FACTORS AFFECTING THE INDIVIDUAL TO ADOPT MOBILE GAMES IN MALAYSIA

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research project is 9,687.

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DEDICATION

This research project is dedicated to our lovely and beloved supervisor, Ms Tan Cheng Peng, friends, and families. Without their sincere and boundless support, it would be impossible for us to achieve the completion of this project.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF APPENDICES

Page

LIST OF ABBREVIATIONS

BI	Behaviour Intention
DV	Dependent Variable
G	Generation
IT	Information Technology
IV	Independent Variable
MLR	Multiple Linear Regression
MG	Mobile Game
PE	Perceived Enjoyment
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SI	Social Influence
SAS	Statistical Analysis System version 5.1
TAM	Technology Acceptance Model
US	United States
UTAR	Universiti Tunku Abdul Rahman

PREFACE

MGs users nowadays easily get bored with a certain game app. In addition, the numbers of game app developers keep on increasing, thus MG users would have a lot of preferences in game apps and they can easily move to another game app. It is important for the MG developers to understand consumers' behavior in adopting the MGs. Therefore, the issue of why the mobile device users are willing to adopt MGs would be an interesting topic for in-depth research

ABSTRACT

The purpose of this research is to examine the factors affecting individuals to adopt MGs in Malaysia. The individuals analyzed are the mobile device users in Malaysia. TAM was used as the theoretical contribution and the factors examined are PEOU, PU, SI, and PE. This research was a cross-sectional study. The primary data had been distributed to 400 target respondents among the states in Malaysia. After the removal of total 10 unqualified cases, there were 390 useful cases in the end, which giving the total respond rate of 97.50%. The data analysis techniques of Pearson's Correlation Analysis and Multiple Linear Regression were employed to test the data collected.

The findings of this study recommended that PEOU, PU, and SI are all positively and significantly related with the mobile device users' BI to adopt MGs in Malaysia. However, PE was found to have positive correlation with mobile device users' BI, but PE does not significant in explaining the mobile device users' BI to adopt MGs in Malaysia. Furthermore, SI is the strongest determinant of users' BI to adopt MG in Malaysia among others IVs (PEOU, PU and PE).

Nevertheless, the findings were limited as this study is only focused in Malaysia. Based on the findings, MGs developer should invent more useful features games and build customer loyalty to improve the adoption of MGs. This project also successfully extended the TAM in the context of Malaysia and mobile games by incorporating PEOU, PU, and SI into it. As the model employed had been proven as fit in this project, therefore the findings also concluded that TAM could be adopted in mobile commerce adoption study.

CHAPTER 1: INTRODUCTION

1.0 Introduction

This chapter is an introduction part that intends to study about the research background, mentions about the problem statement, explains the importance of this research, determines the research objectives and defines the research questions.

1.1 Research Background

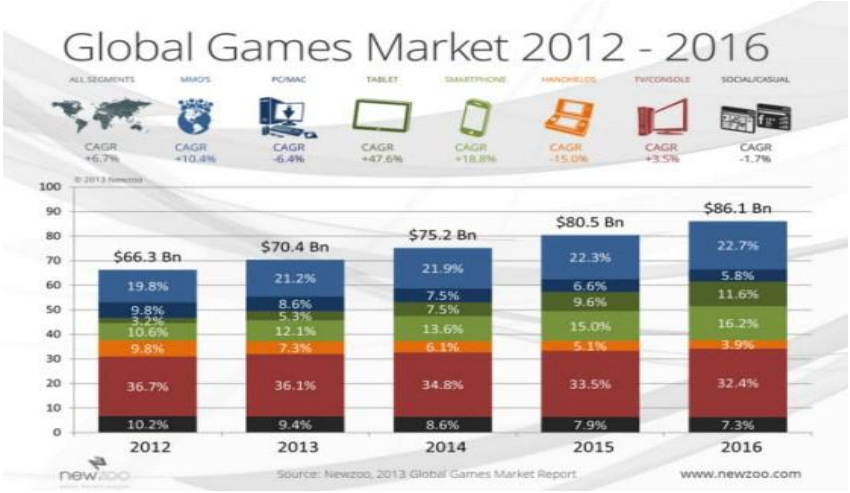
The market value in the service of mobile entertainment keeps increasing and the mobile users are growing quickly (Kim, Kim, & Kil, 2009). Lately, one of the statistics explained that the mobile users in Malaysia was approximately 30,379,000 users in the year of 2012 and had increased to 35,700,000 users in the year of 2013 as the time grows (Mobile Users 2013, 2013).

MG considered as one of the mobile entertainments that is important to the mobile users. Mobile entertainments are such as MGs, mobile movie, and mobile music. (Kim et al., 2009). Nowadays, MG industry is growing as IT and web develops. The accessibility to be in different places is the main characteristic of MG, and also the critical factor in influence mobile user's intention to play (Liang & Yeh, 2008). Basically, MGs are video game played on PDAs, cellular phone, or game device (Ha, Yoon, & Choi, 2007).

MGs are considered as the largest mobile application fields. According to several markets research firms, the Asian mobile gaming market is expected to increase as most of the mobile phones in the market are able to access games application

(Penttinen, Rossi, & Tuunainen, 2010). Newzoo, an international market researcher in the game industry, has expected a compound annual growth rate of 6.7% to $86.1 billion by 2016 in the global games market. Hence, for the MG, it is expected to grow at an average annual rate of 19% for smart phones and 48% for tablets (Mobile games trend report, 2013). The picture below shows that global games market will be increase from year 2012 to 2016.

Figure 1.1: Global Games Market 2012-2016



Source: Mobiles games trend report (2013)

In the recent trend, the complexity of the games has increased as 2.5G, 3G and 4G services have spread. As a result, cell phone provide a more accessible, mobile, portable, and convenient than other game platforms for people to play mobile games. They provide no interruption for user to enjoy games and the accessibility has attracted many to play MGs. Besides, the innovations of 3G & 4G network and handheld technologies causes the mobile games becomes the most profitable services in recent years (Liu & Li, 2010a). The major benefit of mobile technology is it able to provide users with the information that are new and useful in anytime and anywhere .Therefore, MGs are expected to ride the wave of popularity of the trend. One can expect that maximizing user enjoyment of these games will be of critical interest to firms developing them (Browne & Anand, 2012).

1.2 Problem Statement

The global mobile market has growing nearly 7 billion connections in 2012. (Page, Molina, & Jones, 2013). In the games market segment, mobile games showed a well-off growth in Emerging and Asian markets. Based on the iOS App Store data in 44 countries & Play Store data of 17 countries, data showed that 33.33% of app downloads were games and 66.66% of all mobile app spending was on gaming. (Mobile games trend report, 2013). Recently, the users easily get bored with a certain game app over time since the numbers of game app developers keep on increasing. When users have a lot of games app choices, they can easily get bored with one app and move to another (Tiffany, 2013). Thus, the factors that affecting the users to adopt mobile games needs to be determining in order to let games app developers to keep customers onboard longer.

As the global mobile market continues to grow, the deeper understanding the information about the user's acceptance and adoption has to be obtained. Some of the researches has been carried out such as the past studies that focused on the mobile commerce (Khalifa, Kathy, & Sammi, 2012), mobile shopping service (Yang, 2010), mobile banking (Yu, 2012), and mobile marketing (Du, 2012). Nevertheless, the research of the user's adoption of MGs is very limited and consider less published.

Besides, Pan (2012) and Liu and Li (2012) had conducted researches regarding the factors affecting the individual to adopt the MGs in China. In addition, even these studies have been conducted, research of factor affecting individual to adopt MGs in Malaysia has not been conducted.

Despite the sheer size of MGs market in Malaysia, the existing body of knowledge is still less and inadequate knowing of the mobile user's BI toward the use of different MGs (Osman, Sabudin, Osman, & Tan, 2011).

1.3 Research Questions and Objectives

Table 1.1: General Research Question and Objective

General Research Question	General Research Objective
What are the significant drivers that influence user's intention to adopt MG in Malaysia?	To investigate the factors that influence user's intention to adopt MG in Malaysia.

Source: Developed for the research

Table 1.2: Specific Research Questions and Objectives

Specific Research Questions	Specific Research Objectives
Is there any relationship between PEOU and users' BI to adopt MG in Malaysia?	To investigate the relationship between PEOU and user's BI to adopt MG in Malaysia.
Is there any relationship between PU and users' BI to adopt MG in Malaysia?	To investigate the relationship between PU and user's BI to adopt MG in Malaysia.
Is there any relationship between SI and users' BI to adopt MG in Malaysia?	To investigate the relationship between SI and user's BI to adopt MG in Malaysia.
Is there any relationship between PE and users' BI to adopt MG in Malaysia?	To investigate the relationship between PE and user's BI to adopt MG in Malaysia.
Which is the strongest determinant of users' BI to adopt MG in Malaysia among 4 IVs (PEOU, PU, SI, PE)?	To investigate the strongest determinant of users' BI to adopt MG in Malaysia among 4 IVs (PEOU, PU, SI, PE).

