# CHAPTER 5

# CONCLUSION AND RECOMMENDATION

#### 5.1. Introduction

In this chapter, there will be conclusion of the paper, suggestion for further research and limitation of the research.

# **5.2. Conclusion**

Based on the results of data analysis in the previous chapter, author can determine the following conclusions:

- H1a: Network externalities will positively affect the intention to play mobile social game application. (*Rejected*)
- 2. H1b: Network externalities will positively affect individual gratifications. (*Accepted*)
- 3. H1c: Network externalities will positively affect time flexibility.

  (Accepted)
- 4. H2: Individual gratifications will positively affect the intention to play mobile social game application. (*Accepted*)
- 5. H3: Time flexibility will positively affect the intention to play mobile social game application. (*Accepted*)

#### 5.3. Further Research

In this research, the objective is to analyze an examination of network externalities and of uses and gratifications on the people intention to play mobile social games in Indonesia. The respondents of this research is limited to people who aged 19-25 only, therefore it is better for future research to broaden the category of the respondents to see more diverse answers of the respondents. Demographic variable that is used in this research is only age, income, and gender. Future research can add more demographic factors, because the results could be different based on each respondent.

The future research can choose one specific games as the object of the research, for example one specific kind of games or brand. So, the questionnaire can be clearer of what kind of products does the researcher referring to.

# **5.4.** Managerial Implication

This study has implication for managerial decision related to intention to play mobile social games. The result of this research can help the organizations which develop the mobile social games especially in Indonesia to recognize whether network externalities, individual gratifications and the mobile device features can help the sercive providers design their games to satisfy the players more effectively or not. Unfortunately the network externalities not significant influence the players

intention to play mobile social games when individual gratifications and mobile device features significantly influence the players intention to play mobile social games. According to this result, the organizations suggested to pay more intention to focus and develop their mobile social devices and also to provide the games in which can fulfill the players demand about games in order to leads the players to get their individual ultimate gratifiations. Furthermore, the organizations also suggested to provide the game with time flexibility, due to the result, it can be seen that time flexibility positively affect the intention to play mobile social games.

# **5.5. Limitation of the Research**

The limitation of this research are, there is no specifictype of mobile social games or brand of the games does the author refer to. And also the limitation in this study is that the questionnaire was distributed to respondents only using online survey, so that respondents could not ask directly to researcher if there were confusing questions. It also important to note that further research can explore more on the external factors in influencing the player intention to play

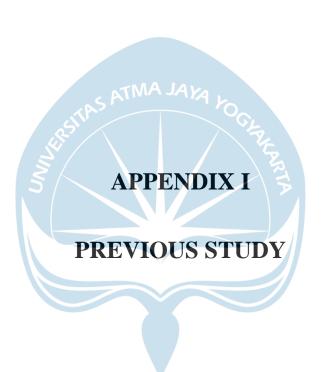
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# Why do people play mobile social games? An examination of network externalities and of uses and gratifications

Why do people play mobile social games?

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#### Abstract

Purpose – The purpose of this paper is to identify the factors that influence people to play socially interactive games on mobile devices. Based on network externalities and theory of uses and gratifications (U&G), it seeks to provide direction for further academic research on this timely topic. Design/methodology/approach – Based on 237 valid responses collected from online question raires, structural equation modeling technology was employed to examine the research model.

Findings - The results reveal that both network externalities and individual gratifications significantly influence the intention to play social games on mobile devices. Time flexibility, however, which is one of the mobile device features, appears to contribute relatively little to the intention to play mobile social games.

Originality/value - This research successfully applies a combination of network externalities theory and U&G theory to investigate the antecedents of players' intentions to play mobile social games. This study is able to provide a better understanding of how two dimensions - perceived number of users/peers and individual gratification - influence mobile game playing, an insight that has not been examined previously in the mobile apps literature.

Keywords Smartphones, Mobile devices, Intention to play, Mobile social games Network externalities theory, Uses and gratifications theory, Tablet computers Paper type Research paper

#### 1. Introduction

The internet and mobile technologies have penetrated all spheres of our daily activities and significantly changed our lives and behavior. We can use mobile devices to engage ourselves in many different kinds of activities anytime and anywhere. Mobile devices – hand-held computing devices such as smartphones, tablet computers, personal digital assistants, and mobile internet devices – are currently reaching a mass audience. According to the market tracker iSuppli Corporation (2010), smartphone shipments are expected to rise 105 percent within a five-year span, from 246.9 million in 2010 to 506 million units in 2014. Also, an analysis by Gartner Inc (2010) predicted that shipments of tablet computers would soar from 19.5 million units in 2010 to 208 million units in 2014. More and more people are using mobile devices with 3G and 4G features, which in turn drive the demand for mobile applications and value-added services. Mobile applications, known as apps, are small programs that run on mobile devices and perform tasks ranging from web browsing to social networking and



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The authors thank the editor and the two anonymous reviewers for their valuable feedback on this paper. gaming. The market for apps is enormous and growing rapidly; in the past few years, it has grown from 0 to a US\$2 billion market (Taylor et al., 2011).

Thanks to the growing popularity of mobile devices and apps, mobile games have become one of the most popular entertainment media (Bose and Yang, 2011). According to Nielsen (2011), games represent the top download category of apps, followed by weather, navigation, and social networking. Strategy Analytics (2010) predicts that mobile gamers will increase by 57 percent within a six-year span, from 532.1 million users in 2010 to 835.7 million in 2015. Compared to PCs and game consoles, mobile devices may not seem to be ideal gaming platforms because of their small size and limited visual effects. However, their portability, which removes the spatial constraints of the larger platforms and allows for short entertainment time periods, has made mobile games a popular choice for leisure activities (Bose and Yang, 2011). Mobile games offer a new range of opportunities for the player's experience. Thus, research on what motivates players to play mobile games will provide better insights into the industry and offer better information for its future development.

There are many mobile games that interact with computers and mobile devices. For example, downloads of Angry Birds, one of the most popular casual games designed for the single player, had reached one billion by May 2012. However, recent online game and mobile game developers have become interested in developing social games (Kleinman, 2009). These games are designed for playing against another player or other players instead of against a computer or device. People can collaborate or compete with friends or other game players to maintain their existing interpersonal relationships and to meet new friends. These interactive games can usually be experienced with more fun than single-player games. Recent research has found that online game players who play against a human opponent report experiencing more presence, flow, and enjoyment than when they play against a computer or device (Weibel et al., 2008). Mandryk et al. (2006) also ascertained that playing against another person leads to higher arousal and a sense of more fun. Most of these empirical studies use data from surveys of all online (i.e. internet) games and do not focus on a new game venue; socially interactive games played on mobile devices.

The present study proposes a new model that can be specifically applied to investigating the acceptance of socially interactive games on mobile devices. Understanding the important antecedents of acceptance – network externalities, individual gratifications, and the mobile device features of socially interactive games – can help service providers design their games to satisfy players more effectively. From a theoretical perspective, examining why people play social games on mobile devices can provide some clues to further understanding how new forms of computer mediated communications are shaping interpersonal relationships. From a practical perspective, an understanding of the needs and motivations of the players of mobile social games can help game designers and marketers develop more successful games and increase their advertising effects.

#### 2. Theoretical background

#### 2.1 Mobile games

A mobile game is a video game played on a mobile device. In late 2007, the appearance of smartphones and the availability of broadband connections with flat data fees changed the circumstances of mobile gaming. New mobile device features – touch screens, increased storage, higher-quality graphics display, and ubiquitous connections to networks – enabled innovations in mobile gaming that heightened both its quality and

user experience. Today mobile device users can play a greater variety of games, not only simple, embedded games but also games on downloaded apps (Feijoo et al., 2012).

Mobile games are seen as casual rather than hardcore gaming. They have easy learning curves and allow playing for short periods of time; they are much more accessible and convenient than other gaming platforms. The Information Solutions Group (2011) indicated that more than one-third of adults in the US and the UK played mobile games at least once per month. The future of mobile gaming is still filled with opportunity. According to a report by Juniper Research, mobile games are projected to surpass \$11 billion in annual revenue by 2014, up from \$8 billion in 2011. Thus, mobile gaming is playing an increasingly important role in the entertainment industry.

#### 2.2 Mobile social games

Social games can be defined as games that use an external social network of some type to facilitate the user's interactions with another player or other players; these social interactions help drive adoption of the game and retain players (Fields and Cotton, 2012). According to Hou (2011), the term social games refers to game applications that are integrated in social networking platforms and are different from other computer games in that they are social platform based; involve multiple players; use real-name identities; and are casual games. In our study, mobile social games are defined as essentially casual games created to be played on portable devices with either strangers or friends in existing social networks. These types of games represent a fast-growing phenomenon. One of the most popular mobile social games is Draw Something, a Pictionary-style game that is more collaborative than competitive. Draw Something is a highly interactive game that garnered more than 35 million downloads in its first six weeks. People play the game with friends or strangers by drawing something on the app and having their friends or strangers guess what the drawing is. Draw Something enables in game chats among users, commenting on completed drawings, and the sharing of finished drawings with others. These games allow individuals to play many games at the same time and with one other or many players, Participants can play on their own schedule while checking in at various points of the day. Unlike traditional mobile casual gaming, in which users played alone against a machine, mobile social games are built to be enjoyed and shared with other people.

