

DRIVERS OF MOBILE GAME ADOPTION AMONGST GENERATION Y STUDENTS

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Vanderbijlpark

2017

DECLARATION

I declare that:

“Drivers of mobile game adoption amongst Generation Y students”

is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references, and that this dissertation has not previously been submitted by me for a degree at any other university.

SIGNATURE

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LETTER FROM THE EDITOR

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To whom it may concern

This is to confirm that I, the undersigned, have language edited the completed research of Dylan Gene Price for the Master of Commerce thesis entitled: *Drivers of mobile game adoption amongst Generation Y students*.

The responsibility of implementing the recommended language changes rests with the author of the thesis.

Yours truly,
Angeliki Albanis

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ABSTRACT

Keywords: Mobile games, drivers of adoption, Generation Y students, South Africa

Mobile games are currently the fastest growing mobile service in the market. The prevalence of traditional video games is dissipating, as mobile games experience much higher growth rates in the industry. The same can be said in South Africa, where mobile gaming revenue is growing at double the rate of traditional video games. The success of mobile games has attracted the interest of various organisations and marketers who wish to use mobile games as platform for advertising. Advertising expenditure in the video games market already exceeds R70 billion, thereby providing evidence of its importance as a marketing medium. Organisations and marketers seeking to exploit the success of mobile games may be wise to target the Generation Y cohort in South Africa. They are individuals born between the years 1986 and 2005, placing them between the ages of 11 and 30 years old in 2016. At 38 percent of the South African population, this age cohort manifests as a sizable market segment. Generation Y individuals are known for their early adoption rates, willingness to be pioneers and tech-savviness. In particular, Generation Y members studying at tertiary institutions are an attractive segment to marketers as they generally have a higher future earning potential and social standing amongst their peers.

The primary objective of this study was to propose and empirically test a model of the drivers of mobile games adoption amongst Generation Y students in the South African context. The sampling frame for the study consisted of 26 public registered HEIs located in South Africa. Non-probability judgement sampling was followed to select three HEIs situated in the Gauteng province. The three HEIs comprised a traditional university, a university of technology and a comprehensive university. Lecturers at the participating campuses were contacted and asked for permission to distribute the questionnaires. Once permission was obtained, a sample of 600 students, split equally across the three campuses, was drawn for the study in 2016. Of the questionnaires returned, 502 were useable giving a response rate of 84 percent. The collected

data was analysed using an exploratory factor analysis, a descriptive statistical analysis, a correlation analysis, structural equation modelling and a two independent-sample *t*-test.

Structural equation modelling revealed that Generation Y students' use-context has a significant positive impact on perceived attractiveness, perceived enjoyment, habit and subjective norms. It also revealed that perceived attractiveness, perceived enjoyment and habit have a direct positive impact on flow, with flow having a direct positive impact on attitude. Moreover, subjective norms and attitude were found to have a direct positive impact on behavioural intentions. In terms of the differences between male and female participants, the findings of this study indicate that male Generation Y students have a statistically and practically significant higher perception of attractiveness of mobile games as well as a statistically and practically significant stronger behavioural intention towards playing mobile games.

The findings of this study aid marketers in understanding consumer behaviour towards mobile gaming in the South African context. In addition, a proposed model that predicts the drivers of mobile games adoption may assist marketers targeting Generation Y students or other segmented groups. These findings can also open up future opportunities for organisations, both local and international, who wish to directly serve this lucrative market segment in South Africa.

TABLE OF CONTENTS

DECLARATION.....	ii
LETTER FROM THE EDITOR.....	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vii
LIST OF TABLES.....	xiv
LIST OF FIGURES.....	xv
CHAPTER 1 INTRODUCTION AND PROBLEM STATEMENT	1
1.1 INTRODUCTION	1
1.2 PROBLEM STATEMENT	4
1.3 OBJECTIVES OF THE STUDY	5
1.3.1 Primary objective.....	5
1.3.2 Theoretical objectives	5
1.3.3 Empirical objectives	6
1.4 HYPOTHESES	6
1.5 RESEARCH DESIGN AND METHODOLOGY	9
1.5.1 Literature review	9
1.5.2 Empirical study	9
1.5.2.1 Target population.....	9
1.5.2.2 Sampling frame.....	9

1.5.2.3	Sample method.....	10
1.5.2.4	Sample size	10
1.5.2.5	Measuring instrument and data collection method.....	10
1.5.3	Statistical analysis.....	12
1.6	ETHICAL CONSIDERATIONS	12
1.7	CONTRIBUTIONS OF THE STUDY.....	12
1.8	CHAPTER CLASSIFICATION	13
CHAPTER 2 LITERATURE REVIEW		15
2.1	INTRODUCTION	15
2.2	VIDEO GAMING	16
2.2.1	Historical overview of video gaming.....	16
2.2.2	Video Gaming in the marketing context	19
2.3	MOBILE GAMES.....	22
2.3.1	An overview of mobile games	22
2.3.1.1	Mobile games on mobile telephones	23
2.3.2	Third generation of mobile gaming.....	27
2.3.3	Freemium model for mobile games.....	30
2.3.4	Global performance of mobile games.....	31
2.3.5	Marketing potential for mobile games	32
2.3.6	Mobile games in the South African market	33
2.4	DRIVERS OF MOBILE SERVICES ADOPTION	34

2.4.1	Use-context	35
2.4.2	Perceived visual attractiveness.....	36
2.4.3	Perceived enjoyment	37
2.4.4	Habitual use	38
2.4.5	Subjective norms.....	39
2.4.6	Flow and cognitive concentration.....	40
2.4.7	Attitudes and behavioural intentions toward mobile services	41
2.5	GENERATIONAL COHORTS	43
2.5.1	Generation Y	44
2.5.2	Generation Y in South Africa	45
2.6	PROPOSED MODEL OF MOBILE GAMES ADOPTION.....	46
2.7	SYNOPSIS	48
CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY.....		49
3.1	INTRODUCTION	49
3.2	RESEARCH DESIGN	50
3.3	SAMPLING PROCEDURE	52
3.3.1	Defining the target population.....	52
3.3.2	Sampling frame.....	53
3.3.3	Sampling method.....	53
3.3.4	Sample size	55
3.4	DATA COLLECTION METHOD.....	56

3.4.1	Design of the questionnaire.....	57
3.4.2	Questionnaire content.....	57
3.4.3	Layout of the questionnaire.....	58
3.4.4	Pre-testing and pilot testing of questionnaire.....	59
3.5	QUESTIONNAIRE ADMINISTRATION.....	60
3.6	DATA PREPARATION.....	60
3.6.1	Step 1: Editing.....	60
3.6.2	Step 2: Coding.....	61
3.6.3	Step 3: Tabulation.....	62
3.7	STATISTICAL ANALYSIS.....	62
3.7.1	Factor analysis.....	63
3.7.2	Internal-consistency reliability.....	63
3.7.3	Validity.....	65
3.7.4	Descriptive statistics.....	66
3.7.4.1	Measures of variability.....	67
3.7.4.2	Measures of location.....	67
3.7.4.3	Measures of shape.....	67
3.7.5	Correlation analysis.....	68
3.7.6	Structural equation modelling.....	69
3.7.6.1	Defining the constructs.....	70
3.7.6.2	Development of the overall measurement model.....	71

3.7.6.3	Designing a study to produce empirical results.....	71
3.7.6.4	Assessing measurement model validity	72
3.7.6.5	Specifying the structural model.....	73
3.7.6.6	Assessing structural model validity	74
3.7.7	Two independent-samples t-test	74
3.7.8	Cohens D-statistic	75
3.8	SYNOPSIS	75
CHAPTER 4 ANALYSIS AND INTERPRETATION OF EMPIRICAL		
	FINDINGS.....	76
4.1	INTRODUCTION	76
4.2	PILOT TESTING OF QUESTIONNAIRE	76
4.3	DATA GATHERING PROCESS.....	77
4.4	PRELIMINARY DATA ANALYSIS	78
4.4.1	Coding	78
4.4.2	Data cleaning	80
4.4.3	Tabulation of variables.....	81
4.5	DEMOGRAPHIC ANALYSIS	82
4.6	EXPLORATORY FACTOR ANALYSIS.....	87
4.7	DESCRIPTIVE STATISTICS.....	90
4.8	RELIABILITY OF THE MAIN STUDY	92
4.9	CORRELATION ANALYSIS	94
4.10	HYPOTHESIS TESTING	96

4.11	STRUCTURAL EQUATION MODELLING	98
4.11.1	Measurement model specification	98
4.11.2	Reliability and validity of the measurement model.....	101
4.11.3	Structural model	103
4.12	TWO INDEPENDENT-SAMPLES T-TEST	107
4.13	SYNOPSIS	109
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS.....		110
5.1	INTRODUCTION	110
5.2	OVERVIEW OF THE STUDY	111
5.3	MAIN FINDINGS OF THE STUDY	113
5.4	CONTRIBUTIONS OF THE STUDY.....	117
5.5	RECOMMENDATIONS	117
5.5.1	Pay attention to the various contexts in which a mobile game are likely to be played	117
5.5.2	Create mobile games that are fun to play and that are aesthetically attractive	119
5.5.3	Promote the idea that playing in the right environment improves the flow experience for players	120
5.5.4	Promote the social acceptability and social aspect of engaging in mobile gaming	120
5.5.5	Ensure that mobile games create a state of flow	121
5.5.6	Target the Generation Y cohort	122

5.5.7	Formulate streamlined industry regulations that will encourage local video game developers	123
5.6	LIMITATIONS AND FUTURE RESEARCH OPPORTUNITIES	123
5.7	CONCLUDING REMARKS	124
	BIBLIOGRAPHY	125
	APPENDIX A QUESTIONNAIRE	154
	APPENDIX B STRUCTURAL MODELS	159

LIST OF TABLES

Table 3.1	Coding of information	61
Table 3.2	Psychometric properties of questionnaire scales.....	65
Table 4.1:	Pilot testing results	77
Table 4.2:	Coding	79
Table 4.3:	Frequency table of responses	81
Table 4.4:	Rotated factors for Section B and C	89
Table 4.5:	Descriptive statistics summary	90
Table 4.6:	Internal-consistency reliability values of the scales in the main study	93
Table 4.7:	Correlation matrix	95
Table 4.8:	Standardised coefficients of the measurement model	100
Table 4.9:	Measurement model: construct reliability, average variance extracted and correlation matrix	102
Table 4.10:	Structural model comparison	107
Table 4.11:	Gender Difference	108

LIST OF FIGURES

Figure 2.1:	Main categories of video games	18
Figure 2.2:	Examples of advergames	19
Figure 2.3:	Examples of in-game advertising.....	21
Figure 2.4:	First generation mobile telephone games.....	24
Figure 2.5:	Second Generation 3D mobile telephone games	26
Figure 2.6:	Third Generation mobile telephone games.....	28
Figure 2.7:	Proposed model of the drivers of Generation Y students' mobile game adoption.....	47
Figure 3.1:	Illustration of the marketing research designs.....	50
Figure 3.2:	Sampling procedures	54
Figure 3.3:	Six-stages in Structural Equation Modelling.....	70
Figure 4.1:	Response rate of institutions.....	83
Figure 4.2:	Participants' current year of study.....	83
Figure 4.3:	Gender profile of participants.....	84
Figure 4.4:	Race distribution of participants.....	84
Figure 4.5:	Participants' province of origin	85
Figure 4.6:	Participants' home language.....	86
Figure 4.7:	Age distribution of participants.....	87
Figure 4.8:	Specified measurement model	99
Figure 4.9:	Structural Model A	104
Figure 4.10:	Structural Model B	105
Figure 5.1:	Drivers of mobile games adoption amongst Generation Y students	116

CHAPTER 1

INTRODUCTION AND PROBLEM STATEMENT

1.1 INTRODUCTION

Video games have become a leading force in the entertainment industry over the past two decades (Granic, Lobel & Engels, 2014:66; Saleem, Anderson & Gentile, 2012:281). Video games are a form of interactive entertainment played by a user through the manipulation of images produced by a computer or gaming console on a television screen or any other display screen (Nelson, Keum & Yaros, 2004:6-7). A video game is played with the aim of achieving certain pleasurable, educational or entertaining outcomes by completing certain tasks set out in the video game (Granic *et al.*, 2014:67). The earliest form of commercial video games dates back to the 1970s, the most famous game that emerged from that time era was Pong - a game in which a ball is hit between two rectangular paddles (Kent, 2001:65;68). Video games became an instant hit amongst consumers as they were interactive, challenging and fun to play. Memorable games such as Pac Man, Donkey Kong and Super Mario Bros. became highly successful in the video game market (Hsu & Lu, 2007:1643).