Source: Developed for the research

1.4 Significance of Study

1.4.1 Managerial contribution

This research presents useful information towards the MG developers. Also, the reasons of affecting the mobile users to adopt MG in Malaysia will be explained in this study. Hence, this study will help the game developers to understand and fulfill the consumers' needs and wants. When they have a better understanding on the mobile users' behavior, they would be able to create better MG applications to enhance their profits in the market. In that case, they can attract more customers and eliminate the risk of suffering loss and creating unwelcome products. Since the development cost is tremendous, this study would probably help MG developers to emphasize on the main perspective of consumers. Furthermore, this research helps them to save the time and cost to develop a new research.

1.4.2 Theoretical Contribution

TAM model was used in this study. We found that there are many things need to be measured in order to get more information on the individual's perspective to adopt MGs. However, there was less information available on the MG field. Thus, TAM model helps to focus on several reasons or variables to discover customer perception. At the end of this research, it might be useful for the future researcher and help them to save the time and cost to generate the similar research.

1.5 Outline of the Study

Chapter 1 explains the overall picture of this study and Chapter 2 shows the theoretical model, review of past empirical studies and hypothesis development. Furthermore, the research's design; data collection method; sampling design; variables and measurement; data processing; and data analysis method will be discussed in Chapter 3. Next, the data analysis techniques through SAS will be explained in Chapter 4 and the results are used to justify against the research questions and the hypotheses statement that developed in this research. Lastly, Chapter 5 concludes all statistical analyses delivered in Chapter 4. Hence, discussions about key findings, implications and drawbacks of the research would delivered in Chapter 5 and bring out the suggestion and recommendation for future researchers.

1.6 Conclusion

The research background, questions and objectives, and also the problem statement had been clarified in Chapter 1. Besides, a clear direction provided to this study is to determine the factors affecting the MG adoption in Malaysia, in order to dedicate to MG developers and researches. Next, the relevant past empirical studies will be discussed in Chapter 2.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter intends to explain the theoretical model and various relevant past empirical studies. Apart from that, a proposed conceptual framework and development of hypotheses are delivered in this chapter.

2.1 TAM

TAM was developed by Fred D. Davis, an information systems professor, in 1989 and it applied in the study of information system (Pan, 2011). Davis used TAM to explain the users' behavior to adopt the system and acceptance of new technologies. TAM is a simple and reliable theory to describe user acceptance of technology (Bourgonjon, Valcke, Soetaert, & Schellens, 2010). Most of the past research used TAM to study the user's intention and behavior.

Tao (2011) used TAM to examine the success factors of the adoption towards mobile website. Besides, TAM has been used to test whether individuals' e-shopping behavior influenced by individual's own socioeconomic characteristics such as gender and age (Hernandez, Jimenez, & Martin, 2011). In addition, Buahom and Yu (2013) applied TAM to determine the factors influencing consumer's intention to adopt mobile commerce services.

In TAM model, PEOU and PU are the two basic determinants to explain the users' intention to adopt a system (Pan, 2011). Table 2.1 below shows the definition of the two determinants.

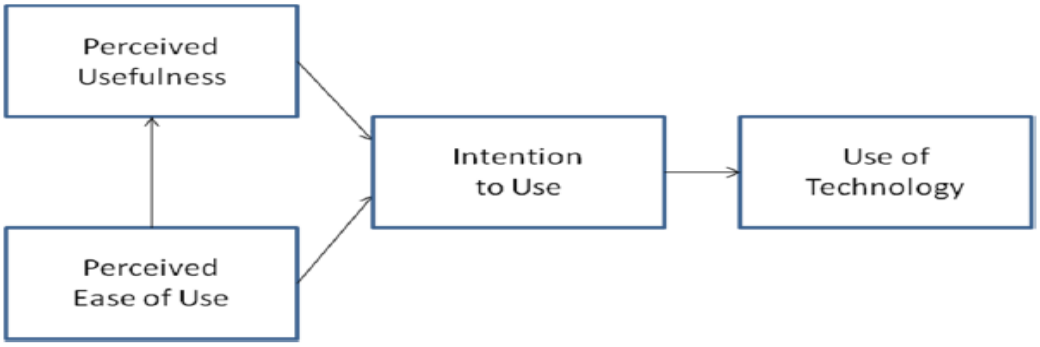
Table 2.1: Definition of PU and PEOU

	Definition	**Sources**
PU	"the level to which an individual trusted that using a specific system would improve his or her job performance and effectiveness"	Davis, 1989; Davis et al., 1989
PEOU	"the level to which an individual trusted that by using a specific system would be free of both physical and mental effort"	Davis, 1989; Davis et al., 1989

Source: Developed for the research

Davis (1989) made the comparisons between the relative strength for both determinants and proved that the association between PU and usage was much stronger than the relationship between PEOU and usage. The reason is due to the functions of the system or application develops for the users and the level of difficulty to use the application or system to develop those functions. Nevertheless, he proposed the existence of a causal relationship rather than the independence of the determinants to prove that proved that PEOU may precede PU. Therefore, the two determinants will be showed on a more linear casual chain, as it can be showed in Figure 2.1. Besides, it explains that users will think about the usefulness and their attitudes to the new application or system before they make a decision on whether to use or apply it. So, if people consider the system or application is perceived to be useful, then there is a possibility of increasing the usage of new system.

Figure 2.1: Original TAM



Source: Davis (1989)

With the growth of technology, some relevant variables had added into TAM by the researchers. (Pan, 2011). Ha et al., (2007) and Liu and Li (2010) have added PE and SI into their research about the user's acceptance and adoption of MG in Chinese contexts. Liu & Li (2010) mentioned that PE is "the scope where an activity is realized to enjoy its own right and any beneficial performance impact that might have potential to be anticipated should be separated away from this property." The author also proved that PE is an important issue for the user to implement mobile internet. According to Ha et al., (2007), the authors also demonstrated that PE had to add into TAM model when it is applied in a game system. Besides, he explained that users believe PE is the most important among all factors affecting their attitude towards the adoption of T-commerce. Next, SI arrived from the concept of subjective norm in the Theory of Reasoned Action, whereby subjective norm refers to "person's perception on whether he or she should perform such behavior in question when most of the people are mean to be important to him" (Fishbein & Ajzen, 1975).

PU and PEOU have been combined with other variables in this research, which are SI and PE. Since this research is conducted in Malaysia, these variables will be added to make this research to suit in this context. Thus, the TAM model has been enlarged and these variables are adapted to determine the users' BI to adopt MG in Malaysia.

2.2 Review of the Prior Empirical Studies

2.2.1 Perceived Ease of Use

PEOU is defined as "the level to which a person trusted that using a specific system would be free of effort" which is from original definition of (Davis, 1989). Ease can be explained as the "freedom from great effort or difficulty." Effort is a finite resource that an individual may assigned to different activities which he or she is responsible (Radner & Rothschild., 1975).

Lgbaria and Livari (1995) have established that PEOU is an important factor that influences user acceptance and usage behaviour of information technologies, which include the mobile gaming. In this research, a computer-based survey was conducted for total of 450 respondents about the self-efficacy affect the computer usage. As a result, self-efficacy has been proved to have a direct and indirect relationship to the computer usage through PEOU.

Furthermore, Venkatesh and Davis (2000) stated that PEOU had shown that "by learning and using to describe an individual's viewpoint of how easy an innovation is". This research showed a theoretical model was conducted to determine computer self-efficacy about ease of use of new system. As a result, total of 246 employees were asked. The model is strongly supported by using three research measurements.

From the previous research, Pederson and Nysveen (2003) found that individuals that perceive the model to be easy to use will develop better attitudes towards the application. The authors concluded in their research that the 459 trail users of mobile parking services with the motivational influence of self-expressiveness by using TAM model. The result shows that mobile parking services have been designed for the functional needs of the parking car driver.

2.2.2 Perceived Usefulness

PU is defined as "the level to which an individual trusted that using a specific system would improve his or her job performance." (Davis, 1989).

Wessels and Drennan (2010) conduct a research to test the important motivators that influenced an individual's intention to adopt mobile phone banking (M-banking). Besides, a web-based survey was conducted in the research. In total, 314 respondents provide usable respond. As a result, they had concluded that PU brings a positive relationship on BI to adopt M-banking.

In addition, Kim, Ma, and Park (2009) concluded in their journal that the PU is positive relationship with BI. The objective of their research was to find out US consumers' attitude toward mobile technology was affected by what factors. Furthermore, respondents were chosen from eight academic courses among the two large universities in United State. Hence, 341 respondents were provided usable responses and the Structure Equation Model was applied to figure out the data gathered.