As Heeter (1992) stated, being aware of other real people in virtual reality may enhance feelings of social presence and enjoyment. Similarly, Mandryk et al. (2006) found that playing against another person or other people leads to more excitement, experienced fun, and less boredom. Although the importance of social effects has been acknowledged, past researches have focussed primarily on online social games played on personal computers and have not paid special attention to games played on mobile devices. This study aims to fill this gap by analyzing how network externalities, individual gratifications, and mobile device features influence the intention to play mobile social games.

#### 2.3 Network externalities

Network externalities describe how a person's use of a particular product or service changes according to the perceived number of other users of that product or service; the person's use increases if more other people are also using it (Economides, 1996; Katz and Shapiro, 1985). People are more likely to use a particular technology when they perceive that many other people also use it, and especially when many people in their social group use it (Kraut et al., 1998). Researchers consider network externalities

an important factor affecting individuals' use of information technology (Gupta and Mela, 2008; Kim and Lee, 2007; Yang and Mai, 2010). Chun and Hahn (2007) investigated the effects of three network externality factors on users' future intention to use network services: total network size, local network size, and network strength. They suggested that the total network size and the number of active members on the "buddy list" (local network size) are significant network externality factors. Scholars have also maintained that an individual's intention to use a social networking site, which is a pleasure-oriented information system, increases when its participants reach a significant number, especially when more peers join (Baker and White, 2010; Sledgianowski and Kulviwat, 2009; Tapscott, 2008). Thus, social considerations drive network externalities (Janssen and Mendys-Kamphorst, 2007).

Recently, mobile devices have developed as a type of social medium that enables socialization among friends and strangers. Those who use mobile devices can easily interact, communicate, and share with others. However, previous research has seldom studied how network externalities relate to users' perceptions of mobile applications or mobile social games and whether the number of users of mobile social games is a key to the success of the game. After examining the research into network externalities (Baker and White, 2010; Chun and Hahn, 2007; Gupta and Mela, 2008; Katz and Shapiro, 1985; Sledgianowski and Kulviwat, 2009), this study concluded that in the environment of mobile social games, network externalities – the perceived number of users and perceived number of peers – should be considered.

#### 24 U&G

The U&G approach originated in the 1940s and is one of the oldest continuous theories used in mass communications research. The U&G model takes a user-level view and assumes that individuals actively use media to fulfill their particular needs and desires (Katz et al., 1974; Weibull, 1985). These needs are derived from psychological and social situations that produce motives that in turn influence media use (Katz et al., 1974; Pornsakulvanich et al., 2008; Weibull, 1985). Rubin (2002) maintained that the U&G model is valuable for understanding newer and interactive media. Mobile games played on mobile devices are new, experience oriented media that fulfill players' particular needs; thus, the U&G perspective can be applied to mobile entertainment.

In a prior study, Wu et al. (2019) classified three categories of online game player gratifications; social interaction, enjoyment, and achievement. Social interaction means socializing and building relationships with others (Kim and Kim, 2010; Koo, 2009). Enjoyment has been extensively shown as a strong determinant of the intention to use hedonic information systems (Turel et al., 2010; Van der Heijden, 2004). The achievement component involves the desire to gain power, to gather valuable performance points, and to compete successfully with other players (Hartmann and Klimmt, 2006).

Mobile games are designed as casual games focussed on fun and diversion rather than on the productive or long-term achievement goals inherent in hardcore games (Engl and Nacke, 2013). Others have noted that social games are relatively easy to pick up and require few mental resources for achieving gaming tasks (Sherry et al., 2006; Sun et al., 2006; Yee, 2006). Moreover, Engl and Nacke (2013) found that only a few participants were motivated by the mental challenge of playing mobile games and were more interested in killing time with on-demand entertainment. These findings suggest that achievement is not an important factor that contributes to an individual's gratification with mobile social games. Because achievement has been shown to not play a significant role in why people play mobile interactive games, this study does

#### 2.5 Mobile device features

There are some mobile device features. Mobile devices are about saving time, varying location, and convenience (Dong et al., 2012). Convenient value is the main driver for mobile phone usage (Liu, 2010). Smartphones and other mobile devices also have great "convenient value" because their functions provide users with relevant information that helps to manage everyday life and that strengthens users' relationships with others. The spread of 3G and 4G services has helped mobile gaming reach new levels of user experience because users can take advantage of the always-on, always-connected, and always-with-you nature of these devices. With mobile devices, any time of day and any location can provide a gaming context and opportunities to play for any length of time.

Engl and Nacke (2013) conducted an open-question survey on mobile gaming contexts. All statements were divided into two context categories: mobile and home. An on-the-go scenario, for example, was the context of playing mobile games while waiting for or taking public transportation. Typical gaming contexts at home were, for example, sitting on the couch while watching television or relaxing. Most participants described mobile gaming as an enjoyable way to fill time between daily activities, valued especially for its ubiquitous availability and its instant entertainment for short time periods.

# 3. Research model and hypotheses

After reviewing the relevant literature, we developed our research model. Figure 1 presents the model and its constructs.

3.1 Network externalities: perceived number of users and perceived number of peers
Network externalities are keys when participation in a network benefits others in the
network and the value of the network grows as the number of members in the network

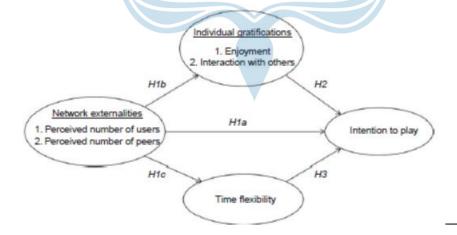


Figure 1. Research model

increases (Song and Walden, 2007). In other words, people use a particular product or service more when more other people also use it and when more people in their social group use it (Kraut et al., 1998). For instance, when the number of mobile device users reaches a critical mass, the device generates more benefits, providing users with more convenient communication, and a wider scope of use. It also attracts more mobile application developers to make their apps available, which in turn brings in more users.

This study focusses on mobile social games, in which the number of people is the key to a successful game. Therefore, it is reasonable to assume that when users perceive that more friends and more other people are playing the same mobile social game, users can interact more readily with friends or strangers at any time and fulfill their entertainment needs, which in turn further enhances users' intention to play the game. In view of the above arguments, this study proposes the following hypotheses:

H1a. Network externalities will positively affect the intention to play mobile social games.

H1b. Network externalities will positively affect individual gratifications.

H1c. Network externalities will positively affect time flexibility.

3.2 Individual gratifications: enjoyment and interaction with others

Moon and Kim (2001) defined enjoyment as "the pleasure the individual feels objectively when committing a particular behavior or carrying out a particular activity." Many scholars (Chou and Tsai, 2007; Colwell, 2007; Ha et al., 2007) have found that users continue to play online games with positive attitudes and stronger motivations if they derive more intense perceived enjoyment from it. Moreover, enjoyment has been found to significantly relate to attitudes toward and intentions to use mobile services (Liao et al., 2007; Kim et al., 2009). In a similar vein, Wang and Li (2012) pointed out perceived enjoyment was the most influential factor that positively affected consumers' intention to purchase mobile value-added services. Sherry et al. (2006) also indicated that social interaction, defined as the use of computer games to interact with other people, is an important gratification. Social interaction has been identified as a key factor that makes users become more engaged and play the game continuously and is a necessary ingredient for the success of massive multiplayer online games (Chen et al., 2006; Cole and Griffiths, 2007). Other research has demonstrated that users spend more time on social games, play them more frequently, and get more engaged in game activities for the purpose of social interaction than they do on nonsocial games (Hou, 2011).

In this study, enjoyment and interaction with others are adopted as the major initiative motivations for playing mobile social games. Gratification refers to the extent that the players' needs are satisfied, so we assume that the stronger the degree of gratification, the greater the intention to play mobile social games. Therefore, this study hypothesizes the following:

H2. Individual gratifications will positively affect the intention to play mobile social games.

Why do people

Mobile games are played on smartphones, tablet computers, or other hand-held computing devices. These devices features are more accessible, mobile, portable, and convenient than other game platforms and allow users to enjoy games without the constraints of time or space. Accessibility and time flexibility have attracted many people to play mobile games, which leads to the following hypothesis:

H3. Time flexibility will positively affect the intention to play mobile social games.