Although the video game industry boomed in the 1980s and 1990s, another invention also made its mark. In 1973, Motorola developed the first commercialised mobile phone, which then became available to the public 10 years later (Goodwin, 2015). Nokia, an innovative and ambitious organisation, then entered the fray in the 1990s (Kaasinen, 2005:6). Upholding the true essence of pioneering, Nokia decided to combine the success of video games with the rapid success of mobile telephones. This led to the creation of the earliest mobile application game (hereafter referred to as mobile games), known as Snake, where a player manoeuvres a line that grows in length, with the line itself being a primary obstacle (Walton & Pallit, 2012:354). Snake went on to become a great success amongst users of Nokia mobile telephones and

this led video game companies to explore the possibility of introducing high powered games into mobile devices (Ha, Yoon & Choi, 2007:276).

The technological improvements in graphics and processing speeds that took place over the next 10 years, post-Snake era, had a profound effect on the evolution of mobile games worldwide (Ha *et al.*, 2007:276-277). In 2008, just a year after Apple released the first multi-touch interface smartphone, Rovio created Angry Birds, which started a new generation of mobile gaming and went on to become a global phenomenon (Feijoo, Gomez-Barroso, Aguado & Ramos, 2011:213). The creation of Angry Birds coincided with the introduction of the Application store for smartphones. The 'app' store created by Apple and Google not long after, had become pivotal to the new-found success of mobile games because it allowed downloading of applications (apps), such as games, onto a smartphone device (Noyons, Macqueen, Johnstone, Robertson, Palm, Point & Behrmann, 2012:10). In South Africa, nine of the top ten downloaded apps are mobile games, with well-known third generation mobile games such as Candy Crush and Clash of Clans amongst the highest ranked (Pricewaterhouse Coopers, 2015:122).

Not all mobile services have enjoyed the same success and luxurious adoption rate as that of mobile gaming (Liu & Li, 2011:890). Various mobile innovations such as mobile TV (Jung, Perezmira & Wiley Patton, 2009:123), mobile payments (Dahlberg, Mallat, Ondrus, Zmijewska, 2008:165) and mobile ticketing (Mallat, Rossi, Tuunainen & Oorni, 2009:194) have struggled to become established in world-wide markets. Researchers in the marketing field of consumer behaviour are trying to uncover the underlying causes as to why these differences in adoption rates occur, as well as what drives consumers to adopt a particular mobile service (Thong, Hong, & Tam, 2006:799). Over the past 10 years, various drivers of mobile service adoption have been identified by researchers. Drivers such as habit (Venkatesh, Thong & Xu, 2012:178), perceived enjoyment (Liu & Li, 2011:892), flow (also known as cognitive concentration) (Jung *et al.*, 2009:124-125), perceived attractiveness (Tao, Cheng & Sun, 2009:9), subjective norms (Fielding, McDonald & Louis, 2008:319) and use-context (Van der Heijden, Ogertschmig & Van der Gaast,

2005:10) have proven to be popular dimensions to measure mobile services adoption.

Furthermore, research conducted outside of South Africa has revealed that use-context can have a strong positive influence over all drivers associated with mobile service adoption (Liang & Yeh, 2011:195, Liu & Li, 2011:891; Mallat *et al.*, 2009:194). Use-context refers to the environment in which a technology medium is going to be used (Wijngaert & Bouwman, 2008:26). The use of mobile phones can occur anywhere, which exposes its user to various social influences and usage-contexts (Verkasalo, 2008:333). Mallat *et al.* (2009:191-192) state that it is important to establish a link between the social setting (use-context) and the mobile information service, as an individual is more likely to use a technological medium when situated in the right context. In addition, Zhou and Lu (2011:883-884) state that flow needs to be included in mobile service adoption studies as mobile services are enjoyed more by consumers when they become totally immersed in the mobile service. Various studies have shown that flow is a dominant predictor of consumer's attitude and behavioural intentions toward mobile services (Zhou, 2013:269; Zhou, 2012:33; Liu & Li, 2011:896; Zhou & Lu, 2011:887; Zhou, Li & Liu, 2010:938; Ha *et al.*, 2007:285).

Research conducted on South Africa (Statista, 2016a) showed that the typical smartphone user was aged between 16-34 years old. Markert (2004:21) defines the Generation Y cohort as any individual born between 1986 and 2005. This suggests that the typical smartphone user in South Africa predominantly belongs to the Generation Y cohort. Noble, Haytko and Phillips (2009:618) state that information gained from Generation Y individuals in the context of technology is valuable to marketers as this cohort has been raised during a time where technology developed at a rapid pace. As a result, Generation Y individuals are able to adapt quickly to technological change (Parment, 2013:192). Moreover, Generation Y individuals who obtain a tertiary qualification through higher education institutions (HEIs) are important to marketers as they are more likely to have a greater future potential earning and a higher future disposable income, as well as a higher social standing within communities. As a result, they typically act as trendsetters amongst their peers

(Bevan-Dye & Surujlal, 2011:49). The latest statistics released by Statistics South Africa indicates that approximately 38 percent of the population in South Africa may be categorised as being part of Generation Y (Statistics South Africa, 2015:9). Therefore, the sheer size of the cohort is important to marketers as they represent a considerable portion of the South African market.

1.2 PROBLEM STATEMENT

Traditional video games have been present in the South African market for nearly two decades. However, a report published by Pricewaterhouse Coopers (2015:121) shows that mobile gaming is growing at a rate that is more than double the speed of traditional console gaming. This occurrence is compounded by the fact that mobile games in South Africa only became officially available in 2010 (Mcilhone, 2015).

Similarly, this phenomenon has also occurred outside South Africa with a handful of studies being conducted to ascertain why mobile games are being adopted at such a rapid rate by consumers (Liang & Yeh, 2011:187; Liu & Li, 2011:890; Ha *et al.*, 2007:276). Research conducted by Liang and Yeh (2011:187-196) and Liu and Li (2011:890-898) found that use-context has the biggest influence over other motivators that consumers perceive to have when playing mobile games. In addition, Ha *et al.* (2007:284) concluded that flow of a game is the most attitudinal influencing predictor for mobile gaming. Liang and Yeh (2011:195) suggest that further research needs to be conducted on a culturally diverse group of consumers to uncover more conclusive results pertaining to adoption of mobile games (previous studies were only focused on Chinese, Korean and Taiwanese consumers).

Owing to the sheer size of the Generation Y cohort in the South African market as well as the importance this age cohort places on technology, (Bevan-Dye & Surujlal, 2011:49; Noble *et al.*, 2009:618) the Generation Y cohort represents an important target market for mobile gaming apps. Marketers are likely to be especially interested in Generation Y university students who generally

manifest as opinion leaders amongst their peers (Synodinos, 2014:5; Bevan-Dye & Surujlal, 2011:49).

A definitive study on what drives a consumer to play mobile games has not yet been conducted in South Africa. This study will attempt to bridge that gap, as well as contribute to the existing international literature on mobile game adoption. The outcome of this study may assist marketers and game developers understand which driver(s) are the most influential adoption indicators for a consumer using mobile games and, in turn, allow for the optimisation of strategies or products aimed at the mobile gaming market.

1.3 OBJECTIVES OF THE STUDY

The following objectives have been formulated for the study:

1.3.1 Primary objective

The main purpose of this study is to determine the drivers that influence Generation Y students' propensity to adopt mobile games in the South African context.

1.3.2 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives were formulated for the study:

- Review the literature on video games as a form of electronic gaming.
- Review the literature on mobile gaming as a form of video game.
- Conduct a review on the factors that influence the use of mobile games.
- Review the literature on the consumer behaviour characteristics of the Generation Y cohort.

1.3.3 Empirical objectives

In accordance with the primary objective of the study, the following empirical objectives are formulated:

- Determine Generation Y students' perception of the influence of context on the usage of mobile games.
- Investigate the level of Generation Y students' perceived attractiveness of mobile gaming.
- Determine if Generation Y students perceive that enjoyment is an important factor for mobile gaming.
- Investigate whether Generation Y students habitually play mobile games.
- Determine Generation Y students' subjective norms towards mobile gaming.
- Determine the level of flow Generation Y students experience when playing mobile games.
- Determine Generation Y students' attitudes towards mobile gaming.
- Determine Generation Y students' mobile gaming adoption intentions.
- Empirically test a proposed model of Generation Y students' drivers to adopt mobile games.
- Determine whether male and female Generation Y students differ in their use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention concerning mobile gaming.

1.4 HYPOTHESES

In line with the empirical objectives, the following 10 hypotheses were promulgated:

- H₀1: Drivers of mobile games adoption is not an eight-factor structure comprising use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention.
- H_a1: Drivers of mobile games adoption is an eight-factor structure comprising use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention.
- H₀2: Use-context (+) does not positively influence the perceived attractiveness, perceived enjoyment, habit and subjective norms of Generation Y students' mobile gaming.
- H_a2: Use-context (+) does positively influence perceived attractiveness perceived enjoyment, habit and subjective norms of Generation Y students' mobile gaming.
- H₀3: Perceived attractiveness (+) does not positively influence Generation Y students' mobile gaming flow.
- H_a3: Perceived attractiveness (+) does positively influence Generation Y students' mobile gaming flow.
- H₀4: Perceived enjoyment (+) does not positively influence Generation Y students' mobile gaming flow.
- H_a4: Perceived enjoyment (+) does positively influence Generation Y students' mobile gaming flow.
- H₀5: Habit (+) does not positively influence Generation Y students' mobile gaming flow.
- H_a5: Habit (+) does positively influence Generation Y students' mobile gaming flow.

- H_{o6}: Subjective norms (+) do not positively influence Generation Y students' mobile gaming flow.
- H_{a6}: Subjective norms (+) do positively influence Generation Y students' mobile gaming flow.
- H_{o7}: Subjective norms (+) do not positively influence behavioural intentions of Generation Y students towards mobile gaming.
- H_{a7}: Subjective norms (+) do positively influence behavioural intentions of Generation Y students towards mobile gaming.
- H_{o8}: Flow (+) experienced by Generation Y students does not positively influence attitude towards mobile gaming.
- H_{a8}: Flow (+) experienced by Generation Y students does positively influence attitude towards mobile gaming.
- H_{o9}: Attitude (+) does not positively influence behavioural intentions of Generation Y students towards mobile gaming.
- H_{a9}: Attitude (+) does positively influence behavioural intentions of Generation Y students towards mobile gaming.
- H_{o10}: There is no difference between male and female Generation Y students' use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention concerning mobile gaming.
- H_{a10}: There is a difference between male and female Generation Y students' use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention concerning mobile gaming.

1.5 RESEARCH DESIGN AND METHODOLOGY

The study comprised a literature review and an empirical study. Quantitative research, using the survey method, was used for the empirical portion of the study. A descriptive research design was followed for the purpose of this study.

1.5.1 Literature Review

In order to fully explore this subject, a review of South African and International literature was conducted. Secondary data sources on the topic included relevant textbooks, journal articles, newspaper articles, the Internet, business articles, academic journals and online academic databases.

1.5.2 Empirical study

The empirical portion of this study comprised the following methodology dimensions:

1.5.2.1 Target population

The target population for this study was full-time Generation Y students registered at publicly registered HEIs in South Africa within the province of Gauteng. The target population was defined as follows:

- Element: Full-time Generation Y students
- Sampling Unit: South African registered public HEIs
- Extent: South Africa, Gauteng
- Time: 2016

1.5.2.2 Sampling frame

The sampling frame comprised the 26 registered South African public Higher Education Institutions (Universities South Africa, 2016). From the initial sample

frame, non-probability judgement sampling was utilised to narrow the sampling frame to three campuses. The HEIs selected comprised one traditional university, one university of technology and one comprehensive university.

1.5.2.3 Sample method

A single cross-sectional, non-probability convenience sample of 600 full-time Generation Y students was drawn for the final study. In order to lessen the limitations a convenience sampling method presents, demographic questions pertaining to the participants' province of origin, home language and gender were included in the questionnaire. Lecturers at the participating campuses of the chosen HEIs were contacted to request permission for their students to complete the questionnaire. Once permission had been obtained, the self-administered questionnaire were handed out to the students at each of the selected HEIs.

1.5.2.4 Sample size

A sample size of 600 Generation Y students was selected for this study. This was in accordance with previous studies done by Billieux, Van der Linden, Achab, Khazaal, Paraskevopoulos, Zullino and Thorens (2013:1) (sample size: 690), Kwon and Chidambaram (2000:3) (sample size: 500), Liao *et al.* (2007:765) (sample size: 610), Park *et al.* (2011:748) (sample size: 556). As such, a sample size of 600 participants was deemed sufficient. The chosen sample size is also in line with the requirements of the statistical techniques used to analyse the collected data. The sample size of 600 full-time Generation Y students was split equally between the three HEI's chosen, with a sample of 200 students per campus. Of the questionnaires distributed, 502 usable questionnaires were returned.