Besides, Kim and Garrison (2009) carry out a study to examine the issues that led to users' intention to use mobile wireless technology. The data was gathered from a medium-sized Korean company which occupying 862 individuals through online survey method. From the results, they proved that PU is positively related to BI.

2.2.3 Social Influence

SI refers to a person involved in an activity could be influence by specific belief or behavior (Chong, Ooi, Darmawan, & Lee, 2012).

Kim, Kim and Kil (2009) carry out a study to examinewhat affect user's intention to adopt mobile entertainment service. Next, a total of 269 questionnaires surveys were used analysis and data had been collected from the undergraduate, graduate college students and also working people from different position and professions. They found that SI has positive relationship with BI.

Furthermore, Yang (2010) examines the determinants of US consumer' intention to adopt mobile shopping services. Then, a sample of 400 mobile services users had been collected via online survey. From the result, he proved that SI is positively related to BI to adopt mobile shopping services.

Furthermore, Hong, Thong and Moon (2008) determine the factors that influence users to adopt mobile data services. Then, a sample of 811 users of mobile data services had been collected through online survey. They found that SI is positively related to BI.

2.2.4 Perceived Enjoyment

PE refers to "the activity that perceived to be enjoyable and did not relate to any performance results" (Ha, Yoon, & Munkee, 2007).

Liang and Yeh (2011) carry out a research to examine whether a user's intention to adopt MG will be influenced by the contextual factors. Also, to investigate which contextual factor will influence more. Data had been collected through the online survey on a popular website in Taiwan. 410 volunteers were employed to do the survey, but 20 cases were invalid. Therefore, 390 data were used to conduct. They proved that PE is not positively related to BI.

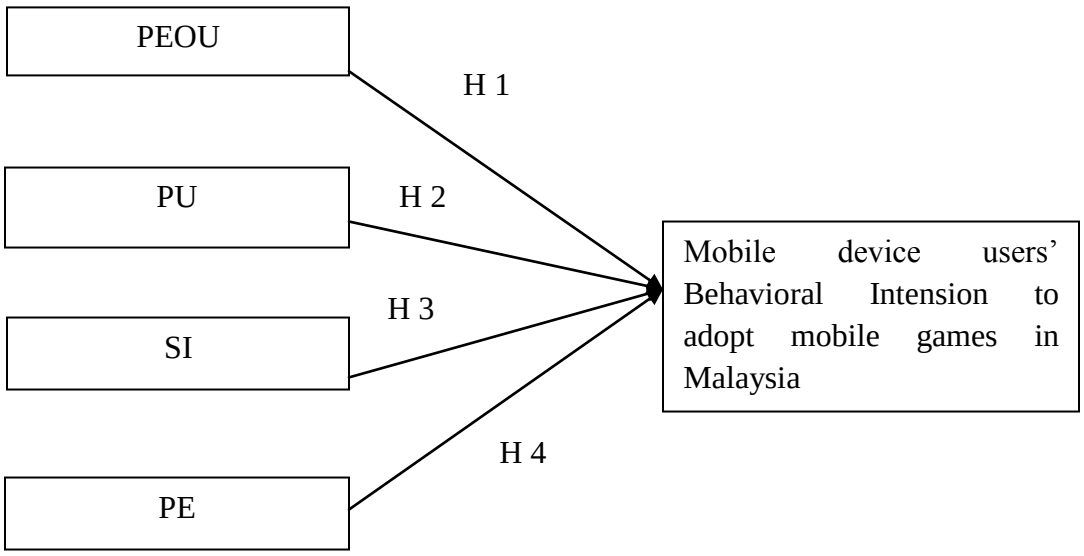
PE refers to the scope where an activity is realized to enjoy any beneficial performance impact that might have potential to be anticipated should be separated away from this property (Liu & Li, 2010b). Liu and Li (2010) investigate the propagation process of mobile internet use in China and investigate the factors affected MIU. Then, 920 users were collected from Zhejiang Normal University in China. The result showed that PE has significant effect on BI.

Iqbal and Qureshi (2012) carry out a research to broaden the perceptive of student's m-learning adoption. A total of 300 survey questions were spread to the students of chartered universities which operating in twin cities of Rawalpindi and Islamabad in Pakistan. In this study, PE has no significant impact on BI.

According to Selamat, Jaffar and Ong (2009) who studied about the factors affecting the acceptance of IT over the banking industry in Malaysia, a total of 200 questionnaires were randomly distributed to the bankers placed within Klang Valley in Malaysia. As a result, PE has impact on the acceptance of IT.

2.3 Proposed Conceptual Framework

Figure 2.2: Research Model



Adapted from: Pan, T. (2011)

2.4 Hypotheses Development

H1: PEOU has a positive influence on the mobile device users' BI to adopt MGs.

H2: PU has a positive influence on the mobile device users' BI to adopt MGs.

H3: SI has a positive influence on the mobile device users' BI to adopt MGs.

H4: PE has a positive influence on the mobile device users' BI to adopt MGs.

2.5 Conclusion

TAM model was applied and reviews of past studies were provided in Chapter 2. The research framework and hypotheses were developed from the reviews of past studies. The coming chapter is going to discuss about the research methodology.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

This chapter provides the research design, sampling design for readers to understand the design of this research. Besides, the target population, techniques use for sampling and also the sampling procedure to collect data will be explained in this chapter. In addition, this chapter also delivers the variables and measurement and data analysis techniques.

3.1 Research Design

The research purpose can be categorized as **descriptive study** since it is "to construct an accurate representation of persons, events or situations in this study" (Saunders, Lewis, & Thornhill, 2009). Hence, this research is purposely to examine the variables which included PU, PEOU, SI and PE that influencing the users to adopt MGs in Malaysia.

Survey method has been used for the data collection method since it is cost-effective and it can gather a huge data from a huge population in short period. Furthermore, this is a quantitative research as this research is conducted by using numerical data for the purpose of data analysis, and is gathered through the questionnaire survey and online surveys.

Hence, survey questionnaires will be spread among 400 mobile phone users in Malaysia. Pilot test will be carried out by distributing 20 sets of questionnaire before primary data is collected. The test of Cronbach's Alpha will be performed to determine the reliability of the data gathered. Next, Pearson's coefficient correlation

along with MLR is used for the purpose of examine the association among variables. SAS software will be used to enter the collected data for data analysis.

According to Saunders et al. (2009), cross-sectional study is the study of a particular incident at a particular time. Therefore, this research study is classified in the cross-sectional study because it is only an incident to be studied at a single point in a moment.

3.2 Data Collection Method

3.2.1 Primary Data

Primary data is those data collected straight from firsthand experiences and structured principally for the research project being undertaken (Saunders et al., 2009). In this research, questionnaire survey method and online survey method will be used to obtain primary data from target respondents.

3.3 Sampling Design

3.3.1 Target Population

Since our research topic is to determine the drivers affecting individual in adopting mobile games in Malaysia, therefore the targeted population for this study is the mobile device users in Malaysia, generally are those who have experience and familiar in playing MG. Up to 2012, the populations for the mobile users in Malaysia are 35,700,000 (Mobile Users 2013, 2013).

3.3.2 Sampling Location

The survey questionnaires were being distributed to target respondents over the states in Malaysia. Also, this study being conducted on the internet, because internet mediated questionnaire was utilized to collect the primary data.

3.3.3 Sampling Elements

The targeted respondents in this research are the mobile device users from Malaysia from different age groups. Students are included in this research as they are the one who actually need MG to relieve stress. For working adults, they will probably need MG to relief the work stress and they are the one who have stable income that allow them to have purchasing power to purchase MG.

3.3.4 Sampling Technique

It is necessary to have a sampling technique since Malaysia population is large and it is impractical to get in touch with all respondents. Hence, this study will use the non-probability sampling technique as it is impossible to obtain a probability sampling.

In this research, convenience sampling technique was chosen from the types of non-probability sampling techniques since it is the easiest way to obtain for the sample. Once the required sample size has been reached, the sample selection process will only stop. Convenience sampling will be used when the researchers selects subject on the basis of availability (Garson, 2012).

Convenience sampling can differentiate to 2 types which are the captive samples and volunteer samples. It draws the sample that is both handy and willing to partake in the study (Teddlie & Yu, 2007).

The rationale of selecting convenience sampling is because of its cost efficient and less time consuming. Questionnaire survey that distribute to respondents is efficient and time saving due to it gathered on the spot and it will directly reflect consumer' true behavior. Besides, since the target respondents of this research are the mobile users in Malaysia, an online survey will allow for a extensive geographic coverage. Therefore, target respondents from every state will be able to contribute to this survey.

3.3.5 Sampling Size

Targeted respondents in this research will be the mobile phone users from Malaysia with different age groups. One of the statistics showed that the recent populations of the mobile users in Malaysia are 35,700,000 (Mobile Users 2013, 2013). Sekaran (2003) showed that population size exceeding 1million would require 384 samples. Also, the most proper sample size for most of the researches should be in between of 300 and 500. Therefore, we set a number at 400 questionnaires to be distributed to target respondent in this research.