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#### 4. Research methods

#### 4.1 Data collection

This research targeted subjects who played online games or mobile games in Taiwan. Participants were solicited through a web-based survey because most game players are internet users. Tan and Teo (2000) suggested that online surveys have several advantages over traditional paper-based surveys because they are cheaper to conduct, elicit faster responses, and are geographically unrestricted. We used my3q (www.my3q.com/) to construct our web-based survey and placed survey messages on popular game-related web sites in Taiwan: Bahamut (www.gamer.com.tw), Gamebase (www.gamebase.com.tw), and Taiwan's game-related bulletin board systems. Respondents who clicked on the questionnaire URL were led to the survey instrument. All respondents participated voluntarily. Each participant was required to answer every question in the online survey, and an incentive (the opportunity to win one of five possible \$500NT – US\$16 – department store gift vouchers) was applied to increase the response rate.

During the two week survey period (from September 1, 2012 to September 14, 2012), 253 responses were received. After those with missing data were eliminated, 237 responses were complete and usable, of which the male and female samples were nearly equal in number. The largest age group was 25-29 years old, accounting for 45.6 percent of the respondents. As for participants' occupations, 44.3 percent of the respondents were students, and 55.7 percent were office workers. Most of the respondents had either undergraduate (48.5 percent) or graduate (35.9 percent) degrees. A majority of respondents (84.8 percent) used mobile devices; 48.1 percent played mobile games for an average of less than 1 hour per day. Half of the participants (50.6 percent) had installed from one to ten games on their mobile devices. Table I summarizes the demographics of the respondents.

#### 4.2 Research instrument

This study's questionnaire was developed from relevant previous literature and carefully modified to ensure that the items fit this context; the list of items is displayed in Appendix. The measure of intention was adapted from Venkatesh and Davis (2000). The two dimensions of individual gratification were derived from previous studies; enjoyment measures were obtained from Agarwal and Karahanna (2000) and Koo (2009), and interaction with others measures were adapted from Hou (2011) and Yee (2006). Network externalities were measured according to two components: perceived number of users and perceived number of peers. Measurement items for the perceived number of users were modified from Pae and Hyun (2002). Measurement items for the perceived number of peers were modified from Lou et al. (2000). Time flexibility measures the degree to which a user can play a mobile social game at any time and can control the period of time to play. Because there was no existing measurement reported in previous studies, we designed items to assess users'

INTR 24,3	Measure	Item	Number	%
24,0		6336		
	Gender	Male	108	45.6
	FIGURE CO.	Female	129	54.4
	Age	Under 18	37	15.6
		19-24	53	224
320		25-29	108	45.6
		30-34	18	7.6
		35-39	16	68
		>40	5	21
	Education	High school (and below)	37	15.6
		College degree	115	48.5
		Master's (and above)	85	35.9
	Occupation	Student	105	44.3
		Office worker	122	55.7
	Use mobile device?	Yes	201	848
		No	36	15.2
	Average mobile game playing time per day	Have no mobile device	36	15.2
		Do not play games	19	80
		Less than 1 hour	114	48.1
	ATMA JAKA	1-3 hours	59	24.9
	Shirt	3-5 hours	6	25
		More than 5 hours	3	1.3
	Number of games in mobile devices	Have no mobile device	36	15.2
		0	6	2.5
		1-10	120	50,6
	2 / \	11-20	43	181
Table I.		21-30	10	42
Participants		31-40	10	4.2
demographics		>41	12	7.1

per ceptions of time flexibility when playing mobile social games. All questionnaire items were measured on a five-point Likert-type scale, from "strongly disagree" (1) to "strongly agree" (5).

## 4.3 Analysis

A two step approach was adopted. The first step was to test the reliability and validity of the measurement model. The second step was to assess the research hypotheses and structural model using partial least squares (PLS). PLS was selected for data analysis because it is suitable for small sample research and places minimal demands on measurement scales and residual distributions (Chin et al., 1996). A repeated indicator approach was used for handling the second-order factors. The two second-order factors (network externalities and individual gratifications) were measured by all indicators of each first-order factor.

### 5. Results

#### 5.1 Tests of the measurement model

The reliability analysis used Cronbach's  $\alpha$  and composite reliability (CR) to assess the model's internal consistency. Cronbach's  $\alpha$  of each construct ranged from 0.84 to 0.91, which is greater than the accepted level of 0.7 recommended by Hair *et al.* (1998). Every CR scored above 0.9, which exceeded the 0.7 score suggested for CRs by Fornell and Larcker (1981). There was convergent validity according to the three standards

recommended by Bagozzi and Yi (1988): all indicator factor loadings should exceed 0.5 (Hair et al., 1998); the CR should be above 0.7; and the average variance extracted (AVE) should exceed 0.5 (Fornell and Larcker, 1981). The indicator factor loading of every item exceeded 0.7. The CR ranged from 0.91 to 0.94. The AVE ranged from 0.76 to 0.85. Table II provides details of these results. The discriminant validity was assessed by the square root of the AVE for each construct, which should be greater than the correlation among the constructs (Fornell and Larcker, 1981). Table III shows that all square roots of the AVE (diagonal numbers) were greater than the off-diagonal numbers. Therefore, the measurement model in this research shows satisfactory reliability, convergent validity, and discriminant validity.

Factor loadings	Cronbach's	Composite reliability	Average variance extracted	Mean	
	0.89	0.93	0.82	3.71	
2 0.83	ATMA	JAYA,			
25/10	0.84	0.91	0.76	3.49	
2 0.90			1		
0.81	0.87	0.92	0.80	3.86	
0.85	0.91	0.94	0.85	3.85	
0.87 0.88	0.01	0.00		0.00	
0.78 0.76	0.84	0.92	0.79	3.76	
0.79	0.88	0.92	0.81	3.77	7.11 W
0.81 0.82 0.82					Table II. Summary of measurement scales
		2.0			-
PNP	Enj	IwO	TF	ItP	
0.87	0.89				
0.25 0.41	0.51 0.39	0.92	0.89		Table III.
	1 0.84 2 0.83 3 0.84 1 0.89 2 0.90 3 0.73 0.81 0.76 0.85 0.81 0.87 0.88 0.78 0.79 0.81 0.82 0.82 0.82	1 0.84 0.89 2 0.83 0.84 1 0.89 0.84 1 0.89 0.90 2 0.90 3 0.73 0.87 0.81 0.76 0.85 0.91 0.87 0.88 0.84 0.78 0.76 0.79 0.88 0.81 0.82 0.82  PNP Enj  0.87 0.48 0.89 0.25 0.51	loadings   α   reliability	loadings   2   reliability   extracted	loadings α reliability extracted Mean

#### 5.2 Tests of the structural model

The structural model was tested with the structural equation modeling technique. The resulting estimations from PLS are shown in Figure 2. The bootstrap resampling method was applied to determine the significance of the structural model paths. The path coefficient among the constructs and the significance of each hypothesis were examined. The testing results support the influence of network externalities on the intention to play mobile social games ( $\beta$  = 0.19, p < 0.05), on individual gratifications ( $\beta$  = 0.5, p < 0.001), and on time flexibility ( $\beta$  = 0.41, p < 0.001), thus supporting H1a, H1b, and H1c. The hypothesized path from individual gratifications is significant in the prediction of the intention to play mobile social games ( $\beta$  = 0.53, p < 0.001), supporting H2. The effect of time flexibility on the intention to play mobile social games is significant ( $\beta$  = 0.16, p < 0.05), supporting H3. As hypothesized, all paths were positively significant at the p < 0.05 level or above. Hence, H1-H3 were supported. The explained variance ( $R^2$ ) indicated how well the antecedents explained an endogenous variable. With an explanatory power of 53 percent, the intention to play mobile social games is influenced by network externalities, individual gratifications, and time flexibility.

## 5.3 Views of a few respondents

In order to better understand why people play mobile social games, we chose five respondents at random and had a short chat with each of them. These five sample respondents were each asked four open ended questions: Why do you play mobile social games? When do you usually play mobile social games? What are your thoughts and reflections on playing mobile social games? Will you continue to play mobile social games in the future?

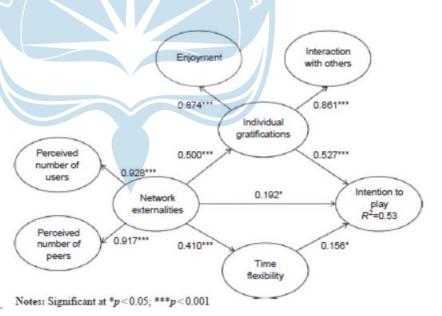


Figure 2. Results of structure model

The first respondent, a male student, said, "I play mobile social games because playing with friends is interesting and can improve our friendship." "I usually play mobile social games while waiting for or taking public transportation. It helps pass the time." "I like to play mobile social games because they are interesting and I can interact with my friends. But I get tired of playing a particular game if the game's design isn't upgraded." "I think I will continue to play mobile social games if the games are new and fun and my friends also play them."