1.5.2.5 Measuring instrument and data collection method

This study utilised a structured, self-administered questionnaire to gather the required data. The questionnaire includes three sections, namely Section A for

demographic questions, Section B for drivers of mobile game adoption and Section C for attitudes and behavioural intentions towards mobile gaming. The drivers of Generation Y students' propensity to adopt mobile games were measured using multiple sub-scales from previous studies conducted by Venkatesh *et al.* (2012:178), Park *et al.* (2011:749), Liu and Li (2011:894), Tao *et al.* (2009:26), Jung *et al.* (2009:127) and Fielding *et al.* (2008:321). The scales include use-context (three items), perceived attractiveness (three items), perceived enjoyment (four items), habit (three items), subjective norms (three items) and flow (three items). Generation Y students' attitude and behavioural intentions towards mobile gaming was measured using scales developed and validated by Liu and Li (2011:894) and Agarwal and Karahanna (2000:693). The two constructs consist of attitude (three items) and behavioural intention (three items).

The questionnaire measured scaled responses using a six-point Likert scale ranging from strongly disagree (1) to strongly agree (6). A six-point Likert scale was chosen for the purpose that it excludes a neutral response, which is seen to be indecisive and redundant as indicated by Pallant (2010:10).

The questionnaire contained a cover letter explaining the nature of the study. Permission was requested from individual lecturers at the chosen institutions to conduct the survey during class times. The lecturers who gave permission to conduct the study were presented with the ethics clearance certificate obtained from the Ethics Committee of the Faculty of Economic Sciences and Information Technology at the North-West University (Vaal Triangle Campus). All participating students were informed that the study was purely of a voluntary basis and that their identities remain anonymous. Thereafter, a hand-delivered, self-administered questionnaire was distributed to the full-time Generation Y students during their lecture times at each of the chosen institutions in 2016.

1.5.3 Statistical analysis

The captured data were analysed using the Statistical Package for Social Sciences (SPSS) and Analysis of Moment Structures (AMOS) Version 23.0 for Windows. The following statistical methods were used on the empirical data sets:

- Exploratory factor analysis
- Reliability analysis
- Descriptive analysis
- Correlation analysis
- Structural equation modelling
- Two independent-samples *t*-test

1.6 ETHICAL CONSIDERATIONS

This research project adhered to protecting the identities and interests of participants while conforming to the ethical writing standards of academic research. All information provided by the participants was treated as confidential and the response provided was assessed in a fair manner. The participation in this study was strictly voluntary. Ethical clearance was sought beforehand from the Ethics Committee of the Faculty of Economic Sciences, North-West University (Vaal Triangle Campus). After approval, the ethical clearance number was included visibly on the questionnaire. The following ethical clearance number was received: **ECONIT 2016-005**.

1.7 CONTRIBUTIONS OF THE STUDY

Mobile services have been well researched internationally for a number of years now. However, research predicting the drivers of mobile gaming is still lacking in both the international and South African context. This study determined, through empirical testing, the most influential drivers that affect mobile game

adoption. This was done specifically amongst the Generation Y cohort in South Africa. By understanding which drivers are the most influential indicators for adoption, game developers can build video games around a more focused path based on the motivators that drive Generation Y students in South Africa. Furthermore, the findings of the research study may allow marketers to create effective marketing campaigns aimed at the Generation Y cohort. Additional research may be required to explore if advertising in mobile games will be an efficient marketing medium to reach the Generation Y cohort.

Moreover, the findings of this study contributes to the literature on mobile services and mobile games, as well as, literature on South African Generation Y student's consumer behaviour. It also contributes to the literature that is in line with the aims of the ProGenY (profiling the consumer behaviour of Generation Y in South Africa) project at North-West University (Vaal Triangle Campus).

1.8 CHAPTER CLASSIFICATION

Chapter 1: Introduction and background to the study

This chapter includes an introduction and brief background on mobile games adoption. It includes the problem statement, the primary objective of the study, research objectives and the research methodology that is going to be followed. This chapter conclude with the organisation and structure of the research study.

Chapter 2: Literature review

This chapter consists of an in-depth literature review regarding video games, mobile games and the drivers of mobile service adoption. It outlines the origins of video games and how the video game industry evolved, leading to the creation of mobile games and their prominence amongst smartphone users. The various drivers of mobile service adoption are clearly defined and explored

in full detail. Lastly, the chapter will conclude with a literature review regarding the Generation Y cohort and their potential value to marketers in this field.

Chapter 3: Research design and methodology

This chapter encompasses the research design chosen for the study. The target population, sampling method, sample frame and data collection method are detailed within this chapter. In addition, data analysis and statistical procedures utilised for the study are discussed in full detail.

Chapter 4: Results and findings

Within this chapter, the research findings will be analysed, interpreted and evaluated.

Chapter 5: Conclusions and Recommendations

This chapter comprised a review of the entire study and provided conclusions and recommendations derived from the main findings. The contributions of the study and suggestions for further research are also outlined in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Technological advancements over the past two decades have resulted in the creation of mobile telephone devices with high resolution display screens and the capability to rapidly process large amounts of information in an instant (Bell, Chalmers, Barkhuus, Hall, Sherwood, Tennent, Brown, Rowland, Benford, Capra & Hampshire, 2006:417). As a result, mobile services have profited from this mobile technology improvement and a plethora of new services have been created over the past 15 years (Verkasalo, 2008:331). Popular mobile services include: mobile Internet banking, mobile ticketing, mobile television (TV) and mobile games (Al-Jabri & Sohail, 2012; Liu & Li, 2011; Jung *et al.*, 2009; Mallat *et al.*, 2009). Moreover, the popularity of mobile services can be linked to the ease and contextual freedom in which mobile services can be accessed (Liang & Yeh, 2011:187). A study done by Liu and Li (2011:890) indicates that mobile games have the highest adoption and growth rate out of all the mobile services currently available to consumers. However, mobile games are a scarcely researched topic in academia, with only a handful of studies conducted in Asia aimed at discerning the antecedents of mobile game adoption amongst consumers (Liang & Yeh, 2011; Liu & Li, 2011; Ha *et al.*, 2007). The purpose of this study was to empirically test a model of drivers that influence mobile game adoption amongst Generation Y students in the South African context.

This chapter is in accordance with the theoretical objectives outlined in Chapter 1 and encompasses an in-depth discussion on mobile games, technology acceptance and the importance of Generation Y as a focus group. Section 2.2 outlines a historical overview of video games. Section 2.3 discusses mobile games in detail. Thereafter, Section 2.4 details the drivers of mobile services adoption and Section 2.5 reviews the literature pertaining to the Generation Y

cohort. Finally, Section 2.6 presents a hypothesised model of mobile games adoption amongst Generation Y students.

2.2 VIDEO GAMING

In order to understand the global evolution of mobile games, it is vital to understand the history of traditional video games as their development in the entertainment industry has played a significant role in the rise and success of mobile games (Waldron, 2014). A video game can be described as a type of interactive entertainment, where graphically produced images via a computer are controlled by the player. The main purpose of a video game is to create a pleasurable, educational or entertaining experience, which can be attained by completing specific objectives in the game (Glass, 2007:25; Granic *et al.*, 2014:67). James Paul Gee, a well-known video game researcher, further defines a video game as having “an intricately designed world that encourages certain sorts of actions, values and interactions while the player co-designs the game’s world by the actions and decisions the player takes” (Bouman, 2006). This definition encompasses why video games became an instant hit, as the interactive, challenging and fun nature of a video game can lead to a satisfying experience for the user (Przybylski, Rigby & Ryan, 2010:154).

2.2.1 Historical overview of video gaming

The origin of video games dates back to 1962 when Space War was created by the world’s first game developer, Steve Russel. However, video gaming went relatively unnoticed until the release of the first commercialised video game called Pong in 1972. Played on a coin-operated arcade machine, Pong had consumers hitting a digitised ball between two rectangular paddles where the winner was determined by the first person or computer to miss the ball (Postigo, 2003:193; Anderson & Bushman, 2001:354; Kent, 2001). Pong became an instant beacon of success in the video game industry and inspired the creation of other successful video games such as Pac Man, Donkey Kong and Super Mario Bros. (Kent, 2001).

Video game popularity continued to grow throughout the 1980s and 1990s as video game giants such as Nintendo and Sega created home video game consoles (Gallagher & Park, 2002:70). These consoles enabled consumers to play popular video games in the comfort of their own home, on a television set or computer monitor (Granic *et al.*, 2014:67). At the time, video game consoles contained more processing power than arcade machines, thus creating the possibility for video game organisations to develop more sophisticated video games for the newly developed gaming market (Anderson & Bushman, 2001:354). As such, popular releases such as Doom, Wolfenstein and Sonic the Hedgehog dominated the market throughout the 1990s, launching video gaming organisations into large profit margins and market shares (Williams, 2002:43; Kent, 2001).

The popularity of video gaming grew at a rapid rate through the 1990s and, as a result, various types of video games emerged (Granic *et al.*, 2014:67), from simple racing games to more stimulating cognitive games such as puzzles (Stahl, 2005). As the portfolio of available video games grew, Griffiths (1999:210) states that a total of nine main categories were formulated. These categories are summarised in Figure 2.1.

Sports Simulation	<ul style="list-style-type: none"> • A game that simulates sports such as cricket, rugby, golf, football etc.
Racers	<ul style="list-style-type: none"> • A game that simulates motorsport, like MotoGP or Formula 1 racing.
Adventures	<ul style="list-style-type: none"> • A game with a fantasy setting in which a player can assume a certain role and explore the game's world.
Puzzlers	<ul style="list-style-type: none"> • A type of game that requires a player to use cognitive thinking to solve 'puzzles' or challenges.
Platformers	<ul style="list-style-type: none"> • A game that involves running and jumping a long or onto platforms.
Beat 'em ups	<ul style="list-style-type: none"> • A game that involves physical violence within the virtual setting of the game, such as fist fighting or wrestling.
Shoot 'em ups	<ul style="list-style-type: none"> • The use of various weapons, such as guns, is a main feature of these games.
Miscellaneous	<ul style="list-style-type: none"> • Games that do not fall into the other categories and are considered odd or different.

Figure 2.1: Main categories of video games (Griffiths, 1999:210)

Arcade video games like Pong are simple and focused on a singular category at a time (Kent, 2001), unlike console video games. The more sophisticated console video games contain multiple gaming elements that require different skills to beat the game (Griffiths, 1999:210). Assassin's Creed is an example of a sophisticated video game, whereby players assume the role of a medieval assassin. The open-world gameplay of Assassin's Creed contains a mixture of Adventure, Puzzler, Platformer, Beat 'em up and Shoot 'em up categories (Peszko, 2007). The multiple gameplay categories created unique challenges for players which made it one of the biggest video game franchises currently in the market (Hillier, 2014).

2.2.2 Video Gaming in the marketing context

The commercial success of the video gaming industry opened the door to potential marketing opportunities for organisations seeking to promote their brand in new, alternative mediums (Van Opstal, 2011:3). The potential reach of video games provided an ideal platform to market a brand to different age, race, gender and cultural groups (Nelson, 2002:81). Marketers aimed to promote products in video games through brand placement, subsequently increasing brand awareness.

Van Reijmersdal *et al.* (2013:127) describe brand placement as the process of including a particular product or brand in an entertainment medium (TV, video games, radio, etc.) in exchange for monetary or promotional benefits. The earliest forms of brand placement in video games were present in 1987, with the rise of advergames (Glass, 2007:23). Played on a traditional video gaming console, an advergame is a video game which contains promotional material for a product or service, created for the sole purpose of promoting an organisation or brand (Winkler & Buckner, 2006:24). Figure 2.2 depicts two popular advergames available on video game consoles in the late 1980s.

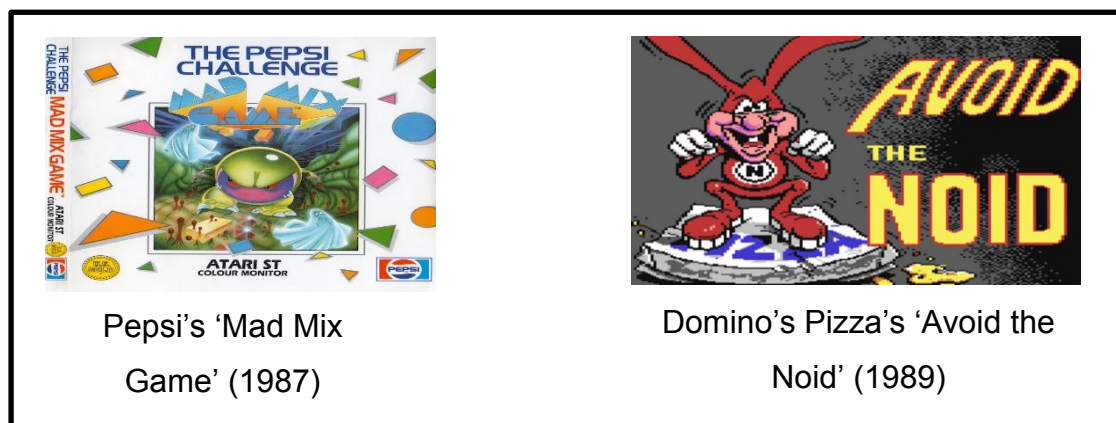


Figure 2.2: Examples of advergames (Glass, 2007:23)

The first advergame is Pepsi's Mad Mix Game. It closely resembled the gameplay of Pac Man and Space Invaders and was created by Pepsi for the Pepsi Challenge marketing campaign (Green & Wei, 2013). The second

advergame is for Domino's Pizza: Avoid the Noid. It was created in conjunction with a marketing campaign that was used in the 1980s by Domino's Pizza (Brownlee, 2014).