Questionnaires will be spread to the target respondents in this research, who are the mobile device users in each state of Malaysia, which are Kedah, Kelantan, Johor, Malacca, Pahang, Negeri Sembilan, Pulau Pinang, Pahang, Perlis, Perak, Selangor, Terengganu, Sabah and Sarawak. Also, spread through the social networking website, which is Facebook.

3.4 Research Instrument

400 survey questionnaires were spread over the target sampling in each state of Malaysia. The respondents are required to respond the questions among the 5 variables. Hence, the data collection period will be expected to use up to 1 month.

For the online surveys method, questionnaires will be formed through a system called Google Drive, and then the hyperlink is going to copy and paste to the social networking sites, Facebook.

Pilot test is needed to be performed before the collection of actual data. Saunders (2009) explained the aims of pilot test as to improve the questionnaires in order that target respondents will not have any troubles when answering the questions. Also, our members will not facing any troubles when recording the data. Furthermore, it is performed to test the reliability of the research model prior to the actual survey conducted in full scale to respondents. This can help to avoid any errors happen at the time the actual survey is being conducted (Zikmund, 2003).

Moreover, Saunders (2009) mentioned the minimum number of cases or respondents to conduct a pilot test is 10. Hence, pilot test had carried out with 20 target respondents who have adopted MGs before by our group. The results of pilot test were considered in order to enhance the questionnaire. Table 3.1 and 3.2 illustrated the normality test as well as the reliability test for 20 questionnaires for the results of pilot testing.

Table 3.1: Normality Test on Pilot Test

Variables	Item	Skewness	Kurtosis
Perceived Ease of Use	PEOU 1	0.2276	0.0470
	PEOU 2	-0.5236	-0.7930
	PEOU 3	-0.6755	-0.3474
	PEOU 4	-0.2177	-0.5861
	PEOU 5	-0.8084	0.2300
Perceived Usefulness	PU 1	-0.4541	-0.6869
	PU 2	-0.3720	-0.5514
	PU 3	0.3040	-0.6253
	PU 4	-0.1757	-0.6023
	PU 5	-0.2472	-0.8227
Social Influence	SI 1	0.4261	-0.7396
	SI 2	0.4182	-0.9492
	SI 3	0.1768	-0.7453
	SI 4	0.0471	-0.5276
	SI 5	-0.3597	-0.5743
Perceived Enjoyment	PE 1	0.1768	-0.7453
	PE 2	0.0588	-0.8591
	PE 3	-0.0588	-0.8591
	PE 4	-0.1054	-0.8389
	PE 5	-0.0674	-0.9637
Behavior Intention	BI 1	0.3231	-0.3137
	BI2	-0.3720	-0.5514
	BI3	-0.1566	-0.6702
	BI4	-0.2472	-0.8227
	BI5	-0.6249	-0.0234

Source: Developed for the research

Gujarati and Porter (2009) stated that variables will fulfill the assumptions of multivariate model when its skewness and kurtosis values are between ± 2. The table above showed that the skewness and kurtosis values are between ± 2 (Gujarati & Porter, 2009). Therefore, it was assumed that the results of pilot test had satisfied the assumptions of multivariate model.

Table 3.2: Reliability Test on Pilot Test

Variables	Number of Items	Cronbach's Alpha
PEOU	5	0.8240
PU	5	0.7718
SI	5	0.7673
PE	5	0.7061
BI	5	0.8105

Source: Developed for the research

The table above appeared that the reliability coefficients of all IVs and DV ranged between 0.70 and 0.90, which is well satisfied the common acceptance level of 0.70. (Nunnally, 1978) Hence, it can be summarized that the questionnaire met the acceptable level of reliability to check internal consistency and validity of the construct of the questionnaire.

3.5 Variables and Measurement

The demographic details of respondents were asked in Section A, which consists of the general questions. Hence, the demographic data will be measures using nominal scale and ordinal scale. Nominal scale that used in questionnaires included gender, experiences of MGs, owning of mobile device and the state where respondents come from. Then, ordinal scale that used in questionnaires included the age in the range of

below 15 to above 36 years old. This is used to determine the discrepancy level of the variables. Besides, ordinal scale applied to gather the data about the education level achieved by respondents, their monthly income, and the time frequency on playing MGs.

Next, section B consists of the questions about the four IVs (PEOU, PU, SI, & PE) and one DV (BI) in the research. So, an interval scale of measurement with 5 point Likert scale measurement were applied for each of the variables, which ranged from "strongly disagree(1) to strongly agree(5)" based on the agreement level of the target respondents (Tsai & Chuang, 2005). Each variable would have five items and overall would have 25 items. Furthermore, these items were adopted from previous literature survey with the purpose of investigating the factors affecting users adoption on mobile commerce.

Table 3.3: Definition and Sources for IVs and DV

Variables	**Definitions**	**Sources**
PEOU	"The degree to which a person believes that using a particular system would be free of effort:	(Davis, 1989).
PU	"The degree to which a person believes that using a particular system would enhance his or her job performance."	(Davis, 1989)
SI	"A belief or behaviour, which significant enough to influence a person to be involved in an activity."	(Chong, Ooi, Darmawan, &Lee, 2012).
PE	"The degree to which performing an activity is perceived as providing pleasure and joy in its own right, aside from performance consequences."	(Venkatesh & Davis, 2000)
BI	"An individual's likelihood of engaging in the behaviour of interest."	(Kumar, 2000)

Source: Developed for the research

3.6 Data Processing

Firstly, checking questionnaire will be done in data processing. Thus, pilot test has been performed previous to the collection of actual data. From pilot test, the potential problems such as instruction misunderstanding could be identified and corrective action has to be taken prior to the distribution of surveys.

Overall, 400 respondents participated in the survey questionnaire but 10 out of 400 responses need to be sort out because of the incompleteness of these cases. So, 390 cases were kept for data collection after the incomplete cases have been sort out. In other words, these 390 useful cases giving a respond rate of 97.50%.

Next, for the data entry process in SAS, the data are coded into the numerical forms as this study is a quantitative research. For example, in section B of the questionnaire, 5 point Likert scale measurement which was answered by target respondents will be coded from "1" for Strongly Disagree to "5" for Strongly Agree. The benefit of using numerical forms is easier to be recognized if compared to the alphabetical description.

In the process of data transcription, it require an accuracy and completeness of the data. All the data gathered from target respondents were recorded into SAS software to obtain a desired result.

3.7 Data Analysis

3.7.1 Descriptive Analysis

Descriptive analysis is used to summarize the data set. The summarization of data is commonly done by calculating mean, standard deviations, and coefficient of variation of every item in questionnaire. The mean of the results will show the preference of target respondents, the standard deviations will

show how dispersed is the data collected and the coefficient of variation will compare the relative spread of data between distributions of different magnitudes. Next, descriptive analysis of the demographic data will be measured by using SAS software and will be explained in section 4.1.

3.7.2 Scale of Measurement

3.7.2.1 Reliability Test

As stated in Sekaran (2003), Cronbach's alpha test is the reliability test to make sure the measurement is free from unfairness so as to get reliable outcomes. The stability as well as consistency of measuring variables can be measured by the Cronbach'Alpha test. (Choy & Ng, 2011). Nunnally (1978) recommended that the level of acceptance of Cronbach's alpha will be 0.70, therefore numbers that exceed 0.70 will be consider as high reliability.

3.7.2.2 Normality Test

The skewness and kurtosis refers to the distribution shape and they are used in the normality test in this study (Cohran, Steed, & Ong, 2010). A distribution is positively skewed when there are positive value of the skewness and kurtosis; whereby a distribution will be negatively skewed when negative value of the skewness and kurtosis is occur. As a result, Skewness and kurtosis from all variables are recommended to fall within the absolute value of ± 1 in order to fulfill the theory of multivariate model (Sit, Ooi, Lin, & Chong, 2009) .

. 3.7.3 Inferential Analysis.

Since a single variable in the questionnaire was determined by many items, the mean score of the multiple items for a variable was calculated and used in further analysis such as Pearson correlation analysis and multiple linear regression analysis (Marthandan, Chong, Ooi, Arumugam, & Wei, 2009).

3.7.3.1 Pearson Correlation Analysis

According to Marthandan et al., (2009), he said that the Pearson correlation analysis is needed to be conduct in order to investigate the association between the variables. In addition, Wong and Hiew (2005) stated that the correlation coefficient value range from 0.10 to 0.29 is regarded as weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is deemed to be strong.

In this research, this analysis is taken in order to measure the relationship between 4 IVs and mobile device users' BI to adopt MG.