The second respondent, a male office worker, made similar comments: "I play mobile social games because it is a way to kill time. If I don't play mobile social games, I can't discuss the games with friends, and most of my friends play mobile social games." "I play mobile social games when I am in waiting situations or when I have free time during work." "I love to play mobile social games because they make me relax, are easy to pick up, and help improve my brain power." "I play mobile social games as part of my daily life, and I will continue to play and discuss them with friends."

The third respondent, a female office worker, made these observations: "I play mobile social games because they are fun and interesting." "I play mobile social games before I go to sleep." "I like to play games that connect with Facebook because I can see my friends' photos during the game, and it is just as if they are beside me." "I will continue to play mobile social games because they provide an easy way to kill time and to have a good experience with friends."

The fourth respondent, a female student, made some different comments: "I play mobile social games because I saw lots of people and my friends playing mobile social games, which led me to give them a try." "I play mobile social games only when I am waiting for my next class to begin." "I don't plan to play mobile social games anymore because some games require asking Facebook friends for help, and if no one helps me, I can't continue the game. It's really frustrating."

The fifth respondent, a male office worker, echoed other respondents: "I play mobile social games because they help me relax, connect with friends, and make me happy." "I play mobile social games when I wait for the bus to go to work." "Yes, I will continue to play mobile social games if the games' designs become more challenging and novel."

#### 6. Discussion

This paper sheds light on why people intend to play mobile social games. Recently, mobile gaming has been playing an increasingly important role in the entertainment industry, and this study focusses on the newest game type, the mobile social game. This research developed an integrated theoretical framework to investigate the important antecedents of players' intention to play mobile social games. The findings reveal that individual gratifications play the most important roles in why people join mobile social games, whereas time flexibility and network externalities appeared to play less direct crucial roles even though they are two of the special features of mobile devices. However, network externalities influence the willingness to join social mobile games indirectly via individual gratifications. The followings are more specific discussions.

First, our results reveal that individual gratification, a second-order factor reflected in perceived enjoyment and interaction with others, is a strong determinant of users' intention to play mobile social games. Noticeably, both of the two sub-constructs contribute greatly to individual gratifications. This is consistent with previous research suggesting that people get more engaged in social games for the purpose of social interaction and diversion (Hou, 2011). It also supports research evidence showing that playing computer games against another person or other people leads to a sense of more fun and higher arousal than playing against a computer (Mandryk et al., 2006). Furthermore, Huang and Hsieh (2011) showed that online games gratifying gamers' entertainment needs leading to their loyalty toward online game, but sociality produce negligible effects on loyalty. They gave it a possible explanation was that social networking sites such as Facebook, MySpace, Twitter, etc., can fulfill the need for social gratifications. In the mobile social gaming, however, this paper shows that both perceived enjoyment and interaction with others are important antecedents of players' intention to play mobile social games. Thus, the importance of the enhanced enjoyment and social interactivity of the mobile social game design becomes obvious.

The second finding from our empirical study is that network externalities play a pivotal role in our research topic. Network externalities significantly influence individual gratification and time flexibility. When many peers or other people play the same game, that critical mass positively enhances users' pleasurable experience, and users can control the length of play time. These results echo the finding of previous study (Lu and Wang, 2008), indicating that gamers might derive more pleasure from playing online game when their friends or significant others also participate. More important, network externalities themselves directly contribute to the intention to play mobile social games. The total number of players and peers are key to whether or not the game is a success because the central concept of social gaming is interacting with real people (Fields and Cotton, 2012). In the case of another social hedonic technology, Facebook, which is one of the most popular social networking sites, scholars have found that users had a positive attitude toward continued intention to use Facebook when they perceived that more peers and other people joined Facebook (Lin and Lu, 2011). Taylor et al. (2011) also suggested that social networks' actors play an important role in consumers' decisions to download and use mobile game apps. In other words, consumers are more likely to user mobile apps and play certain mobile game apps if their most influential contacts also use those mobile apps.

Another feature of mobile social games is that they do not require all friends to be online at the same time to play a game, which means that each user can play whenever he or she wants to and has time, which leads to more time flexibility. However, our results showed a perhaps surprisingly small perceived influence effect of time flexibility on the intention to play mobile social games. This result may be explained by Wagner (2011), who found that consumers generally use smartphones to write e-mails, browse the web, or access social networks while they are en route to another location. Engl and Nacke (2013) also indicated that other leisure activities, such as listening to music and reading books in mobile contexts, compete with playing mobile games. For some participants, mobile gaming is only an activity of last resort if there is no other enjoyable way to spend leisure time.

## 7. Implications

The appeal and opportunities of mobile applications and the mobile gaming market are attracting increasing numbers of entrepreneurs and innovators in the entertainment industries. However, there have been few academic studies that focus on mobile social games. This study contributes to both theory and practice.

From the theoretical standpoint, this study makes two contributions to research. First, it successfully applies a combination of network externalities theory and U&G theory to investigate the antecedents of players' intentions to play mobile social games. This study is able to provide a better understanding of how two dimensions —
perceived number of users/peers and individual gratification — influence mobile game
playing, an insight that has not been examined previously in the mobile apps literature.
This approach is a first step toward integrating this two-theory research on mobile
social games and opens up other areas for further research.

This study's other contribution to theoretical research is its investigation of network externalities in the context of mobile services. Although network externalities have received a considerable amount of attention in traditional communication and information systems, they have seldom been investigated in the context of such mobile services as mobile games. Our results indicate that two factors of network externalities – perceived number of users and perceived number of peers – have significant effects on individual gratification, time flexibility, and intention to play. The implication of this finding is that although network externalities comprise a critical technology acceptance variable affecting customer's behavior toward using any type of technology, they are crucial for social hedonic technology. This research presents a new context for mobile applications of network externalities in innovative technologies and in future research.

This study also makes several practical contributions. Its results have implications for mobile social game practitioners' development and marketing strategies. First of all, our study shows that enjoyment is the variable with the greatest effect on intention to play mobile social games and that interaction with others is a key factor in making people want to play these games. Hence, the developers of mobile social games should highlight the social aspect of their games, enhance players' interactions by designing various interactive mechanisms and networking functions, and develop content that infuses a creative and collective enjoyment atmosphere into the games so that players and their friends feel interested, have fun, and fulfill their individual social needs.

Another practical contribution of this study's findings is that network externalities clearly play a crucial role in social game adoption. We therefore recommend that managers consider how the social factors that affect how users perceive network externalities are vital to users' participation, and consequently, to the success of each mobile social game. The social element makes a game "sticky" (Fields and Cotton, 2012); therefore, administrators should provide ways for users to help grow the game's user base, such as by encouraging members to invite their friends to join the game and thereby enhance player interactions in the game. For example, developing an award for making social recommendations will motivate users to convince friends to play the game; when network externalities develop, it will be easier to retain users and their friends.

Still another practical contribution of our study is its finding that the time flexibility variable appears to play a lesser role in influencing the intention to play mobile social games. One explanation is that mobile devices already enable users to be online all the time and to interact with others whenever they want to and wherever they are. This feature can be described as a "hygiene factor," and improving hygiene factors does not lead to improvement in people's satisfaction (Herzberg et al., 1959). Because mobile devices are already always available to everyone, the characteristic of time flexibility alone may not motivate people to want to play mobile social games. We suggest that administrators instead emphasize developing and delivering fun and enjoyable games and focus on providing different ways to interact with their real-world associates so that they can compete with other entertainment activities designed for leisure time.

Finally, another important practical implication of this study's findings is that they demonstrate the importance of paying attention to the social dimension of mobile games. The rapid adoption of mobile devices and thousands of app games have given millions of users new ways to play online games. In fact, mobile game apps are generally free to play, but their developers make money by selling indirect advertising. Therefore, keeping the game popular and retaining the "eyeballs" of certain demographics are valuable features that advertisers will want to reach. In this context, it is worth noting that in the competitive apps world, anyone can make an app. People do not have time to see every available app and do not even know how to look for them; instead, they rely on friends to tell them about apps they might enjoy (Fields and Cotton, 2012). We suggest that administrators be more concerned about developing electronic word-of-mouth and pay attention to how to acquire new players, retain them, and encourage them to interact with others as the game progresses. For example, embedding a game in social networking sites makes it easy to find, to invite and interact with friends, and to create a community in which users share news of their game activities. Merging gaming and communication can help engage new users and spread the game.

