutely

terrible   delighted

1	2	3	4	5	6	7

25. My experience with using the mobile application was better than what I
expected.

1   2   3   4   5   6   7

26. The service level provided by the mobile application was better than what I expected.

1	2	3	4	5	6	7

27. Overall, most of my expectations from using the mobile application were confirmed.

1	2	3	4	5	6	7

For the following questions, depending on the type of the gamified application you consider, the "aim" could be gathering or sharing information about places (ex. Swarm app), buying or selling products (ex. Asos, Ebay, Modacruz apps), doing sports regularly and having a healthy lifestyle (ex. Nike + running app), ordering food online (Yemeksepeti app), etc.)

28. Using the mobile application;

Improves my performance in achieving my aim.

1	2	3	4	5	6	7

Increases my productivity in achieving my aim.

1	2	3	4	5	6	7

Enhances my effectiveness in achieving my aim.

1   2   3   4   5   6   7

29. I find the mobile application to be useful in achieving my aim.

1   2   3   4   5   6   7

LATENT VARIABLE COEFFICIENTS

```
********************************
* Latent variable coefficients *
********************************

R-squared coefficients
----------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
                                        0.210   0.197   0.282

Adjusted R-squared coefficients
-------------------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
                                        0.207   0.180   0.267

Composite reliability coefficients
----------------------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
0.810   0.804   0.892   0.837   0.880   0.943   0.882   0.837

Cronbach's alpha coefficients
-----------------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
0.686   0.674   0.849   0.755   0.794   0.919   0.821   0.706

Average variances extracted
---------------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
0.517   0.508   0.624   0.509   0.710   0.804   0.652   0.632

Full collinearity VIFs
----------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
1.296   1.171   1.670   1.232   1.486   1.401   1.233   1.403

Q-squared coefficients
----------------------

BASD    BASF    BASR    BIS     C       PU      S       CI
                                        0.213   0.205   0.269
```

PATH COEFFICIENTS, STANDARD ERRORS AND EFFECT SIZES

Table G1. Path coefficients, standard errors and effect sizes

```
Path coefficients
-----------------

        BASD    BASF    BASR    BIS     C       PU      S       CI




PU                                      0.458
S       -0.015  -0.026  0.153   -0.103  0.252   0.194
CI      0.057   0.098   0.259   -0.017          0.218   0.243


P values
--------

        BASD    BASF    BASR    BIS     C       PU      S       CI




PU                                      <0.001
S       0.400   0.327   0.004   0.035   <0.001  <0.001
CI      0.159   0.043   <0.001  0.386           <0.001  <0.001
```

Table G2. Standard errors for path coefficients

	BASD	BASF	BASR	BIS	C	PU	S	CI
PU					0.054			
S	0.058	0.058	0.056	0.057	0.056	0.056		
CI	0.057	0.057	0.056	0.058		0.056	0.056	

Table G3. Effect sizes for path coefficients

	BASD	BASF	BASR	BIS	C	PU	S	CI
PU					0.210			
S	0.002	0.002	0.033	0.010	0.093	0.064		
CI	0.009	0.020	0.094	0.002		0.079	0.083	

REFERENCES

Al-Gahtani, S. S., & King, M. (1999). Attitudes, satisfaction and usage: Factors contributing to each in the acceptance of information technology. *Behaviour & Information Technology,* 18(4), 277-297.

Arnold, M. J., & Reynolds, K. E. (2012). Approach and avoidance motivation: Investigating hedonic consumption in a retail setting. *Journal of Retailing,* 88(3), 399-411.

Bagozzi, R. P. & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.

Bhattacherjee, A. (2001). Understanding information systems continuance. An expectation–confirmation model. *MIS Quarterly*, 25(3), 351–370.

Blohm, I., & Leimeister, J. (2013). Gamification. Design of it-based enhancing services for motivational support and behavioral change. *Business & Information Systems Engineering*, (5)4, 275-278.

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The bis/bas scales. *Journal of Personality and Social Psychology,* 67(2), 319-333.

Chen, C., Zhang, K. Z. K., Gong, X., Zhao, S. J., Lee, M. K. O., & Liang, L. (2017). Understanding compulsive smartphone use: An empirical test of a flow-based model. *International Journal of Information Management,* 37, 438-454.

Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results* (Doctoral Dissertation). Retrieved from: https://dspace.mit.edu/handle/1721.1/15192

Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-339.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.

Demianczyk, A. C., Jenkins, A. L., Henson, J. M., & Conner, B. T. (2014). Psychometric evaluation and revision of Carver and White's bis/bas scales in a diverse sample of young adults. *Journal of Personality Assessment*, 96, 485–494.