3.7.3.2 MLR

MLR analysis is used to analyze the relationship between a single DV and several various IVs (Suki, 2011). Therefore, this analysis is appropriate in this study since there are 4 IVs and 1 DV in the research model. According to Saunder et al.,(2009), calculate multiple regression need to ensure 4 assumptions are met.

First is linearity. Linearity refers to the level to which the change in the DV is related to the change of IVs. Another assumption is homoscedasticity, which

is the extent to which the data values of DV and IV have equal variances. Third assumption is muticollinearity. Multicollinearity test is applied to measure the extent to which two or more independent variables are correlated among others (Saunders, Lewis, & Thornhill, 2009). Next, Hair (1998) stated that if the IVs are not highly correlated with each other or in other word not exceed by 0.9, it is believe that the multicollinearity problem do not arise. The last assumption is that the data for the IV and DV are normally distributed.

The potency of the association among DV and IVs is explained via coefficient of determination (r^2) since it compute the fraction of the variance in DV which is able to be explained by the IV.

Besides, MLR will be used in this research by putting a linear equation to respond on whether the associations between the 4 IVs (PU, PEOU, PE and SI) and DV (BI) appears; weak or strong; and positively or negatively skewed. The MLR's equation is shown in the table below.

Table 3.4: Equation for MLR

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_p X_p + e$
Y =Behavior Intention of individual to adopt mobile games (dependent variable)
β = The slope of the regression surface (The β represents the regression coefficient association with each Xi
X_1 = Perceived ease of use (independent variable)
X_2 = Perceived usefulness (independent variable)
X_3 = Social Influences (independent variable)
X_4 = Perceived Enjoyment (independent variable)
e= An error term, normally distributed about a mean of 0 (For purpose of computation, the e is assumed to be 0)

Source: Developed for the research

3.8 Conclusion

Research methodology of this study were conducted Chapter 3. The result that generated from the survey will be discussed in Chapter 4.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

Previous chapter aims to demonstrate the outcomes yielded from survey using SAS software. SAS was used in this study in order to carry out in-depth analysis of data collected in term of descriptive analysis of respondent's demographic profile as well as the central tendencies measurement of constructs, reliability and normality test, MLR, and Pearson correlation.

4.1 Descriptive analysis

4.1.1 Demographic Profile of the Respondents

Table 4.1 Demographic Profile of the Respondents

	Variables	Frequency	Percentage (%)
Gender	Male	220	55.00
	Female	180	45.00
Age	Below 15 years	18	4.50
	16 – 25 years	193	48.25
	26 – 35 years	155	38.75
	36 years and above	34	8.50
Education	UPSR / PMR / SRP / SPM	29	7.25
	STPM / A-Level / Foundation	60	15.00
	Diploma/ Advances Diploma	133	33.25
	Bachelor Degree/ Professional Qualification	162	40.50
	Master/ PhD Degree	16	4.00

Monthly Income	Less than RM1000	27	6.75
	RM 1001- RM 2000	92	23.00
	RM 2001- RM 3000	146	36.50
	RM 3001- RM 4000	92	23.00
	RM 4001- RM 5000	23	5.75
	Above RM 5001	20	5.00
Own a Mobile Phone	Yes	400	100.00
	No	0	0.00
Experience of Playing MGs	Yes	390	97.50
	No	10	2.50
Frequency of Playing MGs per Day	< 1 hour	73	18.25
	1 hour - 3 hours	295	73.75
	<4 hours	32	8.00
States	Johor	33	8.25
	Kedah	28	7.00
	Kelantan	32	8.00
	Malacca	24	6.00
	Negeri Sembilan	24	6.00
	Pahang	24	6.00
	Penang	60	15.00
	Perak	51	12.75
	Perlis	24	6.00
	Sabah	20	5.00
	Sarawak	20	5.00
	Selangor	40	10.00
	Terengganu	20	5.00

Source: Developed for the research

Among all the respondents, 55% was male and 45% was female. Besides, majority of respondents' age were between 16 to 25 years old which comprised of 193(48.25%) respondents. Moreover, majority of the

respondents have holding Bachelor Degree or Professional Qualification which occupy 40.50% (163 respondents). Furthermore, most of the target respondents are in the group of monthly income between RM 2001 to RM3000 as they take up 36.50% of the sample.

In addition, 100% of the respondents has own a mobile phone but 2.5% of them do not have experience of playing MGs. Next, most of the respondents are playing MGs in between 1 to 3 hour per day as they occupy 73.75% (295 respondents) of the sample. Last but not least, 15% of respondents are coming from Penang and followed by Perak which occupy 12.75% of respondents.

4.1.2 Central Tendencies Measurement of Constructs

Table 4.2: Descriptive Statistics (n=390)

Variables	Item	Mean	Std. deviation
PEOU	PEOU1	2.7897	1.0620
	PEOU2	3.0923	1.0248
	PEOU3	3.0825	1.0333
	PEOU4	3.1692	1.0694
	PEOU5	3.3948	1.0256
PU	PU1	2.9539	0.9636
	PU2	3.1026	1.0390
	PU3	2.7308	1.0907
	PU4	3.3231	1.0795
	PU5	3.0231	1.0978
SI	SI1	2.2581	1.1142
	SI2	2.2026	1.0839
	SI3	2.3974	0.9771
	SI4	2.3846	1.0542
	SI5	2.8026	1.0848

PE	PE1	2.8205	1.0884
	PE2	3.2308	0.8623
	PE3	2.8205	0.8744
	PE4	3.0000	1.1337
	PE5	2.7179	0.9606
BI	BI1	2.8103	1.0635
	BI2	3.0154	1.0315
	BI3	2.9128	1.0278
	BI4	3.0410	1.0914
	BI5	3.3743	0.9875

Source: Developed for the research

The table showed that the highest mean among the 5 variables was PEOU5 by getting 3.3948 where majority agree or neutral regarding the item. The lowest mean was SI2 with 2.2026 which explained the opinion given to the item is neutral. Furthermore, PE4 had the highest standard deviation among all the items. However, PE2 had the lowest standard deviation among the variables.

4.2 Scale Measurement

4.2.1 Normality Test

Table 4.3: Normality test

Variables	Item	Skewness	Kurtosis
PEOU	PEOU1	0.1173	-0.5595
	PEOU2	-0.4595	-0.7673
	PEOU3	-0.4741	-0.5787
	PEOU4	-0.2784	-0.6746
	PEOU5	-0.6916	-0.2067

PU	PU1	-0.2540	-0.8272
	PU2	-0.3724	-0.5861
	PU3	0.1441	-0.7989
	PU4	-0.1900	-0.6212
	PU5	-0.2802	-0.8648
SI	SI1	0.5884	-0.5302
	SI2	0.8564	0.0068
	SI3	0.4977	-0.4067
	SI4	0.3595	-0.6833
	SI5	-0.2810	-0.9580
PE	PE1	0.1187	-0.8649
	PE2	0.0200	-0.8893
	PE3	-0.1066	-0.9143
	PE4	-0.1064	-0.9058
	PE5	-0.1093	-1.0187
BI	BI1	0.2816	-0.4232
	BI2	-0.4263	-0.7160
	BI3	-0.2241	-0.8291
	BI4	-0.2962	-0.8523
	BI5	-0.6131	-0.2079

Source: Developed for the research

By looking at Table 4.5, result from 390 respondent showed values between± 2. Skewness and kurtosis of all IVs and DV should not surpass the absolute value of $\pm$ 2 so as to fulfill the assumptions of multivariate model (Gujarati & Porter, 2009).Thus, normality of the standardized residual was assumed in this study.

4.2.2 Reliability Test

The 25 items in measuring 5 variables was used by the Crobach's Alpha to test for the reliability. According to Nunnally (1978), he stated the Cronbach's Alpha which had more than 0.7 considered reliable.

Table 4.4: Reliability Test

Variables	Number of Items	Cronbach's Alpha
PEOU	5	0.7007
PU	5	0.7065
SI	5	0.7131
PE	5	0.7230
BI	5	0.8058

Source: Developed for the research

Table 4.6 showed BI had the highest reliability with Cronbach's Alpha value of 0.8058, followed by PE, SI, PU and PEOU with Cronbach's alpha value of 0.7230, 0.7131, 0.7065, and 0.7007 respectively. All variables were considered reliable as the Cronbach's alpha of each variable had more than 7.0 (Nunnally, 1978).

4.3 Inferential Analysis

4.3.1 Pearson Correlation Analysis

Table 4.5: Pearson Correlation Coefficient

		PEOU	PU	SI	PE	BI
PEOU	Pearson Correlation					
	Sig.					
PU	Pearson Correlation	0.6379				
	Sig.	<.0001				
SI	Pearson Correlation	0.4945	0.4859			
	Sig.	<.0001	<.0001			
PE	Pearson Correlation	0.6376	0.6745	0.5123		
	Sig.	<.0001	<.0001	<.0001		
BI	Pearson Correlation	0.5131	0.5067	0.5594	0.4551	
	Sig.	<.0001	<.0001	<.0001	<.0001	

Source: Developed for the research

According to Hair et al., (2006), to avoid multicollinearity problem, the correlation coefficient should no exceeded 0.90. In this study, the highest coefficient of 0.6745 as presented in table 4.7 is less than the proposed 0.9.Therefore, there was no multicollinearity problem occurs in this study (Hair, Babin, Anderson, & Tatham, 2006).