The interactive nature of video games benefitted advergames as consumers were able to actively engage with the brand while playing a video game (Nelson *et al.*, 2004:6-7). Advergames have proven to be a success, with games being short and easy to play, which makes them ideal for consumers who want to pass time (Terlutter & Capella, 2013:96). An example of a successful modern day advergame is McDonald's Monopoly-themed mobile game. This advergame allows a player to scan stickers gathered from McDonald's meals into their own game of Monopoly. This unlocks in-game property spaces and presents players with a chance to win real-life prizes, such as money or free meals (McCrum, 2016).

In-game advertising is another form of brand placement that involves inserting a product or service directly into the background of a video game (Winkler & Buckner, 2006:24). This method is popular as it promotes brand recall and brand recognition, even months after the video game has been played (Hang, 2014:193). However, a study conducted by Lewis and Porter (2010:55) on the effects of in-game advertising revealed that advertisements in video games can produce a negative response from players who perceive that the advertisement is inconsistent with the in-game world. As a result, marketers have strategically placed brands in games to be represented in a realistic manner and to avoid negative connotations (Mau, Silberer & Constien, 2008:827). Figure 2.3 presents three cases of in-game advertising.



FIFA '98 – Advertising
Billboards in-game

Tiger Woods PGA '09 –
NIKE apparel in-game



Hitman 2 – Sony Ericsson
mobile telephone in-game

Figure 2.3: Examples of in-game advertising (Walsh, Zimmerman, Clavio, & Williams, 2013:4; Nelson, 2002:82)

The advertisements depicted in Figure 2.3 represent realistic brand placement. The first image represents FIFA Football '98, where brands are shown on advertising billboards; much like at the venues of real-life football games (Emery, 2002). The second in-game image depicts a Golf-simulation video game called Tiger Woods PGA '09. It shows celebrity golfer Tiger Woods wearing Nike apparel; Nike being Tiger Woods' apparel sponsor in real life (Fonseca, 2015). The final image in Figure 2.3 comes from a 'shoot-em up' type video game called Hitman 2. It portrays an in-game character using a Sony-Ericsson mobile telephone to display an image of the video game's main protagonist, Agent 47 (Butts, 2002).

Success in both forms of brand placement has led to global advertising expenditure to be estimated at over R70 billion by organisations implementing these methods into their marketing mix strategies (Statista, 2016b). Moreover, global consumer expenditure in the video games market amounted to \$22 billion at the end of 2014, providing evidence to the profitable nature of video games (Entertainment Software Association, 2015:12).

2.3 MOBILE GAMES

For a long time, the video gaming industry largely consisted of ‘traditional’ video games such as arcade video games, console video games and computer video games. Traditional video games have assisted in growing the video game market since the commercial appearance of Pong in the 1970s, resulting in video games dominating the entertainment industry today (Granic *et al.*, 2014:66; Saleem *et al.*, 2012:281). Despite this, a report released by Pricewaterhouse Coopers (2015:115) shows that traditional console video games are being usurped by a new form of video game, namely mobile games.

2.3.1 An overview of mobile games

Mobile gaming profits are growing at more than double that of traditional video games, making it the fastest growing mobile service as of 2015 (Pricewaterhouse Coopers, 2015:115). Despite various mobile services (such as mobile Internet banking, mobile ticketing and mobile TV) being available since the creation of the hand-held mobile telephone, mobile gaming is leading the market in popularity and is experiencing higher adoption rates than the other mobile services (Browne & Anand, 2012:2; Liu & Li, 2011:890).

A mobile game is loosely defined as a video game that can be played on a hand-held mobile device, such as a smartphone or a tablet device (Jeong & Kim, 2009:186). The focus of this study is on mobile application gaming, but the earliest ‘mobile’ games can be traced back to 1989 with the launch of the Nintendo Game Boy. The Game Boy was the first hand-held non-colour console

that used cartridges to play video games (Rosas, Nussbaum, Cumsille, Marianov, Correa, Flores, Grau, Lagos, López, López, & Rodriguez, 2003:77). Hand-held consoles soon became highly profitable in the video gaming industry as consumers were able to play video games on the go and virtually anywhere (Wong, 2015).

The most notable video game during the reign of the Game Boy was the wildly popular Pokémon series that was released in 1996. Pokémon, which is short for Pocket Monsters, is a video game in which the player attempts to catch all the various Pokémon and train the strongest ones for battle against other Pokémon 'trainers'. The video game was so popular that a TV series was made not long after the success of the Game Boy titles (Falconer, 2014; Stuart, 2014; Russel, 2012; Shinn, 2004). The rapid integration of portable video games into the market introduced the possibility that mobile games could one day overpower traditional video gaming (Keating, 2015).

2.3.1.1 Mobile games on mobile telephones

While the Gameboy became a success in the 1990s, technology continued to develop at a rapid pace with the creation of the hand-held mobile telephone (Waldron, 2014). Telephones are a necessity for communication in society and the creation of mobile telephones allowed consumers access to a telephone wherever they went, similar to the Game Boy (Arteaga, Gonzales, Kurniawan & Benavides, 2012:901). In 1997, Nokia pre-loaded one of the first mobile games onto their Nokia 3310 mobile telephone model, called 'Snake'. Snake was a video game where the player manoeuvres a line that grows in length every time the line swallowed a mouse, with the line itself being a primary obstacle (Walton & Pallit, 2012:354). Snake gained a lot of success and went on to become a popular mobile game (Wright, 2016). Another popular mobile game, Tetris, is a puzzler-type video game in which random geometric shapes (containing four square blocks) are spawned and can be rotated or manoeuvred side-ways by a player to fit into one another. The object of the game is to create horizontal lines with the falling shapes; thereafter, lines disappear and the player progresses to another level (Anthony, 2014; Levy, 2014). Snake and

Tetris became the first generation of mobile games on a mobile telephone and are depicted in Figure 2.4:

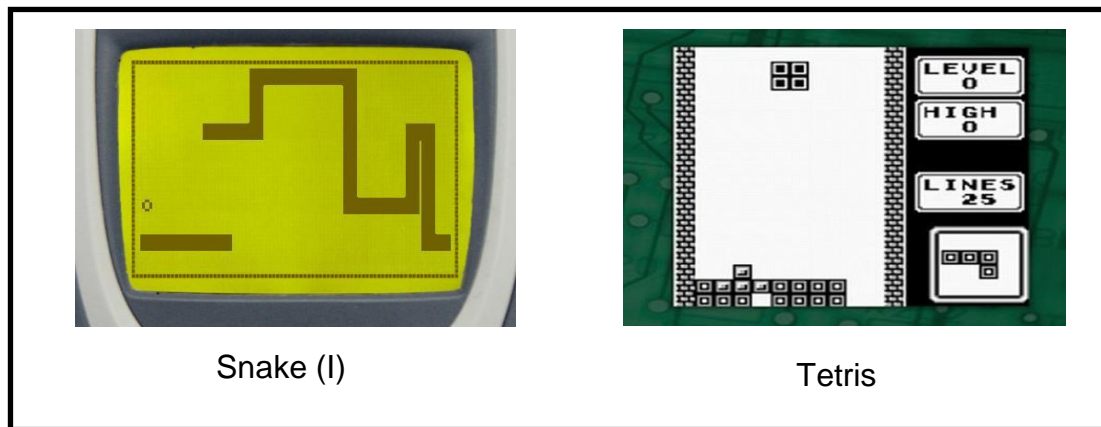


Figure 2.4: First generation mobile telephone games (Wright, 2016)

Following the success of Snake (I), Snake (II) was introduced in 1999 on the Nokia 6110. Snake (II) was the first mobile game to have a multiplayer element to its gameplay. It offered a two-player game mode by using the infrared port on the Nokia 6110. The infrared port transferred information submitted by the game between two Nokia 6110 devices without using cables. This innovative feature kick-started the rise of a second generation of mobile games: Wireless Application Protocol (WAP) (Crews, 2016; Microsoft Devices Team, 2013).

WAP is a basic platform that allowed early mobile phones access to web-like services over a wireless network (Langshaw, 2011). WAP enabled developers to produce more innovative games with greater interactivity and allowed consumers to download these games onto their mobile devices. In contrast to infrared mobile games, WAP games offered multiplayer gaming elements over the Internet. This meant that you did not need to be next to another player in order to play multiplayer mobile games (Wright, 2016).

By 2003, mobile telephone devices equipped with colour screens and more complex processing systems began penetrating the market. WAP services, criticised for not being able to run advanced mobile games, began to dissipate. As such, platforms like JAVA, which provided Flash support (a type of multimedia software platform), was made available on mobile phones (Mayra,

2015:3). Thereafter, organisations such as Sega, Namco and Gameloft began developing video games solely for mobile phones. Popular traditional console video games, like Sega's Super Monkey Ball and Ubisoft's Splinter Cell, were scaled down and made available on mobile devices with JAVA-enabled support (Crew, 2016; Wright, 2016; Langshaw, 2011).

The steady growth of mobile games between 1999 and 2003 did not go unnoticed. Nokia, known for being unique innovators, released the first mobile-phone based gaming system, called N-Gage at the end of 2003 (Mayra, 2015:3). The N-Gage combined the capabilities of a Game Boy with that of the Nokia Series 60 mobile telephone. It was made with the intention of taking over the portable video gaming market from Nintendo (Langshaw, 2011). However, Sony announced the arrival of PlayStation Portable (PSP) in 2004, which would be in direct competition to a newer Game Boy, the Nintendo DS. The Sony PlayStation 1 and 2 had been a huge success in the traditional console video-game market. As such, the prospect of having a "PlayStation 2 in your pocket" proved an important selling point for Sony (Brachmann, 2014; Schreier, 2011). The simultaneous launch of the PSP and the Nintendo DS crippled the sales of Nokia N-Gage devices. This drew gamers away from video games on mobile phones as consumers rather opted to purchase hand-held gaming devices (Patsuris, 2004).

Despite this, developers still invested time and money into the development of mobile games. By 2005, the first 3D mobile games became available for download (Wright, 2016). The earliest and most popular 3D mobile games at the time, Extreme Air Snowboarding and Ridge Racer, are depicted in Figure 2.5:

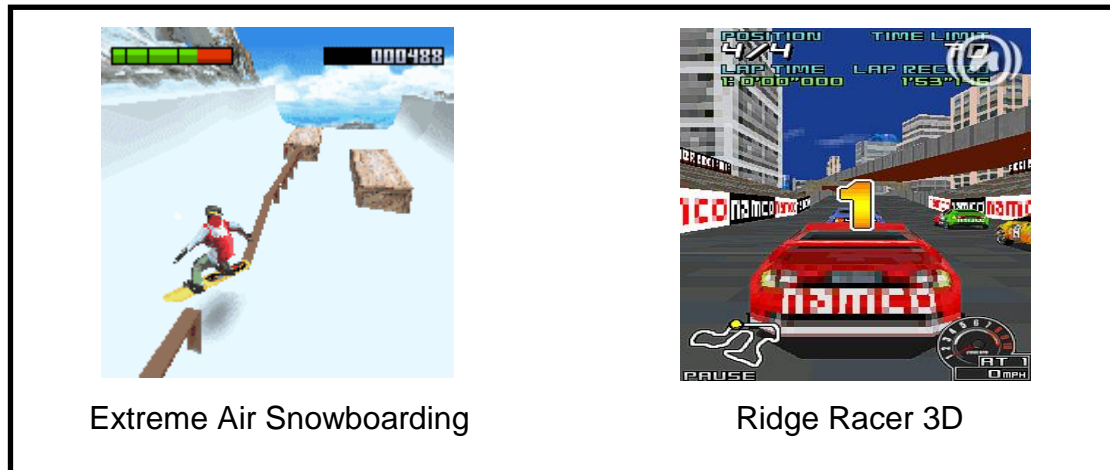


Figure 2.5: Second Generation 3D mobile telephone games (Beaudette, 2011)

The high success rate of Ridge Racer 3D installed the possibility that traditional console video games could potentially make a change-over onto mobile telephone devices. However, mobile telephone devices still lacked the appropriate hardware capable of running more complex video games (Langshaw, 2011).