We also conducted a short chat with five randomly selected respondents and obtained interesting views on why people play mobile social games. Most of the respondents stated that they play these games because lots of people and friends also play them, and playing with friends is more interesting and fun than playing against a computer. This response is consistent with the results of our research; network externalities - the perceived number of users and perceived number of peers - have significant effects on individual gratification and intention to play. One interesting statement from a male office worker was that he loves to play mobile social games because they make him relax and help improve his brain power. Another male office worker also mentioned that he will continue to play mobile social games if the games' designs become more challenging and novel. Thus, we suggest that administrators focus more on developing more intellectually challenging social games that enable players to play with friends, have fun, and achieve their goals together. A different issue arose with one female student's statement that she does not plan to continue playing mobile social games because some games require asking for Facebook friends' help, and she becomes frustrated when friends cannot help her to continue the game. Managers should take a close look at how to avoid this phenomenon as they connect mobile social games on social networking sites (such as Facebook).

#### 8. Limitations and suggestions for future research

Despite its useful findings and implications, this study is not without limitations and questions that warrant future research. First, the topic researched is social interactive games. Although the finding shows the important role of network externalities, in the future, other social factors that might influence the intention to play mobile social games could be investigated to extend this work. Second, online questionnaires were used to collect information; a self-selection bias may well be present in such online surveys. We propose that future research use an interview-assisted quantitative viewpoint to support such research. Third, this study used a convenience sample in Taiwan. The results of this study cannot be generalized to different geographic locations. It would be interesting for future researchers to study Taiwanese attitudes compared with those in other countries.

Finally, this study's finding that social interaction is a key factor in making users want to play social mobile games can be further explored in terms of how different personality types respond to games' social dimensions. Scholars have suggested that

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personality can predict the frequency of game playing (McClure and Mears, 1984), affect the preference for mobile games (Arteaga et al., 2012), and that people who are shy but wish to be social can develop a better relationship with others online (Sheeks and Birchmeier, 2007). Future studies can broaden our understanding of the social dimensions of mobile social games by investigating how different personality types develop intentions to play and experience mobile social games.

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play mobile social games?

## Appendix. Questionnaire instrument

	Perceived number of users					
1	I perceive that a good number of people play mobile social games.	1	2	3	4	5
2	I perceive that most people play mobile social games.	1	2	3	4	5
3	I perceive that there will be many more people playing mobile social games in the future.	1	2	3	4	5
Т	Perceived number of peers	_				
1	I perceive that many friends around me play mobile social games.	1	2	3	4	5
2	I perceive that most of my friends play mobile social games.	1	2	3	4	5
3	I perceive that many friends will play mobile social games in the future.	1	2	3	4	5
Π	Enjoyment					
1	I think it is fun to play mobile social games.	1	2	3	4	5
2	I think playing mobile social games makes me relax.	1	2	3	4	5
3	I think playing mobile social games brings me pleasure.	1	2	3	4	5
	Interactions with others					- 3
1	I think playing mobile social games enables me to interact with others.	1	2	3	4	5
2	I think playing mobile social games can fulfill my need for interacting with others.	1	2	(3)	4	5
3	I think playing mobile social games increases my opportunities to interact with others.	1	2	3	4	5
	Time flexibility		K	2)		
1	I can control the time playing mobile social games by myself,	1	2	3	4	5
2	I can play mobile social games anytime.	1	2	3	4	5
3	I can begin and stop playing mobile social game at any time.	1	2	3	4	5
	Intention to play					K
1	I am willing to play mobile social games.	1	2	3	4	5
2	I will give playing mobile social games a try.	1	2	3	4	5
3	I will take the initiative to play mobile social games,	1	2	3	4	5

All questionnaire items used a five-point Likert scale (1 – strongly disagree to 5 – strongly agree).

# About the authors

Dr Pei-Shan Wei is currently a PhD Candidate in the Department of Information Management, National Taiwan University of Science and Technology. Her research interests include social networking sites, e-commerce, online consumer behaviors, and internet marketing. Her work has appeared in Computers in Human Behavior. Dr Pei-Shan Wei is the corresponding author and can be contacted at: melodyps@gmail.com

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# **APPENDIX II: QUESTIONNAIRE**

I'm Hendy Maleakhi, a student from Atma Jaya University, Yogyakarta, International Business Management Program.

Currently, I am working on a thesis on "An examination of network externalities and of uses and gratifications on the people intention to play mobile social games in Indonesia" Thank you for your participation and willingness.

Perkenalkan, saya Hendy Maleakhi mahasiswa fakultas ekonomi program studi Manajemen Bisnis Internasional dari Universitas Atma Jaya Yogyakarta.

Saat ini, saya sedang mengerjakan skripsi tentang "An examination of network externalities and of uses and gratifications on the people intention to play mobile social games in Indonesia" Saya memohon bantuan Bapak/Ibu/Saudara/i untuk meluangkan waktu dalam mengisi kuesioner ini. Atas partisipasi dan kesediaan Bapak/Ibu/Saudara/I, saya ucapkan terima kasih.

# Section I: Respondent's Profile and Filter Question

Bagian I: Profil Respondent and Filter Pertanyaan

**Gender** Jenis Kelamin:

Age Umur:

Daily time spent on playing mobile games waktu rata-rata yang digunakan untuk bermain game seluler dalam sehari

Using mobile device every day menggunakan perangkat seluler setiap hari?

**Mobile Social Game Definition (included within the questionnaire)** 

"Mobile Social Games" is a type of mobile game that allows users to connect directly with other users, both unknown and known people, examples of these games that are popular among us are: "Mobile Legends", "PUBG Mobile", "Hago", "Dota", etc.

# Definisi "Mobile Social Games"

"Mobile Social Games" adalah jenis permainan seluler yang memungkinkan pengguna untuk berhubungan langsung dengan pengguna lainnya, baik orang tak dikenal maupun yang dikenal, contoh permainan tersebut yang terkenal dikalangan kita adalah: "Mobile Legends", "PUBG Mobile", "Hago", "Dota", dll.

# **Section II: Questionnaire**

Bagian II: Kuisioner

**SD: Strongly Disagree** 

**SA: Strongly Agree** 

	Perceived number of users			Sca	le	
	Perceived number of users	SD				SA
1.	I perceive that a good number of people play mobile social games. Saya percaya sudah banyak orang yang bermain "mobile social games".	1	2	3	4	5
2.	I perceive that most people play mobile social games. Saya percaya kebanyakan orang bermain "mobile social games".	1	2	3	4	5
3.	I perceive that there will be many more people playing mobile social games in the future.  Saya percaya kedepannya akan lebih banyak lagi orang yang bermain "mobile social games"	1	2	3	4	5

SD: Strongly Disagree

**SA: Strongly Agree** 

	Denocited eventor of nears			Scale	e	
	Perceived number of peers	SD				SA
4.	I perceive that many friends around me					
	play mobile social games.	1	2	2	4	5
	Saya percaya banyak teman-teman disekitar	1	2	3	4	3
	saya yang bermain "mobile social games".					
5.	I perceive that most of my friends play					
	mobile social games.	1	2	2	4	5
	Saya percaya kebanyakan teman saya bermain	1	2	3	4	3
	"mobile social games".					
6.	I perceive that many friends will play					
	mobile social games in the future.	1	2	2	4	5
	Saya percaya banyak teman saya akan	1	2	3	4	3
	bermain "mobile social games".					

**SD:** Strongly Disagree

**SA: Strongly Agree** 

	Enjarant			Sca	ıle	
	Enjoyment	SD				SA
7.	I think it is fun to play mobile social games. Saya pikir bermain "mobile social games" menyenangkan.	1	2	3	4	5
8.	I think playing mobile social games makes me relax. Bermain "mobile social games" membuat saya merasa santai.	1	2	3	4	5
9.	I think playing mobile social games brings me pleasure. Saya rasa bermain "mobile social games" memberi saya kesenangan.	1	2	3	4	5

**SD: Strongly Disagree** 

SA: Strongly Agree

Interactions with others	1		Scal	e	
interactions with others	SD				SA
10. I think playing mobile social games enables					
me to interact with others.	1	2	3	4	5
Bermain "mobile social games" memungkinkan	/		3	4	3
saya untuk berinteraksi dengan orang lain.					
11. I think playing mobile social games can					
fulfill my need for interacting with others.					
"mobile social games" dapat memberikan	1	2	3	4	5
sarana yang memuaskan untuk berinteraksi					
dengan orang lain.					
12. I think playing mobile social games					
increases my opportuinities to interact with					
others.	1	2	3	4	5
Bermain "mobile social games" dapat	1		3	4	3
meningkatkan kesempatan saya untuk					
berinteraksi dengan orang lain.					

# **SD: Strongly Disagree**

SA: Strongly Agree

Time flevibility			Scale	e	
Time flexibility	SD				SA
13. I can control the time playing mobile social					
games by myself.	1	2.	3	4	5
Saya dapat mengatur waktu berapa lama saya	1		3	4	3
Bermain "mobile social games".					
14. I can play mobile social games anytime.					
Saya dapat bermain "mobile social games"	1	2	3	4	5
kapan saja.					
15. I felt that shopping is more like an escape					
for me.	1	2	2	4	5
Saya dapat memula dan berhenti bermain	1		3	4	3
"mobile social games" sesuai keinginan saya.					