Based on table 4.7, all the variables were found to be significance at level of $p<0.001$. The analysis result implies that PEOU (0.5131), PU (0.5067), SI (0.5594), and PE (0.4551) are all significantly correlated with BI. Among all correlations between IV and DV, the correlation between SI and BI is the strongest (0.5594).

4.3.2 MLR Analysis

Table 4.6: Model Summary

Model	R Square (R^2)	Adjusted R Square
1	0.4089	0.4028

Source: Developed for the research

Coefficient of determination R^2 is 0.4089 Thus, 40% of BI could be explained by the 4 IVs (PEOU, PU, SI and PE).

Table 4.7: Analysis of Variance

Source	Analysis of variance	
	F Value	Pr>F
Model	66.59	<0.0001

Source: Developed for the research

The F-statistics produced (F value= 66.59) was significant at 1% level (Sig. F<0.0001), thus it proved the fitness of model. Hence, there was a significant association between the 4 IVs (PEOU, PU, SI and PE) and DV (BI).

Table 4.8: Multiple Linear Coefficients

Variable	Parameter Estimate	Pr>|t|	Tolerance	Variance Inflation
Intercept	0.6940	<.0001		0
PEOU	0.2283	0.0003	0.4956	2.0179
PU	0.2137	0.0007	0.4627	2.1613
SI	0.3854	<.0001	0.6760	1.4793
PE	0.0095	0.8872	0.4522	2.2116

Source: Developed for the research

Based on Table 4.10, an equation can be formulated as following

BI=0.6940+ 0.2283(PEOU) + 0.2137(PU) + 0.3854(SI) + 0.0095(PE)

In order to test for multicollinearity problem among variables, Variance Inflation Factor (VIF) and tolerance were applied. The multicollinearity statistics showed that the tolerance indicator for PEOU, PU, SI and PE were greater than 0.1, and their Variance Inflation Factor (VIF) values were less than 10. The result indicated that no multicollinearity problem had occurred (Ott & Longnecker, 2010)

The results showed that PEOU (p=0.0003), PU (p=0.0007) and SI (p=<.0001) are significantly affected the BI of users to adopt MGs. Among them, SI is perceived to impose the greatest influence on BI where every unit factor increases in SI will increase 0.3854 unit of BI, holding other variables remain constant. However, PE (p=0.8872), it had been found that this variables is not significantly related to BI.

4.4 Conclusion

Chapter 4 summarized and interpreted the respondent's demographic profile and the results generated from various data analysis. The coming last chapter will explain key outputs, finding and implications of this study. Also, in Chapter 5, the limitation on this study would be provided and recommendations for future researchers on the limitations will also be suggested.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

Chapter 5 aims to illustrate a summary of entire data tested in Chapter 4. Moreover, it serve the purpose of discuss the major findings and its implications. Also, it will provide the limitation along with the suggestions for upcoming researchers.

5.1 Summary of Statistical Analysis

390 sets of questionnaires were analyzed for further study and summarized based on the statistical results in chapter 4. The analysis used included descriptive analysis, normality test, reliability test, MLR and Pearson Correlation Coefficient Analysis.

5.1.1 Descriptive Analysis

5.1.1.1 Demographic Profile of the Respondents

A total of 400 respondents took part in the survey, but only 390 are useful. Thus the total respond rate yield 97.5%. The major respondents are male and they are generally belongings to the age group of 16-25 years old. Bachelor Degree or Professional Qualification is what most by our respondents currently holds, being 40.50% in total. Moreover, most of the target respondent is still pursuing their studies. Besides, 66.25% of the respondents earn an income of lower than RM 3001 every month. In addition, 15% of the

respondents are come from Penang and 73.75% of the respondents are playing MGs in between 1 to 3 hours per day.

5.1.2 Scale Measurement

5.1.2.1 Normality test

The data of this research is normally distributed since the Skewness and kurtosis of all variables had values between $\pm$ 2. According Gujarati and Porter (2009), they stated that if the Skewness and Kurtosis from all variables are between the absolute value $\pm$ 2, multivariate model would proves to be no significant violations. As a result, it shows the data of this research is normally distributed and parametric testing can be continued.

5.1.2.2 Reliability test

0.8083, 0.7230, 0.7131, 0.7065, and 0.7007 are the result of DV (BI) and the IVs (PU, PEOU, SI and PE) in this reliability test. The tested results of all variables are greater than 0.7, and are believed to be reliable and acceptable (Nunnally, 1978)

5.1.3 Inferential Analysis

5.1.3.1 Pearson Correlation Coefficient

Table 5.1: Pearson Correlation Coefficient Analysis (n=390)

		PEOU	PU	SI	PE	BI
PEOU	Pearson Correlation					
	Sig.					
PU	Pearson Correlation	0.6379				
	Sig.	<.0001				
SI	Pearson Correlation	0.4945	0.4859			
	Sig.	<.0001	<.0001			
PE	Pearson Correlation	0.6376	0.6745	0.5123		
	Sig.	<.0001	<.0001	<.0001		
BI	Pearson Correlation	0.5131	0.5067	0.5594	0.4551	
	Sig.	<.0001	<.0001	<.0001	<.0001	

Source: Developed for the research

The Pearson Correlation Coefficient test results between the DV (BI) and each IV (PEOU, PU, SI and PE) are 0.5131, 0.5067, 0.5594, and 0.4551. From the result, all IVs correlation value exceeds 0.3, which shows the existence of moderate and strong relationship between IVs and DV. Moreover, all variables have a significant level of less than 0.001, thus we can conclude that the IVs have a positive influence on the DV.

5.1.3.2 MLR Analysis

Table 5.2: Multiple Linear Coefficients

Variable	Parameter Estimate	Pr>|t|	Tolerance	Variance Inflation
Intercept	0.6940	<.0001		0
PEOU	0.2283	0.0003	0.4956	2.0179
PU	0.2137	0.0007	0.4627	2.1613
SI	0.3854	<.0001	0.6760	1.4793
PE	0.0095	0.8872	0.4522	2.2116

Source: Developed for the research

The coefficient of determination R^2 is 0.4089 Thus, 40.89% of BI could be explained by the 4 IVs (PEOU, PU, SI and PE). Besides, the 'F' value of 66.59 being p<0.0001 indicates that the IVs have significant relationship with the BI of mobile users to adopt MGs. Moreover, the results showed that PEOU (p=0.0003), PU (p=0.0007) and SI (p=<.0001) are significantly affected the BI of mobile users to adopt MGs, except PE (p=0.8872) which had coefficient more than 0.05, had no significant relationship with BI. Based on these tested results, the alternate hypotheses H1, H2, and H3 are accepted but H4 is rejected. In conclusion, the MLR is adequate in examining the DV using the IVs.

5.2 Discussions of Major Findings

Table 5.3: Summary of the Results of Hypothesis Testing

Hypothesis	Description	Results	Significant level
H1	PEOU has a positive influence on the mobile device users' BI in adopting mobile games.	Accepted	0.0003
H2	PU has a positive influence on the mobile device users' BI in adopting mobile games.	Accepted	0.0007
H3	SI has a positive influence on the mobile device users' BI in adopting mobile games.	Accepted	<..0001
H4	PE has a positive influence on the mobile device users' BI in adopting mobile games.	Rejected	0.8872

Source: Developed for the research

5.2.1 PEOU

PEOU was proven to be one of the significant in explaining the BI. Besides, there is a positive relationship between PEOU and BI. According to the outcomes in Chapter 4, it is established that PEOU was found to have significant effect in affecting the BI of MG users to adopt MG in this study. A significant value of $p<0.05$ is achieved.

This result supports and is consistent with some past researches relating to determine computer self-efficacy about ease of use of new system (Venkatesh

& Davis, 2000), which recommended that PEOU has positive impact and significant effect with BI. Besides that, it was proven that "PEOU is the vital cause that influences user acceptance and usage behavior of ITs which include the mobile gaming." said by Lgbaria and Livari. (1995). Hence, when the MGs are easy to learn or play, it will increase the mobile users BI to adopt the MGs.

5.2.2 PU

PU was proved as one of the important forecasters in explaining BI and the result shows a positive and significant relationship among of them (p-value= 0.0007 which is <0.05). Hence, the hypothesis in this research was supported. Hence, there was a positive association between PU and BI. Our outcome was consistent with prior researchers relating to mobile wireless technology (Kim & Garrison, 2009), which suggested that PU has positive influence on BI.