In 2007, Apple Inc. released the world's first multi-touch interface smartphone, called the iPhone (Chen, 2009). The iPhone changed the way consumers perceived mobile telephones and quickly became the catalyst that ushered in a new generation of mobile gaming (Cusumano, 2008:22). The new mobile telephones were aptly called 'smart' phones because they were more than just a communication device; they acted as a personal computer connected to the Internet. This enabled consumers to access emails, shop online, participate in social media and gain access to information in an instant (Kim, 2013:42-43). These complex capabilities are made possible from advanced operating and processing systems embedded into the hardware of smartphones (Wang, Xiang & Fesenmaier, 2014:11; Anand, Thirugnanam, Sebastian, Kannan, Ananda, Chan & Balan, 2011:57). A report released by Canalsys (2010) showed that by the end of 2009, two years since their introduction into the telecommunications market, the prevalence of smartphones amongst consumers was growing at a rate of 138 percent. Moreover, the sheer size of the smartphone-user market, as well as the advanced capabilities of the

smartphone, created an ideal platform for a new generation of mobile gaming (Bhojan, Akhihebbal, Chan & Balan, 2012:21; Silva & Hjorth, 2009:603; Duh, Chen & Tan, 2008:391).

2.3.2 Third generation of mobile gaming

Owing to smartphones revolutionising the mobile telecommunications market, video game developers needed to adapt their strategies accordingly. The use of WAP and pre-loading video games onto mobile phones were becoming out-dated techniques (Lescop & Lescop, 2014:104). As such, the application or 'app' store was created by Apple (iOS), followed shortly by Google's Play Store (Android). While there are other app stores for other digital platforms, these are the two largest. An app store is a digital distribution platform containing various mobile service apps that can be downloaded onto an iOS or Android enabled device (Noyons *et al.*, 2012:10). This platform creates an easy and secure way for app developers to sell their products to smartphone users worldwide at any instant. Consumers are able to purchase various apps through the app store by means of electronic payments using their credit card. Some apps are free of charge while others require a monetary purchase before they can be downloaded (Liu, Au & Choi, 2014:327; Liu, Au & Choi, 2012:2). These are usually classified as Free-to-play, Pay-to-play or Paymium apps and are discussed in Section 2.3.3 (Torres, 2014).

In 2008, shortly after the opening of the app store, Angry Birds was launched and became a global success (Cheng, 2012:50). Angry Birds is a mobile game in which the user catapults birds at various objects (Feijoo *et al.*, 2011:213). By 2011, Angry Birds had been downloaded over 250 million times and players had spent over 200 million minutes on the game per day, globally (Cheng, 2012:52). The simplicity and portability of mobile games, such as Angry Birds, made them a hit amongst all kinds of consumers (Jeong & Kim, 2009:290).

Following from the success of Angry Birds is another hit mobile game, Candy Crush Saga (Candy Crush) (Chen, 2014:3). Candy Crush is a simple puzzle game where a player completes levels by matching three or more of the same coloured pieces of candy, which removes those candies from play and replaces them with new ones that help create further matches. The game poses various challenges (obtaining high scores or eliminating certain candies) that need to be completed in order to pass a level (Jones, 2013). In 2013, Candy Crush had over 90 million daily active users and contributed greatly towards a total profit of over \$560 million for King Games (creator of Candy Crush) (Grubb, 2014). Today, Candy Crush still generates about \$400 000 per day from advertising income and in-app purchases (Think Gaming, 2016). Angry Birds and Candy Crush are depicted in Figure 2.6.

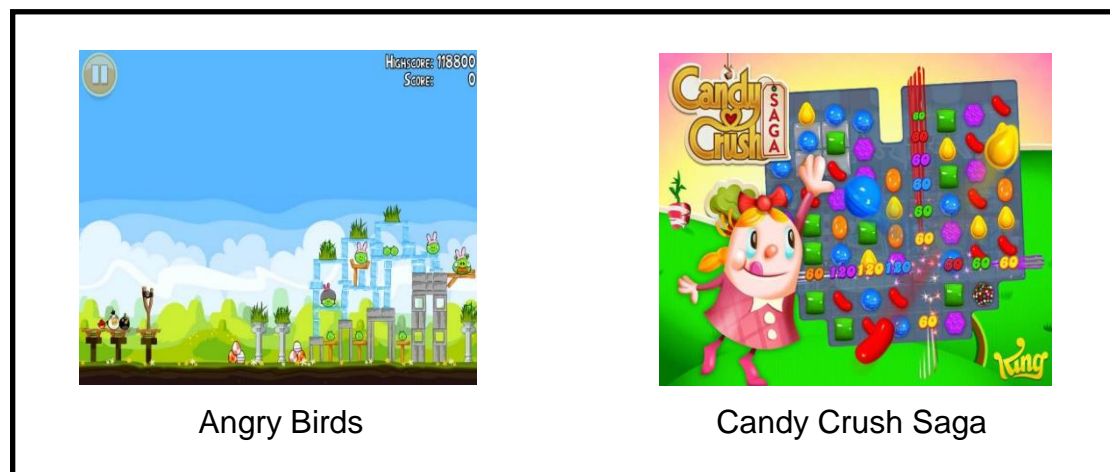


Figure 2.6: Third Generation mobile telephone games (Jones, 2013; Cheng 2012)

The success of Angry Birds and Candy Crush led various video game organisations to invest a considerable amount of time and money into mobile game development, thus greatly expanding the number of mobile games available (Curran & George, 2012:25-26). As a result, a third generation of mobile games emerged with five main categories. These categories harness the full potential of a smartphone and are briefly outlined below (Joselli & Clua, 2009:136).

- **Location based:** Mobile games that utilise the GPS function on a smartphone when playing the game. The gameplay changes depending on the player's movement patterns and location (Avouris & Yiannoutsou, 2012:2120). Examples of such games include Pokémon Go and Geocache.
- **Voice based:** These mobile games use speech recognition software to analyse and implement voice commands to alter or change the gameplay in a video game. The video game adapts to what the player says (Zyda, Thukral, Ferrans, Engelsma & Hans, 2008:143-144).
- **Camera based:** Also referred to as Augmented Reality (AR) games. Camera based gaming entails using the camera of a smartphone to project or create a virtual or 'augmented' reality. In other words, real imagery is amalgamated with the creative content from a mobile game to create a virtual playing experience (Capin, Haro, Setlur & Wilkinson, 2006:765-773)
- **Accelerometer based:** A type of mobile game that recognises motion and gestures made by the player and uses those motions as input to play the game. A basic accelerometer video game may register the tilt or shake of a mobile device as part of its gameplay (Joselli & Clua, 2009:137).
- **Touch based:** Mobile games that make use of the touchscreen of a smartphone. These mobile games are played by physical touching or pressing down on the screen of a smartphone to affect a change or reaction in the game (Joselli & Clua, 2009:137).

Similar to traditional video games, some mobile games increase the challenge and uniqueness of a gameplay experience by incorporating multiple category types into their gameplay (Joselli & Clua, 2009:137). Temple Run is a prime example and contains elements of accelerometer and touch-based gameplay. It is an 'endless' running game that rewards players with points for keeping the main character alive. Once the character dies, the points are tallied and a score is given (Holt, 2014). The player is given various options on how to dodge oncoming obstacles and navigate the route. Through the accelerometer,

players can turn corners by tilting their smartphones in different directions. Touch-based gameplay is used to dodge obstacles such as rocks or branches by swiping the display screen up or down, left or right (Kohler, 2012). Mobile games like Temple Run have become ubiquitous amongst smartphone users due to their unique, simple and fun gameplay (Hill, 2014).

2.3.3 Freemium model for mobile games

The majority of third generation mobile games were available to consumers free of charge from the app store. However, this notion misled consumers; as they began to play the game it became apparent that additional gaming elements were locked and required a purchase before becoming available to the user (Nash, 2014). These purchases are known as in-app purchases and involve relatively inexpensive purchases of virtual goods inside the game that assists the game to progress faster (Moreira, Filho & Ramalho, 2014:3). Video game developers use this business model, known as Freemium, to continually generate revenue even if the game is so-called 'free of charge' (Schoger, 2014). This practice has led to three distinct kinds of mobile gaming apps, namely Free-to-play, Pay-to-play and Paymium apps.

- **Free-to-play:** These allow consumers to download and play a mobile game for free, but certain game items and gameplay elements are locked away and require an in-app purchase in order to be unlocked. These purchases can range from relatively inexpensive (R10) to very expensive (R2000) (Hall-Stigerts, 2013). In-app purchases in mobile games like Clash of Clans can give players an advantage over other players. However, so-called pay-to-win systems can create negative feedback from non-paying players (Torres, 2014).
- **Pay-to-play:** These mobile games are similar to traditional video games whereby an upfront payment is required to buy the full game. Thereafter, the mobile game can be played in all its entirety without the potential hindrance of in-app purchases or advertisements (Thomas, 2015).

- **Paymium:** These mobile games require an initial purchase before playing, much like Pay-to-Play games. However, Paymium mobile games contain additional gameplay elements and items that can only be unlocked through further purchases (Lovell, 2011). As such, it combines elements of both Free-to-Play and Pay-to-Play.

Implementing these models is considered to be the best way for organisations to earn profits via Internet and digital-based content (Wagner, Benlian & Hess, 2014:260). The most popular model is the Free-to-Play, with over 90 percent of mobile games revenue obtained from Free-to-Play gaming titles (Lescop & Lescop, 2014:104). Davidovici-Nora (2014:83) posit that Free-to-Play mobile games play an integral role in attracting first-time casual players, thus growing the number of daily active players. A study conducted by Liu *et al.* (2012:13) revealed that Free-to-Play titles are important for increasing app awareness and developing player retention which may lead to increased sales revenue. The study also revealed that a positive Free-to-Play gaming experience will likely influence a player to adopt the Pay-to-Play or Paymium version of that game.

2.3.4 Global performance of mobile games

At the end of 2015, global mobile gaming revenue had amounted to \$35 billion. Currently, mobile gaming revenue has surpassed the \$3 Billion mark in the United States of America (U.S.A), with eight of the top 10 paid-for apps being mobile games (Statista, 2016c; App Annie, 2016). Moreover, 2016 has proven to be a landmark year for mobile gaming with the release of Pokémon Go on iOS and Android. Pokémon Go is an AR/Location based mobile game released in June 2016. Within 3 days Pokémon Go had more users than the popular social media app Twitter. As of July 2016, it has become the largest mobile game on the U.S.A. app store with over 21 million users, surpassing the daily active users on Candy Crush (Allan, 2016; Broussard, 2016). Despite this, popular social media apps like Instagram, WhatsApp and Snapchat still have more daily active users than Pokémon Go (Dogtiev, 2016).

2.3.5 Marketing potential for mobile games

In the past, marketing strategies focused primarily on placing advertisements in free mobile games. These are known as pop-up advertisements. Pop-up advertisements are promotional information about a product or an organisation that appear or 'pop-up' in small windows (Boone, Secci & Gallant, 2010:244). This commonly occurs while browsing web pages on the Internet or using certain mobile apps (Schofield, 2010). Some of the earliest Free-to-Play mobile games were littered with pop-up advertisements that were placed at the top or bottom of the screen while playing a mobile game (King Jnr, 2016). Research has shown that this garnered negative reactions from players, as they felt bombarded by pop-up advertisements while trying to play a game, as they would only disappear once an in-app purchase was made (Kim, Lee, Hwang & Jeong, 2015:68; Truong & Simmons, 2010:241).

However, the success of Pokémon Go's augmented reality gameplay has created a new window of opportunity for marketers and organisations alike. Pokémon Go utilises real-world locations, such as restaurants and supermarkets, to take up the role of 'Pokéstops'. These Pokéstops provide important in-game items such as Pokéballs, health/revive potions and Pokémon eggs. Creators of the Pokémon Go app, Niantic, generated over \$50 million in the first week of the game's release from businesses purchasing Pokéstops for their premises. This allowed marketers to assign a Pokémon Go 'specialist', who then deploys in-game 'lures' on a Pokéstop. These lures attract Pokémon to their location, thus attracting players to their store location. Marketers are using this method in an attempt to attract customers to their businesses due to the sheer amount of people playing Pokémon Go (Dorfman, 2016; Gilbert, 2016; Hobbs, 2016; Perlow, 2016).

McDonald's, the world's largest fast-food restaurant, has become the first brand to partner with Niantic due to innovative marketing possibilities presented by Pokémon Go. In Japan, McDonald's has paid Niantic to have all 3 000 of their restaurants become 'Pokémon Gyms'. Players need to visit Pokémon Gyms in

order to progress further in the game and to become the gym's champion. As such, McDonald's has experienced increased sales in Japan as players consume food and drinks while battling other players to become the gym's champion (Russel, 2016; Smith 2016; Soble, 2016; Vizard, 2016).

The new found success of Pokémon Go's marketing capabilities has opened up new possibilities for organisations seeking to utilise mobile gaming as a medium to market their respective brands.