# SD: Strongly Disagree

SA: Strongly Agree

Intention to play			Sca	ıle	
Intention to play	SD				SA
16. I am willing to play mobile social games.					
Saya memiliki keinginan untuk bermain "mobile	1	2	3	4	5
Social games".					
17. I will give playing mobile games a try.					
Saya akan mencoba bermain "mobile social	1	2	3	4	5
games"					
18. I will take the initiative to play mobile social					
games.	1	2	2	4	5
Saya berinisiatif untuk bermain "mobile social	1		)	<del>  4</del>	3
games".					



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3	5	5			NEP2	NEP3	EJ1	EJ2	EJ3	IW01	IWO2	IWO3	TF1	TF2	TF3	ITP1	ITP2	ITP3
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135	5	5	5	5	5	5	4	3	4	4	4	2	4	2	4	4	4	4
136	5	5	5	5	5	5	√5△	5	5	5	3	5	5	3	3	5	5	5
137	4	4	4	5	5	2	4	4	4	5	5	5	5	5	5	5	2	2
138	5	5	3	4	4	3	3	3	3	4	<b>3</b>	4	5	5	5	3	3	2
139	5	4	5	4	4	4	4	2	4	4	2/	2	4	2	2	2	4	2
140	4	4	5	5	4	4	4	5	5	4	4	4	2	5	3	4	4	4
141	5	5	5	5	5	5	5	5	5	5	5	<b>5</b>	4	5	5	5	5	5
142	5	4	5	5	5	5	4	4	4	4	2	4	4	5	5	2	2	2
143	5	4	4	5	4	4	4	3	4	3	3	3	2	4	4	5	5	5
144	4	4	4	4	4	4	3	3	3	4	3	3	5	5	5	4	3	4
145	5	4	5	3	3	4	5	4	5	5	4	5	5	3	5	5	5	5
146	5	4	4	4	3	3	2	2	2	3	2	2	5	4	5	1	1	1
147	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4
148	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5
149	5	5	5	4	4	4	5	3	5	5	5	5	1	1	1	5	5	5
150	5	3	4	5	4	3	5	3	3	2	3	2	5	2	5	4	4	4

	Α	В	С	D	Е	F	G	Н	1	J	K	L	М	N	0	Р	Q	R
151	5	4	5	5	5	5	4	3	4	3	3	4	5	5	5	5	4	4
152	4	4	5	4	4	4	5	4	4	4	4	4	5	4	5	4	4	4
153	5	4	4	3	4	4	5	4	5	5	5	5	2	2	3	3	3	3
154	4	4	5	4	5	5	5	4	5	5	4	4	5	5	5	3	3	3
155	5	5	4	4	5	4	5	4	5	5	4	5	5	4	5	5	4	5
156	4	4	5	4	4	5	4	4	5	4	4	5	4	4	4	4	4	5
157	4	4	4	5	4	4	5	5	4	5	5	4	5	4	4	5	4	5
158	5	4	4	4	4	4	3	3	3	4	3	4	4	3	3	3	3	3
159	4	4	4	4	4	4	4	3	3	4	4	4	5	5	5	4	4	4
160	5	5	4	4	5	4	4	4	5	4	4	4	4	4	5	5	4	4
161	5	5	5	5	5	5	5	5	5	5	5	5	2	3	4	5	5	5
162	4	4	5	5	5	5	3	3	3	3	3	3	3	3	5	3	4	4
163	5	5	5	4	5	4	4	3	3	3	3	3	4	4	4	2	3	2
164	5	5	5	5	5	4	4	4	4	3	3	3	5	3	4	2	2	2
165	5	4	5	4	4	3	3	3	3	4	4	4	3	4	4	3	3	3
166	5	5	5	5	5	5	4	4	4	5	4	4	1	1	1	1	1	1
167	5	5	5	5	5 <	5	5	4	5	5	4	5	5	5	5	4	4	4
168	5	5	5	5	5	2	5	4	5	2	<b>G2</b>	2	5	4	5	5	5	5
169	4	4	3	4	4	3	4	4	4	4	3	3	4	3	4	4	3	4
170	5	5	4	5	5	5	5	4	4	5	4	4	4	4	4	4	4	4
171	5	5	4	5/	5	5	4	4	5	5	5	5	4	5	4	5	5	4
172	5	3	5	5	4	5	3	3	4	4	4	4	4	4	3	4	4	3
173	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	4
174	5	5	5	4	5	4	4	3	4	4	3	3	1	5	4	5	4	5
175	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
176	4	3	4	4	4	4	5	4	3	3	1	2	4	3	4	4	4	3
177	5	2	5	5	5	5	4	2	3	5	2	3	5	1	5	2	2	2
178	4	4	4	4	4	4	4	3	4	2	2	2	4	3	4	3	3	3
179	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
180	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

	Α	В	С	D	Е	F	G	Н	1	J	K	L	М	N	0	Р	Q	R
181	4	4	4	4	4	4	5	4	5	4	4	3	3	4	4	4	5	5
182	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
183	5	4	4	4	3	3	4	3	4	5	4	5	4	4	5	4	3	2
184	5	3	5	5	4	5	4	2	2	3	1	3	4	4	5	4	4	4
185	5	3	4	4	4	4	3	3	4	4	3	3	4	3	5	4	4	4
186	5	4	5	3	3	3	4	1	1	4	1	2	1	3	1	2	1	2
187	4	4	4	4	4	4	4	5	5	5	5	4	4	5	4	4	5	4
188	4	4	4	4	4	4	4	4	4	3	4	4	3	3	3	4	4	4
189	4	4	5	5	4	5	4	4	4	5	4	4	5	4	5	4	4	5
190	5	2	4	4	3	1	4	1	4	4	4	4	4	2	4	2	4	2
191	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
192	5	5	4	5	5	4	4	4	4	3	2	2	4	4	2	4	4	3
193	5	5	5	5	5	5	5	3	5	5	5	5	5	4	5	3	5	4
194	5	5	5	5	5	5	2	2	2	2	3	3	2	3	4	2	2	2
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196	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	4	5	5
197	5	4	4	5	4	4	4	4	4	3	2	3	4	2	4	4	3	3
198	5	4	5	3	4	5	4	5	4	4	<b>4</b>	4	5	4	3	5	4	4
199	5	5	5	5	5	5	1	1	1	1	1	1	5	5	5	1	3	2
200	5	4	5	5	5	5	2	2	2	2	2	3	3	2	2	1	1	1
201	5	5	5	5	4	4	4	2	3	2	2	2	2	2	3	4	4	4
202	4	4	5	3	4	4	2	2	3	3	3	3	5	1	5	3	3	3
203	5	5	5	5	5	5	5	4	5	5	4	5	4	5	5	5	4	5
204																		
205																		
206																		
207																		
208																		
209																		
210																		



No.	Jenis Kelamin	Umur	Rata-rata bermain (perhari)	Menggunakan perangkat seluler setiap hari
1	Wanita	22	<1 jam	Ya
2	Pria	22	1-3 jam	Ya
3	Pria	19	3-5 jam	Ya
4	Pria	19	>5 jam	Ya
5	Wanita	22	<1 jam	Ya
6	Pria	19	1-3 jam	Ya
7	Wanita	22	<1 jam	Ya
8	Pria	23	>5 jam	Ya
9	Wanita	22	3-5 jam	Ya
10	Pria	21	<1 jam	Ya
11	Pria	A 22	3-5 jam	Ya
12	Pria	21	3-5 jam	Ya
13	Pria	22	<1 jam	Ya
14	Pria	23	3-5 jam	Ya
15	Pria	24	>5 jam	Ya
16	Pria	22	3-5 jam	Ya
17	Wanita	21	>5 jam	Ya
18	Pria	22	1-3 jam	Ya
19	Wanita	21	<1 jam	Ya
20	Wanita	22	1-3 jam	Ya
21	Wanita	22	1-3 jam	Ya
22	Wanita	21	<1 jam	Ya
23	Pria	25	3-5 jam	Ya
24	Pria	20	1-3 jam	Ya
25	Wanita	20	>5 jam	Ya
26	Wanita	22	<1 jam	Ya
27	Pria	22	1-3 jam	Ya
28	Wanita	22	>5 jam	Ya
29	Wanita	22	>5 jam	Ya
30	Pria	22	<1 jam	Ya
31	Pria	22	1-3 jam	Ya
32	Pria	21	3-5 jam	Ya
33	Pria	23	1-3 jam	Ya
34	Pria	22	>5 jam	Ya
35	Wanita	22	1-3 jam	Ya
36	Wanita	22	<1 jam	Ya
37	Pria	23	>5 jam	Ya
38	Pria	22	1-3 jam	Ya
39	Pria	25	1-3 jam	Ya
40	Pria	20	<1 jam	Ya
41	Wanita	21	1-3 jam	Ya