The results show that mobile user would only adopt MGs if they find it is useful. Hence, when MGs bring mobile users more practical benefits, the adoption rate of MGs will increase. Due to this reason, this study can help and support the MGs developers launched the games apps that are interest and difficult to score so that can attract more mobile gamers and maintain the popularity of the mobile gaming company's livelihood.

5.2.3 SI

SI shows a positive and significant relationship with BI in this study. Also, a significant value of p<0.0001 is reached and therefore the hypothesis in this research was supported. This validates the past researches on mobile

entertainment service (Kim, Kim and Kil, 2009) also stated as SI is positively related and has significant relationship with BI.

According to McCrindle (2005), he stated that the decisions made by consumer are easily influenced by the experiences of their peers. (McCrindle, 2005) Moreover, Malaysia is an intense family-oriented base society (Sani, Yusof, Kasim, & Omar, 2009), where family decision will affect their children BI. Besides, consumers purchasing behavior are influence by their family decision (Jung & Kau, 2004).

In conclusion, the BI of mobile users in Malaysia to adopt MGs is simply affected by friends and family.

5.2.4 PE

The relationship has been proven to be positive between PE and BI in this research. However, PE was insignificant in explaining the BI. This results is different to prior study (Liu & Li, 2010b), which stated that PE has significant effect on BI. Also, this result is similar in the study of m-learning adoption (Iqbal & Qureshi, 2012) , which had showed that PE has no significant impact on BI.

PE is found to have no significant impact on BI of mobile users in adoption of mobiles games in this study. This is perhaps due to the fact that mobile user did not focuses on fun. Besides, the MG users are easier to get bored in certain games apps, they did not feel happy when adopting mobile games. (Tiffany, 2013). Hence, PE has no significant influential for mobile user BI to adopt MGs.

5.3 Implications of the Study

5.3.1 Practitioner Implications

This research is significant to MG developers as it provides detailed and useful information to assist in developing MGs, it allows them to get better understanding on MG users so that they may develop better MGs to fulfill customers' needs. In this research, it included 4 IVs that affect individuals in adopting MGs. The 4 IVs are PEOU, PU, SI and PE.

It is important for MG developers in designing MGs by considering PEOU. Developers should not design MGs too difficult as individuals might find out hard to operate it and hence affect the sales of the developers.

PU is one of the IVs for individuals in adopting MGs. Game developers should consider it when developing MGs. Developers may implement more useful features. For example, they may design more educational games which might help in educating children. This might pull parents' attention towards the games.

MG developers should invent higher and better quality games for individuals in preventing bad reputations. Once there are poor reputations about the games, individuals tend to spread the news to others and affect the sales of the developers. Therefore, developers should consider social influence when designing MGs.

In our research, PE is proven to be insignificant in explaining the BI of individuals in the adoption of mobile games. However there is a positive relationship between PE and BI. Therefore MGs developers should consider PE when inventing mobile games. This is because if they able to create joyful, fun and innovative MGs, individuals will have the intention to purchase and download and they would not easily get bored to the games.

This information allows MG developers to understand these factors in explaining how they are going to affect individuals to adopt MGs. If BG developers able to fulfill these 4 IVs, they can create better MGs. Therefore, customer satisfactions may be fulfilled too. Time and cost will be saved as this research provides detailed information for game developers. They do not need to do surveys on customers anymore as our research provides enough information for them. Game developers might not need to spend unnecessary money on doing the similar research.

5.3.2 Scholars Implications

Different from practitioner implication, this study also provides few scholar implications too. There are some MG researches in foreign countries but only a few in Malaysia. Now, this research is done in benefiting future researchers as a reference when doing similar researches in Malaysia.

Moreover, unlike past researches which only focused on certain mobile phone services such as mobile banking, mobile shopping and so on, this study allow the researchers to understand better on the effects of the 4 IVs that affecting individuals to adopt MGs also. In addition, this study has triumphantly assured the variables do affect individuals in adopting MGs by using TAM model. Other than mobile technologies, TAM model also has been proved in this study that it can be used in MG adoption.

5.4 Limitations of the Study and Recommendations

Although the results of this research suggest several significant factors affecting mobile device users' BI to adopt MGs, it has some limitation identified during the research process. Thus, recommendations are suggested for future research as well.

An overall of 400 respondents participate in this survey, however only 390 sets can be used, while other 10 were incomplete. When we conduct our questionnaire survey via online, it is impossible that all the respondents are willing to help us fill up the survey whatever they had promise to help us fill it up. Besides that, it is possible that some respondents might have difficulty in understanding the questionnaire and this will reflect their true opinions. Thus, we might key in the incomplete and inaccurate data into our research. Instead of distributing questionnaire via online, researchers can consider the direct communication with respondents, such as interview method when collecting the responds from target respondents. This allows researchers to have deeper understanding about their intention to adopt MGs. Thus, misunderstanding can be avoid and the data will be more reliability and accurate.

Furthermore, the questionnaire that we distributed did not provide a feedback section. Therefore, some respondents might not have a clear understanding on the questions we asked and unable to provide their opinion regarding to the question requested. Thus, this have influence the result of this study due to uncertainty of what the question asked. A feedback column should be added in the questionnaire to ensure that the respondents can leave their comments on the questionnaire items. This might helps researchers to discover their problems, which will be useful during the discussion of research findings.

Also, we have not included the negative question when designing the questionnaires. Such question can be confusing the respondents. Nevertheless, it can helps in discovering whether the respondents fill up the questionnaires seriously or just simply ticking the options provided in the questionnaires. Hence, several negative questions are suggested to be added in the questionnaire. This can helps to ensure that the respondents are concentrating when the fill up the questionnaire. Therefore, the results are more reliable.

Another limitation is time constraint. As the questionnaires were distributed to the target respondents throughout every state of Malaysia, this may take some time to collect back the data and limit the outcome of this study. Hence, longitudinal

approach is suggested for future research. According to Saunders (2009), longitudinal approach "studies an event at more than one point in time". Therefore, future researcher will be enough time to gather more information on the BI of target respondents.

The major limitation of this research is this study was conducted only among the 13 states in Malaysia. Hence, if future researchers want to conduct the similar study in different country, it is possible that the results provided will be slightly different. Hence, they should attempts to insert moderating factor into their research frameworks.

Even though several limitations were discussed regarding the present research, significance of the study would not be affected. However, this research would probably act as fundamental platform of more-detailed discussion for future study.

5.5 Conclusion

In brief, this research proven TAM is fit in this study and it can anticipate the BI of mobile device users to adopt the mobile games in Malaysia. Also, this research indicates that the associations between PEOU, PU, SI, and BI of mobile device users to adopt MGs are significantly and positively related. However, PE has not significant relationship with BI. Furthermore, the SI is found to be the strongest determinant of BI of users to adopt MGs in Malaysia among others IVs (PU, PEOU and PE). Hence, this study is benefited the future MGs developers. Besides that, future researchers should also put more attention in doing such research in developing countries such as Malaysia in order to provide more useful insight from research perspective.

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Appendix 2.1: Summary of Past Empirical Studies on PU – BI

Study	Country	Data	Major Findings
Wessels & Drennan, 2010	Australia	Online Survey of 314 respondents completed a questionnaire	PU is positive and significant effect on BI to use
Kim, Ma & Park, 2009	United State	Questionnaire of 314 of college students in two large US universities	PU is positive and significant related on BI to use
Kim & Garrison, 2009	South Korea	Online survey of 862 employees from medium – sized Korean company	PU has a significant and positive effect on BI

Source: Developed for the research

Appendix 2.2: Summary of Past Empirical Studies on PEOU – BI

Study	Country	Data	Major Findings
Igbaria & Livari, 1995	United State	Questionnaire survey of 450 microcomputers user in USA provided	PEOU has positive relation in user BI to computer usage.
Vantesh & Davis, 2000	India	Questionnaire survey of 246 employees in India Provided	PEOU has a positive and significant effect on BI.
Pederson & Nysveen, 2003	Norway	Questionnaire survey of 459 mobile parking services trial users In Norway provided.	PEOU has a positive effect on BI.

Source: Developed for the research

Appendix 2.3: Summary of Past Empirical Studies on SI – BI

Study	Country	Data	Major Findings
Kim, Kim & Kil, 2009	South Korea	Online Survey of 269 of the undergraduate and graduate college students as well as working adults from different position and industries respondents completed a questionnaire.	SI has a positive and significant relationship on the BI.
Yang, 2010	United State	Online survey of 400 mobile service users	SI is significant and positive effect on BI
Hong, Thong & Moon, 2008	Hong Kong	Online survey of 862 consumers of different categories of mobile data services associated with different usage contexts.	SI has positive association and significant power in explaining BI.