2.3.6 Mobile games in the South African market

Mobile games are prevalent in the South African market. A report published by Pricewaterhouse Coopers (2015:22) indicated that nine of the top ten downloaded apps are mobile games, with games such as Candy Crush and Clash of Clans at the top of the download charts. Pokémon Go has also proved to be a hit in South Africa. It was officially released in October 2016 (Matos, 2016). However, South African users have been playing Pokémon Go 'unofficially', downloading the game through mirror sites since July 2016. This included Pokémon 'events' being held at various venues around South Africa, such as at the Johannesburg Zoo and the Botanical Gardens in Durban (Sanchez, 2016).

The same report released by PricewaterhouseCoopers (2015:114-125) also revealed that console video games are being usurped by mobile games in the South African market, with mobile games growing more rapidly. This phenomenal growth is compounded by the fact that mobile games in South Africa only became available much later than in international markets due to strict government regulations (Vermeulen, 2013). In addition, the dissemination of Internet connectivity and smartphones amongst the South African population is also considered key to the success of mobile games (Mcilhone, 2015).

As of 2016, the revenue generated by mobile games in South Africa amounts to R500 000 million (Statista, 2016a). However, 99 percent of generated revenue is distributed to international video game developers, which is detrimental to the local economy (Fripp, 2016). This is due to the lack of freedom experienced by local video game developers from various regulation councils in South Africa (News24 Wire, 2016). The biggest stumbling block is the Film and Publications Board (FPB) draft bill on content distribution. This bill threatens South African game developers with jail sentences if they do not classify the content of their game correctly. Classification can take a considerable amount of time and incur high costs discouraging local video game developers (Alfreds, 2016).

Lack of knowledge and understanding of the mobile gaming industry may be the attributing factors towards current inadequate government legislations in South Africa (Alfreds, 2016). Research of this nature may aid local government in creating appropriate legislation to assist this rapidly growing industry (Oxford, 2014)

2.4 DRIVERS OF MOBILE SERVICES ADOPTION

Mobile games have become one of the most popular mobile services available to consumers (Browne & Anand, 2012:1-2). Other mobile service innovations, such as mobile TV (Jung *et al.*, 2009:123), mobile payments (Dahlberg *et al.*, 2008:165) and mobile ticketing (Mallat *et al.*, 2009:194) have not enjoyed the same successful adoption rates as that of mobile gaming (Liu & Li, 2011:890). Differences in adoption tendencies is a well-researched area in the field of consumer behaviour (Thong *et al.*, 2006:799).

Over the past decade, rapid technological changes coupled with the growing influence of usage-context have led consumers to become more technologically savvy. As such, researchers have had to move away from traditional acceptance models to fully explain the intricate complexities of mobile technology adoption (Venkatesh *et al.*, 2012:159; Chen, Shing-Han & Chien-Yi,

2011:125; Liu & Li, 2011:891; Legris, Ingham, Collette, 2003:191; Moon & Kim, 2001:217; Agarwal & Karahanna, 2000:666). Researchers began integrating a diverse range of external variables believed to influence the attitudes and behavioural intentions of consumers using mobile services. These include use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms and flow (Venkatesh *et al.*, 2012:178; Chen *et al.*, 2011:125; Liu & Li 2011:894; Tao *et al.*, 2009:26; Fielding *et al.*, 2008:321; Jung *et al.*, 2009:127; Venkatesh & Bala, 2008:273; Venkatesh & Davis, 2000:186). The external variables are discussed in the proceeding sub-sections.

2.4.1 Use-context

Use-context is described as an environment in which a person is most likely to use a mobile service (Van der Heijden *et al.*, 2005:4). Chang (2015:687) states that the likelihood of a mobile service being adopted increases in an environment that has an emotional or social appeal to the user. Understanding the various contextual factors that form the adoption process of consumers has become an important necessity for marketers (Gummerus & Pihlstrom, 2011:521). These factors include the following: using a mobile phone at work or at home, having obligated tasks (such as homework or chores) or having no tasks at all and being alone or being surrounded by family and/or friends (Liu & Li, 2011:893).

A study conducted by Mallat *et al.* (2009:194) on mobile ticketing services concluded that situational contexts had a major influence on the benefits of using a mobile ticketing service. It was concluded that in a situation where a “person was in a hurry, ticketing queues were too long, the need for a ticket was unexpected, or there were no other ticketing alternatives available”, that person would value the use of a mobile ticketing service more, thus adopting that service much faster than usual. This finding lends support to the theory that adoption comes about due to unique circumstances involved in the usage of a particular mobile service (Liang & Yeh, 2011:195). These circumstances are attributed to peoples growing reliance on the use of mobile telephones, the

hedonic nature of mobile services, as well as the ever-changing social contexts surrounding people that engage with mobile services (Van der Heijden *et al.*, 2005:8).

Similarly, use-context has been found to have a significant influence on mobile game adoption. A study pertaining to the mediating effects of use-context on mobile game usage revealed that a user's lifestyle, social influences, task obligations and place of play (work vs. home) all have a positive significant effect on that user's attitude towards playing a mobile game (Liang & Yeh, 2011:194-195). A similar study conducted by Liu and Li (2011:891) proposed that an individual is more likely to play a mobile game in a specific situation, such as when "a user feels bored or has nothing else to do" or when "a user wants to kill time". The study also revealed that use-context has a strong positive influence over all external variables associated with mobile games and that a user's perception towards all aspects of a mobile game is dependent on use-context. However, these studies were limited to the Asian market.

2.4.2 Perceived visual attractiveness

Perceived visual attractiveness, or aesthetics, is believed to play in an important role in predicting the adoption of various technologies. Perceived visual attractiveness is defined as the extent to which a technology is perceived to be visually pleasing or appealing (Ha *et al.*, 2007:289). A study conducted on the usage of websites concluded that perceived visual attractiveness had a positive significant influence over enjoyment of using that website. In addition, it was suggested that further research could explore perceived visual attractiveness as an independent predictor of attitude (Van der Heijden, 2003:547). Currently, there is limited literature available explaining the influence perceived visual attractiveness has on mobile services. However, research has been conducted on mobile games (Ha *et al.*, 2007) and business simulation games (Tao *et al.*, 2009), of which the outcome revealed that perceived visual attractiveness is a significant driver for video game adoption. In the case of video games, Tao *et*

al. (2009:944) describes perceived attractiveness as how pleasing a video game's audio and visual aspects are for a player.

Video game developers strive to create games that allow players to become fully immersed in the gameplay in other words a state of flow (see Section 2.4.6). This can be achieved through various complexities in a video game's design, such as audio and visual aspects (Caroux, Le Bigot & Vibert, 2013:1865). Audio aspects of a video game contribute greatly to the illusion of reality presented in that game. Audio contained within a video game has the ability to create sensory immersion if the game accurately matches realistic sounds with in-game scenarios. Implementing sound effects, such as a gun firing or footsteps when a character moves in the game, add a sense of reality to that game (Caroux *et al.*, 2013:1865; Grimshaw, 2008:119). Visual aspects are attributed to the level of detail contained within various scenes of a video game. Foreground scenes include the main character, potential targets, opposing characters and essential objects; whilst background scenes include any environmental details such as landscapes, buildings and dynamic weather patterns (Caroux, Le Bigot & Vibert, 2011:104; Grimshaw, 2008:119). As such, video games that effectively amalgamate these scenes with audio acoustics can create a visually attractive experience for a player (Jorgensen, 2008:176; Lipscomb & Zehnder, 2004:342).

The overall design of mobile games is much more simplistic than that of traditional console video games, but Ha *et al.* (2007:285) state that attractiveness of a mobile game remains a crucial component in mobile games adoption. As with perceived attractiveness, mobile games that are fun to play are also at the crux of mobile game adoption

2.4.3 Perceived enjoyment

Perceived enjoyment is a natural motivator and is considered to be a strong predictor of technology acceptance (Wang & Li, 2012:148). Prior research into technology acceptance has shown that a consumer who has a pleasurable

experience when using new technology is most likely to continue using that technology (Zhou & Lu, 2011:884). Moreover, perceived enjoyment continues to be a prominent factor in studies conducted on mobile services adoption (Kim, 2012; Liang & Yeh, 2011; Liu & Li, 2011; Zhou & Lu, 2011; Ha *et al.*, 2007; Hsu & Lu, 2007). This can be attributed to the hedonic nature of most mobile services (Jung *et al.*, 2009:123). Liu and Li (2011:892) describe perceived enjoyment as a player's perception on whether or not a mobile game is fun or enjoyable to play. This is in line with the core goal of any video game, that is, to create a pleasurable and entertaining experience for the player (Ha *et al.*, 2007:279).

Liang and Yeh (2011:193) confirmed the importance that perceived enjoyment plays in the adoption process of video gamers in Taiwan. It also revealed that use-context has a positive significant influence over the enjoyment experienced when playing a mobile game. This result was replicated in another study by Liu and Li (2011). The study found that use-context has a positive significant influence on the level of enjoyment experienced when playing a mobile game for Chinese consumers. As such, both studies confirmed that different use-contexts have a positive significant impact over perceived enjoyment and therefore, perceived enjoyment is an important component in the adoption process. In a similar vein, various studies have concluded that perceived enjoyment can be an important predictor of flow (Liu & Li 2011; Zhou & Lu, 2011; Ha *et al.*, 2007). This relationship is discussed further in Section 2.4.6.

2.4.4 Habitual use

A rarely explored external variable, habit, is briefly defined as a recurring behavioural response brought about by a context-based stimulus (Venkatesh *et al.*, 2012:159). Habits tend to form through the repetition of an activity that takes place over an extended period of time. This leads to less cognitive processing needed to perform the activity allowing for minimal effort and maximum efficiency to complete the activity (a state of flow) (Bhatterjee & Lin, 2015:364-365). It is generally believed that habitual behaviour is not planned

beforehand, but happens autonomously in a familiar usage context. However, the habitual behaviour ceases when a person leaves the environment that induces the recurring activity (Limayem, Hirt & Cheung, 2007:709). Research on the effects of habit on technology acceptance revealed that habit can be an influential driving force towards the continued use of new technologies (Bhattacharjee & Lin, 2015:371; Dernbecher, Beck & Weber, 2013:5; Venkatesh *et al.*, 2012:174; Limayem & Cheung, 2011:97).

2.4.5 Subjective norms

Social norms that exist in society can have an important impact on an individual's behavioural patterns (Lopez-Nicolas, Molina-Castillo & Bouwman, 2008:360). As such, societal groups can have a major impact on the decision-making process of that individual (Lu, Liu, Yu & Wang, 2008:55). This stream of thought led to subjective norms being included into various behavioural models to explain the impact of social norms on behavioural intentions of an individual (Fielding *et al.*, 2008:319). Teo, Tan, Cheah, Ooi & Yew (2012:583) describe subjective norms as an individual's belief that a particular action must be taken as a result of social pressures. Yang and Jolly (2009:503) state that subjective norms arise through cultural differences that are experienced in society. Cultures can differ in many aspects and play an important role in influencing normative views (Lee, Trimi & Kim, 2013:20). Furthermore, social influences present on social media, as well as the opinions of family members, peers and friends are considered highly influential factors of social norms (Lu *et al.*, 2008:55).

The flood of mobile services over the past decade created uncertainties amongst consumers. Lack of knowledge and information available on new innovations made consumers reach out to their peers for advice before adopting a new mobile service (Lu, Yao & Yu, 2005:249). Prior research indicates varied results concerning the effect of subjective norms on behavioural intentions. Lu *et al.* (2005:260) found that subjective norms did not directly affect behavioural intention with regards to wireless Internet services.

In contrast, other studies conducted on mobile banking, advanced mobile services and wireless mobile data services revealed that subjective norms have a direct positive influence on behavioural intentions (Teo *et al.*, 2012:591; Lopez-Nicolas, 2008:363; Lu *et al.*, 2008:59). This suggests that the influence of social norms on a consumer's behavioural intentions tends to differ according to the mobile service/technology in focus.

The social nature of mobile games is clearly evident, with popular mobile games like Pokémon Go, Candy Crush Saga and Clash of Clans all having a core social element present in their gameplay (Pricewaterhouse Coopers, 2015:121-122; Billeux *et al.*, 2012:1). These games are created with various multiplayer elements, such as allowing a player's score to be shared online with friends or allowing players to work in teams in order to progress further in the game (Chen, 2014:3). A survey done by TNS (2016) noted that mobile games are more likely to be played if there are social connections for a player. Furthermore, the study emphasised that mobile games of a social nature bring a competitive spirit amongst players, with players striving to beat scores of their friends and claim bragging rights in the process.

2.4.6 Flow and cognitive concentration

In leisure studies, the quality of an experience is determined by the challenges posed and the skills that are required to overcome those challenges (Zhou, 2012:29). If an individual overcomes the challenge, they will master new skills and grow from the experience, thus enjoying the moment and gaining knowledge at the same time (Zaman, Anandarajan & Dai, 2010:1012). The concept of gaining experience while enjoying an activity is known as flow (Liu & Li 2011:892). Zhou and Lu (2011:884) state that flow can also take on a negative form when an individual engages in an experience where he/she possesses skills far beyond the challenges posed by that experience. This often leads to boredom and greatly hampers the experience gained from the intended challenge (Zhou, 2013:264). As such, flow is described as a holistic sensation that an individual perceives when he/she becomes cognitively absorbed in a

particular experience (Ha *et al.*, 2007:279). Owing to this definition, flow has often been given an interchangeable term called 'cognitive concentration' (Jung *et al.*, 2009:125).