42	Pria	19	1-3 jam	Ya
43	Wanita	21	<1 jam	Ya
44	Pria	21	>5 jam	Ya
45	Pria	23	<1 jam	Ya
46	Pria	22	<1 jam	Ya
47	Pria	22	1-3 jam	Ya
48	Wanita	22	3-5 jam	Ya
49	Pria	23	1-3 jam	Ya
50	Pria	20	<1 jam	Ya
51	Wanita	22	<1 jam	Ya
52	Pria	22	1-3 jam	Ya
53	Wanita	21	1-3 jam	Ya
54	Pria	21	1-3 jam	Ya
55	Wanita	22	1-3 jam	Ya
56	Pria ATV	A 23)	1-3 jam	Ya
57	Pria	23	>5 jam	Ya
58	Wanita	21	3-5 jam	Ya
59	Wanita	21	>5 jam	Ya
60	Pria	23	>5 jam	Ya
61	Wanita	22	<1 jam	Ya
62	Pria	21	1-3 jam	Ya
63	Pria	22	1-3 jam	Ya
64	Pria	19	1-3 jam	Ya
65	Pria	23	>5 jam	Ya
66	Wanita	22	1-3 jam	Ya
67	Pria	22	>5 jam	Ya
68	Pria	19	3-5 jam	Ya
69	Pria	21	3-5 jam	Ya
70	Pria	21	1-3 jam	Ya
71	Pria	23	3-5 jam	Ya
72	Wanita	21	<1 jam	Ya
73	Pria	23	<1 jam	Ya
74	Wanita	20	1-3 jam	Ya
75	Pria	22	1-3 jam	Ya
76	Wanita	21	1-3 jam	Ya
77	Pria	22	1-3 jam	Ya
78	Pria	25	3-5 jam	Ya
79	Pria	22	<1 jam	Ya
80	Pria	23	>5 jam	Ya
81	Pria	22	3-5 jam	Ya
82	Pria	23	1-3 jam	Ya
83	Pria	23	1-3 jam	Ya
84	Wanita	21	>5 jam	Ya
85	Pria	23	<1 jam	Ya

86	Pria	23	<1 jam	Ya
87	Wanita	21	<1 jam	Ya
88	Wanita	19	<1 jam	Ya
89	Pria	23	<1 jam	Ya
90	Wanita	22	3-5 jam	Ya
91	Wanita	20	3-5 jam	Ya
92	Pria	23	3-5 jam	Ya
93	Wanita	21	<1 jam	Ya
94	Pria	23	3-5 jam	Ya
95	Pria	22	1-3 jam	Ya
96	Wanita	21	<1 jam	Ya
97	Pria	24	>5 jam	Ya
98	Pria	23	3-5 jam	Ya
99	Wanita	22	<1 jam	Ya
100	Pria	A J <sub>21</sub> )	3-5 jam	Ya
101	Wanita	23	<1 jam	Ya
102	Wanita	25	<1 jam	Ya
103	Pria	24	1-3 jam	Ya
104	Pria	24	<1 jam	Ya
105	Pria	23	<1 jam	Ya
106	Pria	22	<1 jam	Ya
107	Wanita	21	3-5 jam	Ya
108	Pria	10	<1 jam	Ya
109	Wanita	21	1-3 jam	Ya
110	Wanita	21	3-5 jam	Ya
111	Pria	22	>5 jam	Ya
112	Wanita	21	3-5 jam	Ya
113	Wanita	21	<1 jam	Ya
114	Pria	21	3-5 jam	Ya
115	Wanita	21	3-5 jam	Ya
116	Wanita	21	<1 jam	Ya
117	Wanita	22	<1 jam	Ya
118	Pria	20	<1 jam	Ya
119	Pria	22	3-5 jam	Ya
120	Wanita	20	1-3 jam	Ya
121	Pria	19	1-3 jam	Ya
122	Wanita	21	<1 jam	Ya
123	Wanita	23	<1 jam	Ya
124	Pria	22	<1 jam	Ya
125	Pria	23	1-3 jam	Ya
126	Pria	22	1-3 jam	Ya
127	Pria	22	<1 jam	Ya
128	Pria	22	>5 jam	Ya
129	Wanita	20	<1 jam	Ya

130	Pria	22	1-3 jam	Ya
131	Pria	21	1-3 jam	Ya
132	Pria	23	<1 jam	Ya
133	Wanita	22	<1 jam	Ya
134	Wanita	23	<1 jam	Ya
135	Wanita	21	>5 jam	Ya
136	Pria	23	1-3 jam	Ya
137	Wanita	21	<1 jam	Ya
138	Pria	20	<1 jam	Ya
139	Wanita	20	1-3 jam	Ya
140	Pria	24	<1 jam	Ya
141	Pria	22	<1 jam	Ya
142	Pria	21	>5 jam	Ya
143	Pria	21	1-3 jam	Ya
144	Wanita	A 23	1-3 jam	Ya
145	Wanita	24	<1 jam	Ya
146	Wanita	22	<1 jam	Ya
147	Pria	24	<1 jam	Ya
148	Pria	22	3-5 jam	Ya
149	Pria	22	1-3 jam	Ya
150	Wanita	21	<1 jam	Ya
151	Wanita	22	1-3 jam	Ya
152	Wanita	21	>5 jam	Ya
153	Wanita	22	<1 jam	Ya
154	Pria	23	1-3 jam	Ya
155	Pria	24	>5 jam	Ya
156	Wanita	21	<1 jam	Ya
157	Wanita	19	<1 jam	Ya
158	Pria	23	<1 jam	Ya
159	Wanita	22	1-3 jam	Ya
160	Pria	20	>5 jam	Ya
161	Pria	20	>5 jam	Ya
162	Pria	19	1-3 jam	Ya
163	Wanita	22	<1 jam	Ya
164	Wanita	21	1-3 jam	Ya
165	Wanita	22	<1 jam	Ya
166	Pria	22	<1 jam	Ya
167	Wanita	21	>5 jam	Ya
168	Pria	22	1-3 jam	Ya
169	Wanita	21	3-5 jam	Ya
170	Pria	24	1-3 jam	Ya
171	Pria	20	<1 jam	Ya
172	Pria	20	1-3 jam	Ya
173	Pria	22	>5 jam	Ya