Source: Developed for the research

Appendix 2.4: Summary of Past Empirical Studies on PE – BI

Study	Country	Data	Major Findings
Iqbal & Qureshi, 2012	Pakistan	300 questionnaires survey distributed to the students of chartered universities in Pakistan	PE has no significant effect on BI.
Liang & Yeh, 2011	Taiwan	390 useful observations drawn from the online survey on a popular website in Taiwan	PE has no significant effects on BI.
Liu & Li, 2010	China	920 questionnaires collected from students at Zhejiang Normal University in China	PP has significant effect to BI to use.

Source: Developed for the research

Appendix 3.1: Measurement for Each Variable

Variables	Items	References
PEOU	1. I think that mobile games are easy to learn. 2. I think that playing mobile games requires a lot of mental effort. 3. I think that mobile games are easy to play. 4. Mobile games cannot be playing without the manual. 5. I think that it takes effort to become skilful at mobile games.	(Liang & Yeh, 2011) , (Pan, 2011)
PU	1. I think that it is useful for me to play mobile games. 2. I think that playing mobile games would enable me to accomplish my tasks more quickly. 3. I think that playing mobile games would make it easier for me to carry out my tasks. 4. I think that playing mobile games can increase my quality of life. 5. I think that playing mobile games make my life better.	(Lee, 2009), (Pan, 2011)
Social influence	1. My friend play and recommend mobile games to me. 2. People who play mobile games have more esteem. 3. Playing mobile games is considered a status symbol. 4. People that I admire play mobile games. 5. I will maintain positive attitude when playing mobile games.	(Pan, Factors affecting mobile gaming adoption, 2011)

PE	1. Playing mobile games can bring enjoyment to me. 2. Playing mobile games can bring fun to me. 3. Playing mobile games can make me feel happy. 4. Playing mobile games can enhance my imagination. 5. Playing mobile games help me to spend my free time.	(Dr.Ya & Buahom, 2013), (Liang & Yeh, 2011)
BI	1. I frequently play mobile games. 2. I intend to play mobile games regularly in the future. 3. I will try different types of mobile games in the future. 4. I will play mobile games more frequently in the future. 5. I was willing to recommend my friend to use mobile games.	(Dr.Ya & Buahom, 2013)

Source: Developed for the research

Appendix 3.2: Sources of Variables

Variables	Items	Description	Sources
Perceived Ease of Use	PEOU 1	I think that mobile games are easy to learn	(Lee, 2009)
	PEOU 2	I think that playing mobile games requires a lot of mental effort	(Pan, Factors affecting mobile gaming adoption, 2011)
	PEOU 3	I think that mobile games are easy to play	
	PEOU 4	Mobile games cannot be playing without the manual	(Liang & Yeh, 2011)
	PEOU 5	I think that it takes effort to become skilful at mobile games	(Pan, Factors affecting mobile gaming adoption, 2011)
Perceived usefulness	PU 1	I think that it is useful for me to play mobile games	(Pan, Factors affecting mobile gaming adoption, 2011)
	PU 2	I think that playing mobile games would enable me to accomplish my tasks more quickly	(Lee, 2009)
	PU 3	I think that playing mobile games would make it easier for me to carry out my tasks	
	PU 4	I think that playing mobile games can increase my quality of life	(Pan, Factors affecting mobile gaming adoption, 2011)
	PU 5	I think that playing mobile games make my life better	

Social influence	SI 1	My friend play and recommend mobile games to me	(Pan, Factors affecting mobile gaming adoption, 2011)
	SI 2	People who play mobile games have more esteem	
	SI 3	Playing mobile games is considered a status symbol.	
	SI 4	People that I admire play mobile games.	
	SI 5	People that are close to I play mobile game.	
Perceived Enjoyment	PE 1	Playing mobile games can bring enjoyment to me	(Pan, Factors affecting mobile gaming adoption, 2011)
	PE 2	Playing mobile games can bring fun to me	
	PE 3	Playing mobile games can make me feel happy	
	PE 4	Playing mobile games can enhance my imagination	(Liang & Yeh, 2011)
	PE 5	Playing mobile games help me to spend my free time	(Yu & Buahom, 2013)
Behaviour Intention	BI 1	I frequently play mobile games.	(Pan, Factors affecting mobile gaming adoption, 2011)
	BI 2	I intend to play mobile games regularly in the future	
	BI 3	I will try different types of mobile games in the future	
	BI 4	I will play mobile games more frequently in the future	
	BI 5	I willing to recommend my friend to use mobile games	(Yu & Buahom, 2013)

Source: Developed for the research

Appendix 3.3: Questionnaire

UNIVERSITI TUNKU ABDUL RAHMAN

Faculty of Business and Finance

BACHELOR OF COMMERCE (HONS) ACCOUNTING

FINAL YEAR PROJECT

TITLE OF TOPIC: FACTORS AFFECTING THE INDIVIDUAL TO ADOPT MOBILE GAMES IN MALAYSIA

Survey Questionnaire

Dear respondent,

We are final year undergraduate students of Bachelor of Commerce (HONS) Accounting, from Universiti Tunku Abdul Rahman (UTAR). The **purpose** of this survey is to investigate the significant factors that affect the adoptability of mobile games in Malaysia.

Please answer all questions in **ALL** sections. All responses are completely confidential.

Thank you for your participation.

Instructions:

1) There are **Five** (5) sections in this questionnaire. Please answer **ALL** questions in ALL sections.

2) Completion of this form will take you approximately 10 to 15 minutes.

3) Please feel free to share your comment in the space provided. The contents of this questionnaire will be kept **strictly confidential**.

Section A: Demographic Profile

Please place a tick "√" or fill in the blank for each of the following:

1. Gender:

- □ Male
- □ Female

2. Age:

- □ Below 15 years
- □ 16 years – 25 years
- □ 26 years – 35 years
- □ 36 years and above

3. Highest education completed:

- □ UPSR / PMR / SRP / SPM
- □ STPM / A-Level / Foundation
- □ Diploma/ Advances Diploma
- □ Bachelor Degree/ Professional Qualification
- □ Master/ PhD Degree

4. Monthly Income:

- □ Less than RM1000
- □ RM 1001- RM 2000
- □ RM 2001- RM 3000
- □ RM 3001- RM 4000
- □ RM 4001- RM 5000
- □ Above RM 5001

5. Do you own a mobile phone?

- □ Yes
- □ No

6. Do you have experience of playing mobile games?

- ☐ Yes
- ☐ No

7. How frequency you play mobile games per day?

- ☐ < 1 hour
- ☐ 1 hour - 3 hours
- ☐ > 4 hours

8. What state you come from?

- ☐ Johor
- ☐ Kedah
- ☐ Kelantan
- ☐ Malacca
- ☐ Negeri Sembilan
- ☐ Pahang
- ☐ Penang
- ☐ Perak
- ☐ Perlis
- ☐ Sabah
- ☐ Sarawak
- ☐ Selangor
- ☐ Terengganu

Section B:

Please circle your answer to each statement using 5 Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree]

Perceived Ease of Use

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I think that mobile games are easy to learn	1	2	3	4	5
2	I think that playing mobile games requires a lot of mental effort	1	2	3	4	5
3	I think that mobile games are easy to play	1	2	3	4	5
4	Mobile games cannot be playing without the manual	1	2	3	4	5
5	I think that it takes effort to become skilful at mobile games	1	2	3	4	5

Perceived of Usefulness

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I think that it is useful for me to play mobile games	1	2	3	4	5
2	I think that playing mobile games would enable me to accomplish my tasks more quickly	1	2	3	4	5
3	I think that playing mobile games would make it easier for me to carry out my tasks	1	2	3	4	5
4	I think that playing mobile games can increase my quality of life	1	2	3	4	5
5	I think that playing mobile games make my life better	1	2	3	4	5

Social Influence

No.	Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	My friend play and recommend mobile games to me	1	2	3	4	5
2	People who play mobile games have more prestige.	1	2	3	4	5
3	Playing mobile games is considered a status symbol.	1	2	3	4	5
4	People that I look up to play mobile games.	1	2	3	4	5
5	People that are close to I play mobile game.	1	2	3	4	5

Perceived Enjoyment

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Playing mobile games can bring enjoyment to me	1	2	3	4	5
2	Playing mobile games can bring fun to me	1	2	3	4	5
3	Playing mobile games can make me feel happy	1	2	3	4	5
4	Playing mobile games can enhance my imagination	1	2	3	4	5
5	Playing mobile games help me to spend my free time	1	2	3	4	5

Behaviour Intention

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I frequently play mobile games.	1	2	3	4	5
2	I intend to play mobile games regularly in the future	1	2	3	4	5
3	I will try different types of mobile games in the future	1	2	3	4	5
4	I will play mobile games more frequently in the future	1	2	3	4	5
5	I willing to recommend my friend to use mobile games	1	2	3	4	5

Thank you for your time, opinion and comments.

~ The End ~