Flow is commonly used in studies on mobile services that are created for entertainment purposes (Zaman *et al.*, 2010:1011; Jung *et al.*, 2009:123). Zhou and Lu (2011:883-884) state that the inclusion of flow is necessary because mobile services are enjoyed more by consumers when they can become totally immersed while using them. Studies conducted on mobile games, mobile TV, mobile instant messaging, mobile banking and mobile social network services all conclude that perceived enjoyment is critical to creating flow and that flow has a positive significant effect on a consumer's attitude towards that mobile service (Zhou, 2013; Zhou, 2012; Liu & Li, 2011; Zhou & Lu, 2011; Zhou *et al.*, 2010; Ha *et al.*, 2007).

When a sense of flow is created a player's cognitive functions are solely concentrated on the video game, hence the term cognitive concentration (Jung *et al.*, 2009:124). Liu and Li's (2011:896) study on mobile games found that there is a positively significant relationship between perceived enjoyment and flow. Furthermore, the outcome of this study concluded that flow is imperative in creating a positive attitude towards a mobile game.

2.4.7 Attitude and behavioural intention toward mobile services

All the aforementioned drivers of mobile service adoption were used to determine if they have an impact on the adoption process of a mobile game by a consumer. The various models in which they were used, aimed to predict the attitude and behavioural intentions of a consumer towards a particular mobile service (Venkatesh *et al.*, 2012:178; Liu & Li, 2011:891; Tao *et al.*, 2009:26; Fielding *et al.*, 2008:321; Jung *et al.*, 2009:127).

An individual's attitude can be defined as a predisposition of beliefs and perceptions, positive or negative in nature, towards a particular object or topic (McLeod, 2009; Lee, Park, Chung & Blakeney, 2012:1591). Clow & Baack (2014:71) state that attitudes are formed through personal experience and can be powerful predictors of behaviour. In addition, attitudes are not always constant and can change as a person grows with age or experience (Cherry, 2016). As such, marketers and organisations strive to understand the attitudes of consumers, as attitudes contribute greatly to a consumer's decision-making process (Iacobucci, 2013:22).

Ajzen (2011:1122) states that behavioural intentions are an individual's likelihood to engage in any given behaviour. Thus, an individual's actions are guided by their attitude and behavioural intentions (Venkatesh *et al.*, 2012:164). Moreover, Hsiao and Yang (2011:129) add that understanding attitudes and behavioural intentions is crucial, as these attributes have a major impact on an individual's decision-making process. Research on attitude and behavioural intentions of consumers allows organisations to gain valuable insight into technology acceptance (Liu & Li, 2011:890-891). This research can be used to develop and validate behavioural models that aid organisations in understanding the adoption tendencies of consumers, enabling them to adapt their strategies accordingly (Ha *et al.*, 2007:277).

Over the past decade, studies on various mobile services - like mobile TV, mobile instant messaging, mobile banking, mobile gaming and mobile social network services - revealed that consumers display positive attitudes and behavioural intentions to use them (Zhou, 2013; Zhou, 2012; Liu & Li 2011; Zhou & Lu, 2011; Zhou *et al.*, 2010). Jung *et al.* (2009:123) attribute this to the hedonic nature of mobile services. In addition, the studies on mobile banking and mobile instant messaging services, which are not considered hedonistic, showed that consumers' positive attitudes and behavioural intentions stemmed from the ability of these services to create flow (Zhou, 2012:34; Zhou & Lu, 2011:887).

To conclude, understanding individuals attitude and behavioural intentions toward mobile technology or services can help marketers and organisations predict an individual's future purchase behaviour (Lii & Sy, 2009:772).

2.5 GENERATIONAL COHORTS

One of the most important tasks for a marketer is identifying a suitable target market for a product or service (Iacobucci, 2013:43). Products and services differ according to their features, attribute and benefits, thus not all consumers may be attracted to the same product/service offered by an organisation (Burgess, 2011:38). Therefore, marketers segment consumers into homogeneous groups according to age (generational cohorts), gender, income levels, personality traits, morals, values, social standings and cultures. Segmented groups that are best suited to a product or service are more easily targeted, which makes efficient targeting of specific consumers possible (Jansen van Rensburg, 2014:132; Burgess, 2011:38).

Segmentation according to generational cohorts has been frequently practiced by marketers. Consumers born in the same generational cohort are believed to have underlying similarities according to the time period in which they have grown up (Lissitsa & Kol, 2016:304). Researchers believe that certain time periods and significant societal events such as wars, economic changes, popular culture, globalisation and technological development are pivotal in the formation of consumers' values and beliefs (Parment, 2013:190). There is great debate on what the time period of a generational cohort should be. Markert (2004:21) believes that a 20-year increment exists between generational cohorts and important events that occur during this 20-year span is what separates one generation from the next. As such, three distinct generational cohorts have thus far been created: Baby Boomers (1946-1965), Generation X (1966-1985) and Generation Y (1986-2005). The three aforementioned generation cohorts are briefly summarised below.

- **Baby Boomers:** Born after World War II between 1946 and 1965, Baby Boomers are characterised as having rejected and redefined many of the traditional values held before the war. As a much older generational cohort, they are considered late adopters, heeding caution before making decisions (Parment, 2013:191). This may be attributed to their age, as experience gained over many years allowed them to make slow, informed and rational decisions (Kumar & Lim, 2008:570).
- **Generation X:** Following Baby Boomers is the Generation X cohort, born between 1966 and 1985 (Markert, 2004:15). Due to harsh economic times resulting from World War II, Baby Boomer parents had to work exceptionally hard and members of Generation X were largely separated from their parents during their childhood and adolescent years. As a result, the Generation X cohort developed high levels of independence and self-reliance, often completing tasks on their own without requiring any assistance (Lissitsa & Kol, 2016:304). Characteristically, Generation X individuals are highly educated, sceptical and pragmatic (Yang & Jolly, 2008:274).

Succeeding the Generation X cohort is the Generation Y cohort. As the Generation Y cohort is the main focus of this study a detailed discussion is provided below.

2.5.1 Generation Y

Generation Y, also known as the Millennial's or today's youth, were chosen as the target group in this study. Generation Y cohort individuals are the largest of the three generations and were born between 1986 and 2005 (Markert, 2004:21). As such, Generation Y individuals are currently between the ages of 11 and 30 years old. Generation Y individuals are characteristically 'tech-savvy' as they have been exposed to rapid technological change throughout their lives (Parment, 2013:192). Moreover, the presence of social media and the importance placed on social influences has shaped this cohort into image-conscious individuals whose decisions are driven by emotion (Chuah, Marimuthu & Ramayah, 2014:534).

Globalisation has greatly impacted Generation Y individuals, innovations such as the Internet, mobile telephones, social media and reality TV have made the world an instant interconnected habitat (Sharp & Bevan-Dye, 2014:87). This has exposed the Generation Y cohort to a plethora of readily accessible sources of information, none more so than that of mobile phone devices (Gao, Sultan & Rohm, 2010:574). For this reason, Generation Y individuals are reluctant to respond to traditional marketing techniques as they have been constantly inundated with online promotional advertisements (Bolton, Parasuraman, Hoefnagels, Migchels, Kabadayi, Gruber, Loureiro & Solnet, 2013:247). Moreover, the Generation Y cohort is known to switch brands without hesitation as soon as a new trend presents itself, whether on social media platforms or on reality TV as portrayed by their favourite celebrities (Chuah *et al.*, 2014:533).

Despite being resistant to traditional marketing strategies, Generation Y individuals still boast a higher adoption rate of new technologies than the Baby Boomer and Generation X cohorts (Kumar & Lim, 2008:570). Witt, Massman and Jackson (2011:763) state that an average member of the Generation Y cohort can spend up to 12 hours a day using technologies such as mobile phones, computers, or playing video games. Contrastingly, Baby Boomers and Generation X have not adapted as quickly to technological change, thus Generation Y's opinions on various technological advancements are important to note for gaming developers and marketers (Noble *et al.*, 2009:618).

2.5.2 Generation Y in South Africa

A survey conducted in South Africa (Statista, 2016a) revealed that consumers playing mobile games are typically aged between 16 and 34 years of age. This suggests that consumers playing mobile games in South Africa largely fall into the Generation Y age category. Generation Y comprises more than a third of the South African population (38 percent), making it the largest generational group in the country (Statistics South Africa, 2015). University students have become valuable members of the Generation Y cohort, individuals that obtain

higher educational qualifications through tertiary institutions are more likely to have a higher earning potential, greater social influence and extra disposable income than their peers without a tertiary qualification (Bevan-Dye & Surujlal, 2011:49). As such, numerous researchers have noted the importance of studying the Generation Y cohort in South Africa, particularly those who attend a Higher Education Institution (Akpojivi & Bevan-Dye, 2015; Synodinos, 2014; Amory & Molomo, 2012).

Even though Generation Y members have similar characteristics and traits, gender differences are palpable within generational cohorts (Pentecost & Andrews, 2010:45). An Israeli study on online shopping revealed that male Generation Y members were more likely to purchase online products than female members (Lissitsa & Kol, 2016:310). In addition, a study undertaken by Witt *et al.* (2011:768) in the U.S.A. revealed that female members of Generation Y cohort were less likely to play video games than their male counterparts. Contrastingly, a study conducted on gender differences amongst Generation Y South Africans who play computer video games noted that majority of male and female participants played similar games and evaluated their experiences in the same manner (Amory & Molomo, 2012:193). This finding suggests that South African Generation Y members may not have significant gender differences in terms of technology acceptance and therefore, warrants further investigation.

In conclusion, the Generation Y cohort's sheer size, spending power, early adoption rates, willingness to be pioneers and the importance of their opinion on various technologies, has made the information gained from Generation Y members valuable to marketers.

2.6 PROPOSED MODEL OF MOBILE GAMES ADOPTION

This chapter reviewed the literature on mobile game adoption and provided valuable insight into video games, mobile games and the drivers of mobile

games adoption. This section incorporates the reviewed literature to propose a model that explains the drivers affecting mobile games adoption.

The hypothesised model takes into consideration the various theories and empirical studies outlined in prior literature. The model proposes that use-context has a significant influence towards perceived attractiveness, perceived enjoyment, habit and subjective norms. Thereafter, it hypothesises that perceived attractiveness, perceived enjoyment, habit and subjective norms are significant predictors of flow and that flow influences attitude. Lastly, subjective norms and attitude are proposed to have a significant effect on behavioural intentions. Figure 2.7 presents the proposed model and the hypothesised drivers that influence mobile games adoption, according to the literature.

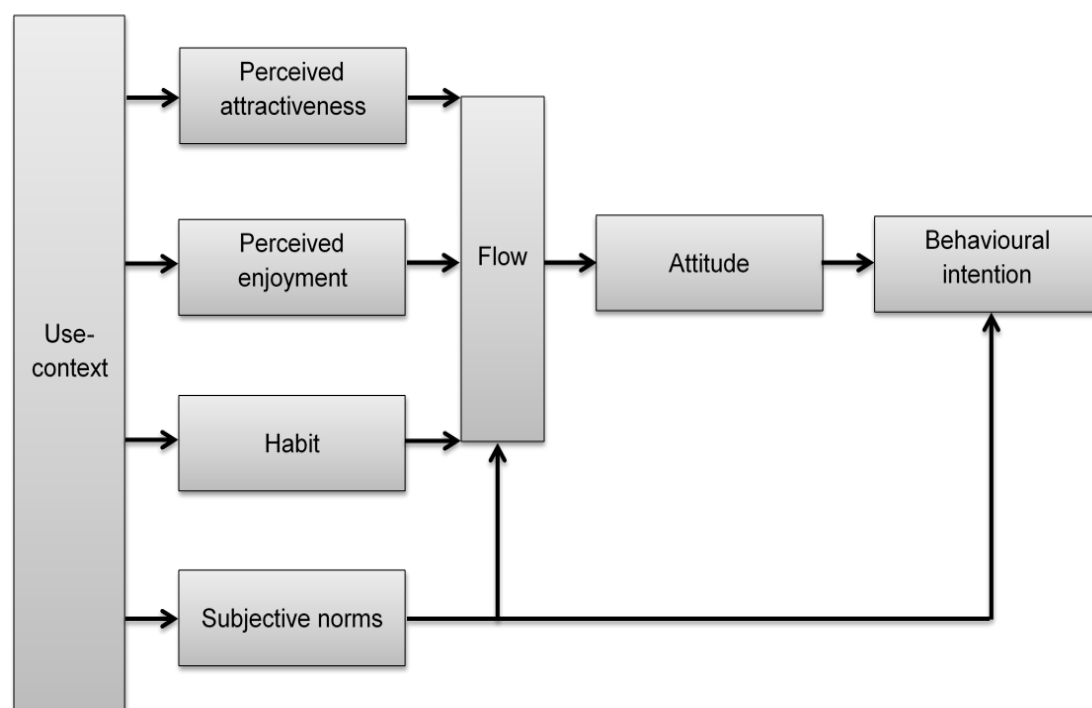


Figure 2.7: Proposed model of the drivers of Generation Y students' mobile game adoption

The proposed drivers of mobile games adoption presented in Figure 2.7 will be empirically tested in Chapter 4, with the results thereof reported on in Chapter 5.