175       Wanita       21       1-3 jam       Ya         176       Pria       21       <1 jam       Ya         177       Wanita       21       <1 jam       Ya         178       Pria       24       3-5 jam       Ya         179       Wanita       22       <1 jam       Ya         180       Pria       21       >5 jam       Ya         181       Pria       21       >5 jam       Ya         182       Pria       21       -3 jam       Ya         182       Pria       21       -3 jam       Ya         183       Wanita       23       -5 jam       Ya         184       Pria       22       >5 jam       Ya         185       Pria       22       >5 jam       Ya         186       Pria       21       3-5 jam       Ya         187       Pria       22       1-3 jam       Ya         188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam       Ya         190       Pria       20       1-3 jam       Ya         191       Wanita </th <th>174</th> <th>Pria</th> <th>23</th> <th>1-3 jam</th> <th>Ya</th>	174	Pria	23	1-3 jam	Ya
176       Pria       21       <1 jam				•	
177       Wanita       21       <1 jam	-			-	
178         Pria         24         3-5 jam         Ya           179         Wanita         22         <1 jam				•	
179       Wanita       22       <1 jam					
180         Pria         21         >5 jam         Ya           181         Pria         22         1-3 jam         Ya           182         Pria         21         1-3 jam         Ya           183         Wanita         23         3-5 jam         Ya           184         Pria         22         >5 jam         Ya           185         Pria         22         >5 jam         Ya           186         Pria         21         3-5 jam         Ya           187         Pria         22         1-3 jam         Ya           188         Wanita         22         3-5 jam         Ya           189         Pria         23         <1 jam					
181         Pria         22         1-3 jam         Ya           182         Pria         21         1-3 jam         Ya           183         Wanita         23         3-5 jam         Ya           184         Pria         22         >5 jam         Ya           185         Pria         22         >5 jam         Ya           186         Pria         21         3-5 jam         Ya           187         Pria         22         1-3 jam         Ya           188         Wanita         22         3-5 jam         Ya           189         Pria         23         <1 jam				-	
182       Pria       21       1-3 jam       Ya         183       Wanita       23       3-5 jam       Ya         184       Pria       22       >5 jam       Ya         185       Pria       22       >5 jam       Ya         186       Pria       21       3-5 jam       Ya         187       Pria       22       1-3 jam       Ya         188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam				•	
183       Wanita       23       3-5 jam       Ya         184       Pria       22       >5 jam       Ya         185       Pria       21       3-5 jam       Ya         186       Pria       21       3-5 jam       Ya         187       Pria       22       1-3 jam       Ya         188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam				i	
184       Pria       22       >5 jam       Ya         185       Pria       22       >5 jam       Ya         186       Pria       21       3-5 jam       Ya         187       Pria       22       1-3 jam       Ya         188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam				·	
185         Pria         22         >5 jam         Ya           186         Pria         21         3-5 jam         Ya           187         Pria         22         1-3 jam         Ya           188         Wanita         22         3-5 jam         Ya           189         Pria         23         <1 jam				,	
186       Pria       21       3-5 jam       Ya         187       Pria       22       1-3 jam       Ya         188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam				•	
187       Pria       22       1-3 jam       Ya         188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam				•	
188       Wanita       22       3-5 jam       Ya         189       Pria       23       <1 jam					
189       Pria       23       <1 jam					
190       Pria       20       1-3 jam       Ya         191       Wanita       20       <1 jam		Wanita	22		
191       Wanita       20       <1 jam		Pria	23	<1 jam	Ya
192       Pria       24       3-5 jam       Ya         193       Wanita       21       <1 jam	190	Pria	20	1-3 jam	Ya
193       Wanita       21       <1 jam	191	Wanita	20	<1 jam	Ya
194       Pria       21       <1 jam	192	Pria	24	3-5 jam	Ya
195       Wanita       20       1-3 jam       Ya         196       Wanita       19       <1 jam	193	Wanita	21	<1 jam	Ya
196       Wanita       19       <1 jam	194	Pria	21	<1 jam	Ya
197       Wanita       21       <1 jam	195	Wanita	20	1-3 jam	Ya
198       Wanita       21       3-5 jam       Ya         199       Wanita       21       >5 jam       Ya         200       Pria       24       <1 jam	196	Wanita	19	<1 jam	Ya
198       Wanita       21       3-5 jam       Ya         199       Wanita       21       >5 jam       Ya         200       Pria       24       <1 jam	197	Wanita	21	<1 jam	Ya
200       Pria       24       <1 jam	198	Wanita	21		Ya
200       Pria       24       <1 jam	199	Wanita	21	>5 jam	Ya
201         Wanita         19         <1 jam	200	Pria	24		Ya
	201	Wanita	19		Ya
		Pria	22	•	Ya

V



## Outer Loadings

	Network Externalities (NEP, NEU)	Individual Gratifications (EJ, IWO)	Time Flexibility	Intention to Play
NEP1	0.691			
NEP2	0.833			
NEP3	0.701			
NEU1	0.565			
NEU2	0.763			
NEU3	0.765			
EJ1	as AT	0.798		
EJ2	25171	0.79	C.F	
EJ3	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	0.828	1	
IWO1	5	0.817	13	
IWO2		0.835		
IWO3		0.841		
TF1		V	0.697	
TF2			0.817	
TF3			0.69	
ITP1				0.937
ITP2		<b>V</b>		0.942
ITP3				0.937

## Construct Reliability and Validity

	Composite Reliability	Cronbach's Alpha	Average Variance Extracted (AVE)
Network externalities	0.867	0.815	0,525
Individual gratifications	0.924	0.901	0,670
Time flexibility	0.780	0,629	0,543
Intention to play	0,957	0.933	0,881

# Fornel-Lacker Criterion SATMA JAVA

	Individual gratifications		Intention to play	Network Externalities	Time flexibility
Individual gratifications	UM	0.819		RTA	
Intention to play		0.690	0.939		
Network Externalities		0.396	0.294	0.724	
Time flexibility		0.286	0.328	0.267	0.737

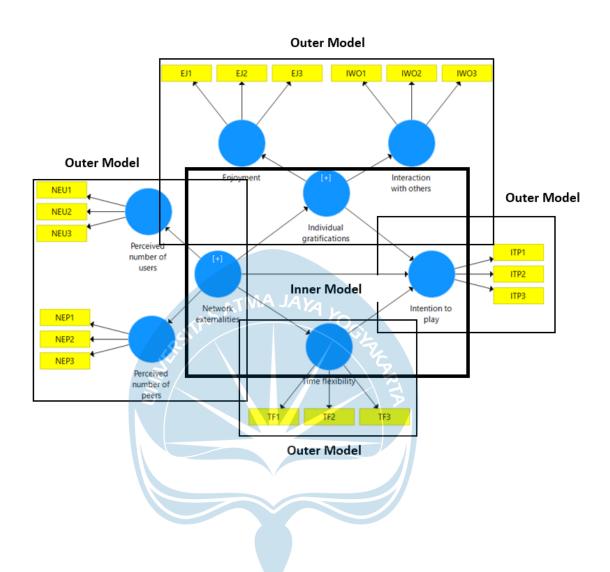
#### Path Coefficients

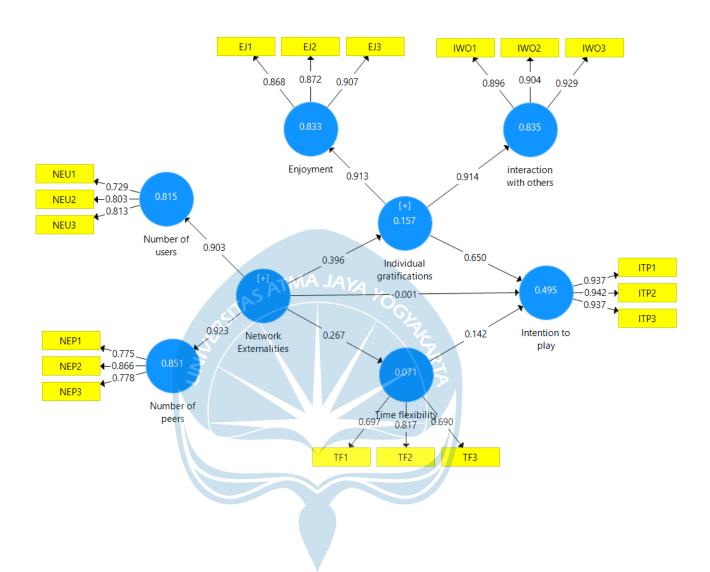
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values
Individual gratifications -> Enjoyment	0.913	0.912	0.012	71.788	0,000*
Individual gratifications -> interaction with others	0.914	0.913	0.012	68.241	0,000*
Individual gratifications -> Intention to play	0.650	0.647	0.053	11.216	0,000*
Network Externalities -> Individual gratifications	0.396	0.396	0.070	5.212	0,000*
Network Externalities -> Number of peers	0.923	0.924	0.012	72.471	0,000*
Network Externalities -> Number of users	0.903	0.904	0.017	54.629	0,000*
Network Externalities -> Time flexibility	0.267	0.277	0.070	3.844	0,000*
Network Externalities -> Intention to play	-0.001	0.002	0.058	0.012	0.990*
Time flexibility -> Intention to play	0.142	0.146	0.079	1.832	0.068*

## Outer Loading (bootstrap)

	Original	Sample
	Sample (O)	Mean (M)
EJ1 <- enjoyment	0.868	0.870
EJ1 <- individual gratifications	0.798	0.798
EJ2 <- enjoyment	0.872	0.871
EJ2 <- individual gratifications	0.790	0.789
EJ3 <- enjoyment	0.907	0.908
EJ3 <- individual gratifications	0.828	0.828
ITP1 <- intention to play	0.937	0.937
ITP2 <- intention to play	0.942	0.942
ITP3 <- intention to play	0.937	0.937
IWO1 <- interaction with others	0.896	0.898
IWO1 <- individual gratifications	0.817	0.820
IWO2 <- interaction with others	0.904	0.905
IWO2 <- individual gratifications	0.835	0.834
IWO3 <- interaction with others	0.929	0.930
IWO3 <- individual gratifications	0.841	0.840
NEP1 <- perceived number of peers	0.775	0.776
NEP1 <- network externalities	0.691	0.692
NEP2 <- perceived number of peers	0.866	0.869
NEP2 <- network externalities	0.833	0.835
NEP3 <- perceived number of peers	0.778	0.779
NEP3 <- network externalities	0.701	0.704
NEU1 <- perceived number of users	0.729	0.729
NEU1 <- network externalities	0.565	0.565
NEU2 <- perceived number of users	0.803	0.805
NEU2 <- network externalities	0.763	0.764
NEU3 <- perceived number of users	0.813	0.814
NEU3 <- network externalities	0.765	0.765
TF1 <- time flexibility	0.697	0.686
TF2 <- time flexibility	0.817	0.812
TF3 <- time flexibility	0.690	0.672







#### R-Square

	R-Square	R-Square Adjusted
Intention to Play	0.495	0.487