Deterding, S., Dixon, D., Khalled, R., & Nacke, L. (2011, 28-30 September). From game design elements to gamefulness: Defining gamification. Paper presented at: International Academic MindTrek Conference: Envisioning Future Media Environments, Tampere, Finland

Dominguez, A., Saenz-de-Navarrete, J., de-Marcos, L., Fernández-Sanz, L., Pagés, C., & Martinez-Herráiz, J. (2013). Gamifying learning experiences: Practical implications and outcomes. *Computers and Education*, 63, 380-392.

Donnison, S. (2007). Unpacking the millennials: A cautionary tale for teacher education. *Australian Journal of Teacher Education*, 32(3), Article 1.

Gartner (2012). Gamification: Engagement strategies for business and IT. *Report G00245563* 13

Gliner, J. A., Morgan, G. A., & Leech, N. L. (2017). *Research methods in applied settings: An integrated approach to design and analysis* (3rd ed.). New York NY: Routledge.

Gray, J. A. (1978). The 1977 Myers lecture: The neuropsychology of anxiety. *British Journal of Psychology*, 69, 417-434.

Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Eds.), *A model for personality* (pp. 246-276). Berlin, Heidelberg: Springer.

Gray, J. A. (1987). Perspectives on anxiety and impulsivity: A commentary. *Journal of Research in Personality*, 21(4), 493-288.

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition and Emotion*, 4(3), 269-288.

Gray, J. A., & McNaughton, N. (2000). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system* (2nd ed.). Oxford: Oxford University Press.

Gray, J. D., Hanna, D., Gillen, A., & Rushe, T. (2016). A closer look at Carver and White's bis/bas scales: Factor analysis and age group differences. *Personality and Individual Differences,* 95, 20–24.

Hair, J. F., Anderson, R. E., Tatham, R.L., & Black, W. C. (2006). *Multivariate data analysis*. Upper Saddle River, New Jersey: Prentice Hall International Inc.

Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Upper Saddle River, New Jersey: Prentice Hall.

Hair, J. F., Ringle, C. M. & Sarstedt, M. (2011). PLS-SEM: Indeed, a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152.

Harman, K., Koohang A., & Paliszkiewicz, J. (2014). Scholarly interest in gamification: A citation network analysis, *Industrial Management & Data Systems*, 114(9), 1438-1452.

Haws, K. L., Dholakia, U. M., & Bearden, W. O. (2010), An assessment of chronic regulatory focus measures. *Journal of Marketing Research,* 47(5), 967–82.

Hinton, P. R., Brownlow, C., McMurray, I., & Cozens B. (2004). *SPSS explained.* London; New York: Routledge.

Hong, S., Kim, J., & Lee, H. (2008). Antecedents of use-continuance in information systems: Toward an integrative view. *The Journal of Computer Information Systems*, 48(3), 61-73.

Huotari, K., & Hamari, J. (2017). A definition for gamification: Anchoring gamification in the service marketing literature. *Electronic Markets*, 27(1), 21-31.

Hur, H. J., Lee, H. K., & Choo, H. J. (2017). Understanding usage intention in innovative mobile app service: Comparison between millennial and mature consumers. *Computers in Human Behavior,* 73, 353-361.

Insley, V., & Nunan, D. (2014). Gamification and the online retail experience. *International Journal of Retail & Distribution Management*, 42(5), 340-351.

Jin, X. L., Lee, M. K. O., & Cheung, C. M. K. (2010). Predicting continuance in online communities: Model development and empirical test. *Behaviour & Information Technology,* 29(4), 383–394.

Kim, B. (2010). An empirical investigation of mobile data service continuance: Incorporating the theory of planned behavior into the expectation–cconfirmation model. *Expert Systems with Applications*, 37, 7033–7039.

Kim, B. (2015a). Designing gamification in the right way. *Library Technology Reports.* 51(2), 29-35.

Kim, B. (2015b). The popularity of gamification in the mobile and social era. *Library Technology Reports*. 51(2), 5-9.

Kock, N. (2018). *WarpPLS User Manual, Version 6.0.* Laredo, TX: ScriptWarp Systems.

Levinson, C. A., Rodebaugh, T. L., & Frye, T. (2011). An examination of the factor, convergent and discriminant validity of the behavioral inhibition system and behavioral activation system scales. *Journal of Psychopathology and Behavioral Assessment*, 33(1), 87–100.

Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE Transactions on Professional Communication*, 57(2), 123-146.

Manlove, J., & Whitacre, B. (2018). Understanding the trend to mobile-only internet connections: A decomposition analysis. *Telecommunications Policy,* 43(1), 76-87.

Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research,* 17(4), 460-469.

Ortiz de Guinea, A,. & Markus, M. L. (2009). Why break the habit of a lifetime? Rethinking the roles of intention, habit, and emotion in continuing information technology use. *MIS Quarterly,* 33(3), 433-444.

Paharia, R. (2013). Loyalty 3.0: How big data and gamification are revolutionizing customer and employee engagement. *Journal of Marketing Analytics*, 234–236.

Park, G. G., Van Dyne, L., & Ilgen, D. R. (2013). Satisfaction pursuing approach and avoidance goals: Effects of regulatory fit and individual temperaments. *Motivation and Emotion*, 37(3), 424-432.

Park, N., Kim, Y. C., Shon, H. Y., & Shim, H. (2013). Factors influencing smartphone use and dependency in South Korea. *Computers in Human Behavior*, 29(4), 1763-1770.

Petkov, P., Köbler, F., Foth, M., Medland, R.C., & Krcmar, H. (2011). Engaging energy saving through motivation-specific social comparison. *Proceedings of the 2011 Annual Conference Extended Abstracts on Human Factors in Computing Systems*, Vancouver, Canada (1-6). ACM

Poythress, N. G., Skeem, J. L., Weir, J., Lilienfeld, S. O., Douglas, K. S., Edens, J. F., & Kennealy, P. J. (2008). Psychometric properties of Carver and White's (1994) bis/bas scales in a large sample of offenders. *Personality and Individual Differences*, 45(8), 732–737.

Reichheld, F., & Schefter, P. (2000). E-loyalty: Your secret weapon on the web. *Harvard Business Review*, 78(4), 105-113.

Ryckman, R. M., Thornton, B., & Gold, J. A. (2009). Assessing competition avoidance as a basic personality dimension. *The Journal of Psychology*, 143(2), 175–192.

Salcu, A.V., & Acatrinei, C. (2013). Gamification applied in affiliate marketing. Case study of 2Parale. *Management & Marketing Challenges for the Knowledge Society*, 8(4), 767-790.

Smits, D. J. M., & Boeck, P. D. (2006). From bis-bas to the big five, *European Journal of Personality*, 20(4), 255-70.

Sukaini, A. K., Zhang, J., & Albazooni, A. G. Z. (2015). Mobile crowdsourcing: Intrinsic and extrinsic motivational factors influencing online communities in China. *Journal of Marketing Development and Competitiveness.* Vol. 9(1), 129-145.

Swan, C. (2012). Gamification: A new way to shape behavior. *Communication World*. 29 (3), 13-14.

Tarka, P. (2018). An overview of structural equation modeling: Its beginnings, historical development, usefulness and controversies in the social sciences. *Quality & Quantity,* 52(1), 313–354.

Thong, J. Y. L., Hong, S. J., & Tam, K. Y. (2006). The effects of post-adoption beliefs on the expectation–confirmation model for information technology continuance. *International Journal of Human–Computer Studies*, 64(9), 799–810.

Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information Technology Theory and Application*, 11(2), 5-40.

Van der Heijden, H. (2004). User acceptance of hedonic information systems, *MIS Quarterly*, 28(4), 695-704.

Vella, J., Caruana, A., & Pitt, L. F. (2012). The effect of behavioural activation and inhibition on crm adoption. *International Journal of Bank Marketing,* 30(1), 43-59.

Venkatesh, V., & Davis, F.D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204.

Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., Hu, P. J. H., & Brown, S. A. (2011). Extending the two-stage information systems continuance model: Incorporating utaut predictors and the role of context. *Information Systems Journal,* 21, 527–555.

Vinichenko, M. V., Melnichuk, A. V., Kirillov, A. V, Makushkin, S. A., & Melnichuk, Y. A. (2016). Modern Views on the Gamification of Business. *Journal of Internet Banking and Commerce*, 21 (S3).

Voigt, D. C., Dillard, J. P., Braddock, K. H., Anderson, J. W., Sopory, P., & Stephenson, M. T. (2009). Carver and White's (1994) bis/bas scales and their relationship to risky health behaviors. *Personality and Individual Differences*, 47(2), 89-93.

Yen, J. Y., Ko, C. H., Yen, C. F., Chen, C. S., & Chen, C. C. (2009). The association between harmful alcohol use and internet addiction among college students: Comparison of personality. *Psychiatry and Clinical Neurosciences*, 63(2), 218–24.

Zhou, T. (2011). An empirical examination of users' post-adoption behaviour of mobile services. *Behaviour & Information Technology*, 30(2), 241-250.