2.7 SYNOPSIS

This chapter provided an in-depth literature review on mobile gaming and technology adoption as outlined in the theoretical objectives contained in Chapter 1 (Section 1.3.2).

Section 2.2 provided a historical overview of video games (Section 2.2.1) and discussed the role of video games in marketing (Section 2.2.2). Section 2.3 contained an in-depth review of mobile games, including an overview of mobile games (Section 2.3.1), the impact of third generation mobile games (Section 2.3.2), the definition and explanation of freemium games (Section 2.3.3), the global performance of mobile games (Section 2.3.4), the marketing potential of mobile games (Section 2.3.5) and growth of mobile games in the South African market (Section 2.3.6). Next, Section 2.4 detailed the drivers associated with the adoption of mobile games (Section 2.4.1 to 2.4.7). The chapter continued with Section 2.5 which discussed the Generation Y cohort in detail and concluded with the hypothesised model of drivers influencing mobile games adoption in Section 2.6.

The research methodology is fully discussed in the next chapter, Chapter 3, and comprises the following: the research objectives and design, the sampling procedure, data collection method, questionnaire administration, data preparation and statistical analysis.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Marketing research is a key component that connects an organisation to its desired market through the collection and analysis of data (Hair, Bush & Ortinau, 2002:4). A more in-depth definition describes marketing research as a systematic design that encompasses an objective examination of a subject that is of importance to an organisation, in order to gather applicable data on that subject (Smith & Albaum, 2010:1). Kent (2007:3-4) states that data collected from market research help to identify the needs of the target market, leading to both efficient and effective decision-making within an organisation, as well as the creation of optimised strategies in the marketplace. As such, marketing research can be seen as an essential part of operations for any organisation.

As stipulated in Chapter 1, the primary objective of this study was to determine the drivers that influence Generation Y students' propensity to adopt mobile games in the South African context. This primary objective was then classified into 10 empirical objectives (refer to Section 1.3.3), which promulgated the collection of the following data:

- Generation Y students' drivers of mobile game adoption.
- Generation Y students' attitude towards mobile game adoption.
- Generation Y students' behavioural intentions towards mobile game adoption.

Chapter 3 outlines the various research and methodology approaches that were employed in the composition of this research study. The research design is discussed in Section 3.2, whilst Section 3.3 details the sampling procedure that was followed. Section 3.4 and Section 3.5 specify the data collection method and the administration of the questionnaire, respectively. The data preparation

and statistical techniques utilised to analyse the data are explained in Section 3.6 and Section 3.7.

3.2 RESEARCH DESIGN

A research design is a blue-print that outlines the methods or procedures that are followed in order for a researcher to achieve the objectives set out in the research study (Maree, 2016:35). Every research design is unique, although a systematic approach should be followed for it to be successful (Smith & Albaum, 2010:21).

Shukla (2010:25) points out that there are three possible research designs that may be selected based on the researcher’s predetermined judgement criteria. The three research designs comprise exploratory, descriptive and causal research approaches. Figure 3.1 illustrates the three research designs:

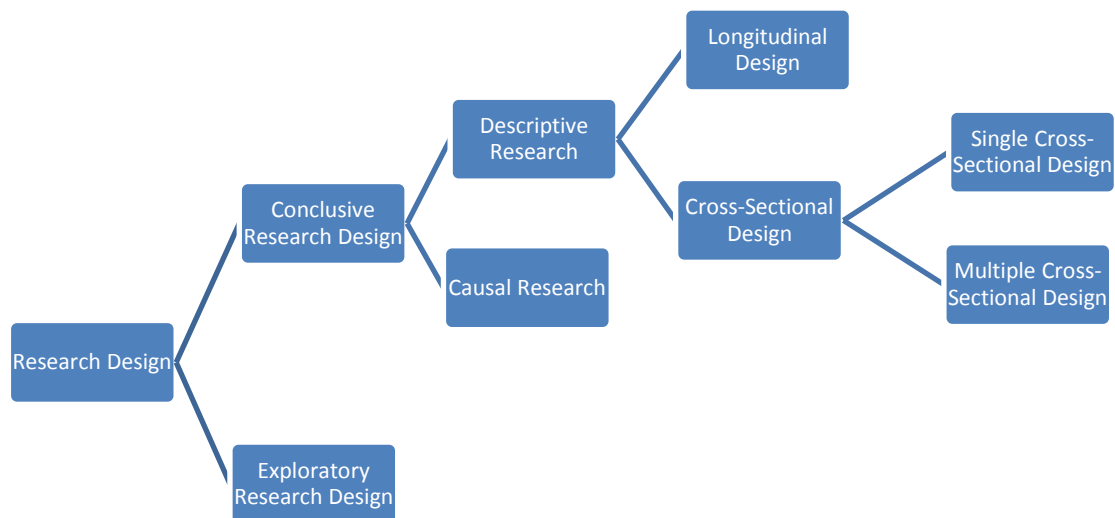


Figure 3.1: Illustration of the marketing research designs (Malhotra, 2010:103)

In an exploratory research design, the research problem is investigated through the use of primary and secondary data sources to classify potential problems or opportunities that may exist. In addition, the purpose of exploratory research is not to provide decisive action plans but rather to further enlighten

researchers' knowledge on a subject topic or research problem (Smith & Albaum, 2010:21; Hair *et al.*, 2002:41). As such, the findings of exploratory research are regarded as tentative and are generally built upon when implementing a conclusive research design (Malhotra, 2010:103).

A conclusive research design comprises either causal or descriptive research. Causal research is undertaken when a researcher seeks to determine a cause-and-effect relationship between observed variables, or rather, how an observed independent variable affects an observed dependant variable (Kent, 2007:18). Causal research is typically carried out by conducting experiments, in which the outcome allows one to ascertain specific causal relationships between the observed variables. However, this makes it a complicated design that is often difficult to administer in a natural setting (Peter & Donnelly, 2012:34; Malhotra 2010:113).

A descriptive research design is followed when a researcher aims to describe or understand a phenomenon experienced by an observed variable or set of variables (Sarstedt & Mooi, 2014:17). Shukla (2010:35) states that descriptive research can be used to validate and quantify findings derived from exploratory research in order to estimate conclusive results. Therefore, descriptive research is seen as a pre-calculated and structured method, as opposed to the unstructured and informal approach of exploratory research (Smith & Albaum, 2010:21-23).

Moreover, descriptive research designs comprise longitudinal and/or cross-sectional designs. A longitudinal design measures a sample of participants at multiple points over an extended period of time (Berndt & Petzer, 2011:133). This design is valuable for discovering specific trends that can develop over a designated time period. In contrast, a cross-sectional design is used to measure and collect data from an observed variable or sample of participants at one point in time (Shukla, 2010:38).

For the purpose of this study, a descriptive single cross-sectional design was selected. The following section describes the sampling procedure adopted in this study.

3.3 SAMPLING PROCEDURE

This section comprises an outline of the sampling procedure followed in this study in which the definition of the target population, the sampling frame, the sampling method and the chosen sample size will be discussed.

3.3.1 Defining the target population

A target population is the sum of all the population elements that share similar attributes or traits which can be affiliated with the research problem. The population elements can be defined as the variables, objects or people that a researcher seeks to obtain data from (Malhotra 2010:370-371; Berndt & Petzer, 2011:65). There is a general consensus amongst scholars that it is highly unlikely to include an entire population in a research study, as population sizes are simply too large. Furthermore, time restrictions and financial constraints prevent researchers from including the entire population (Maree & Pietersen, 2016a:192). As such, a smaller and more manageable sample is drawn from the target population. A sample is a small group of participants whose size is decided upon through statistical considerations that best represent the target population (Smith & Albaum, 2010:10-11).

The target population selected for this study was defined as full-time Generation Y students ranging between the ages of 18 and 24 years, enrolled at registered public South African HEIs during 2016.

3.3.2 Sampling frame

A sampling frame is an assembly of all possible population elements that can be linked to the defined target population (Hair *et al.*, 2002:335). Researchers and organisations commonly use multiple sources to draw up sample frames which include voter lists, commercial directories, maps, telephone directories and in some cases the acquisition of databases that contain names, addresses and telephone numbers of potential population elements (Shukla, 2010:52).

The sampling frame chosen for this study comprises the 26 publicly registered South African HEIs (Universities South Africa, 2016). From the initial sample frame, judgement sampling was utilised to narrow the sampling frame to three campuses located within the Gauteng province. The three HEIs consisted of one traditional university, one university of technology and one comprehensive university.

3.3.3 Sampling method

There are two types of sampling methods that can be followed when selecting a representative sample: probability and non-probability sampling (Maree & Pietersen, 2016a:192; Blythe, 2005:108-109).

In probability sampling, every member, object, or variable of the population has an unbiased chance of being included in the sample (Blythe, 2005:109). Probability sampling determines a sample selection through estimations that enable the generalisation of findings, which are drawn from that sample, pertaining to the target population (Berndt & Petzer, 2011:175). Conversely, non-probability sampling is based on the judgment of the researcher and the population elements are chosen subjectively to form the final sample (Malhotra, 2010:376). This can lead to desirable results, however, due to the biased nature of the sample selection as opposed to the unbiased selection in probability sampling, the findings may not be considered to be a precise representation of the population (Maree & Pietersen, 2016a:197).

Figure 3.2 provides an outline of the probability and non-probability sampling sub-group classifications:

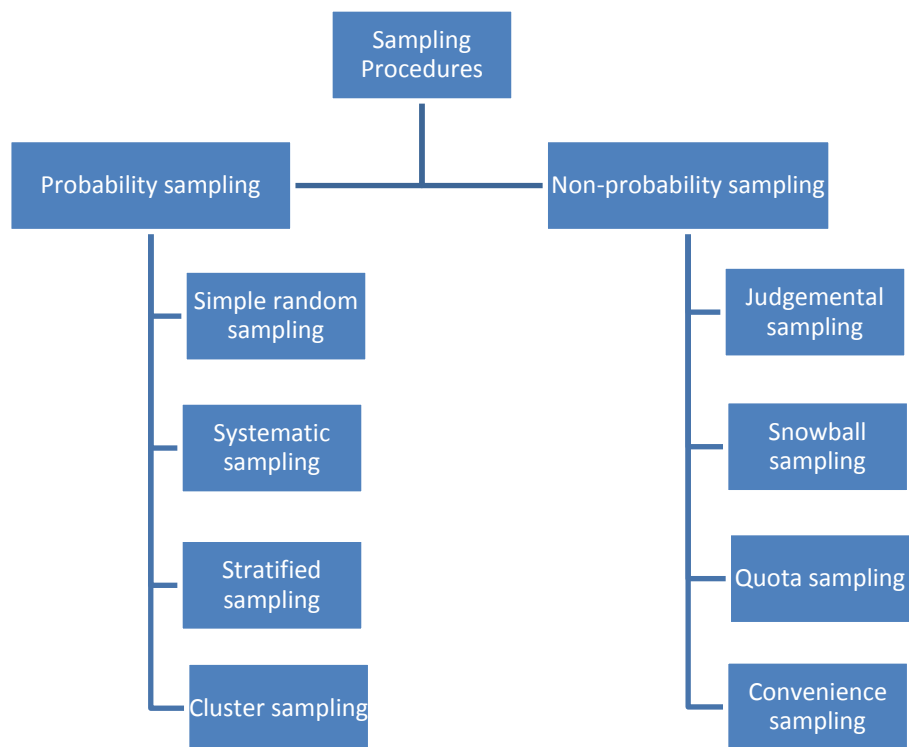


Figure 3.2: Sampling procedures (Sarstedt & Mooi, 2014:40)

As indicated in Figure 3.2, probability sampling is made up of the following methods; simple random sampling, systematic sampling, stratified sampling and cluster sampling. Non-probability sampling consists of judgemental sampling, snowball sampling, quota sampling and convenience sampling.

Despite the limitations presented by a non-probability sampling method, a convenience sampling method was employed in this research study. Convenience sampling is the subjective selection of readily available population elements by the researcher at a specified time in which a research study is conducted (Berndt & Petzer, 2011:174). As such, careful consideration should be taken when generalising results to the population. Owing to financial limitations and time constraints, a non-probability convenience sample of full-time Generation Y students, registered at three South African HEIs, ranging between 18 and 24 years of age were selected for this study. In order to overcome the limitations of a convenience sampling method, demographic

questions pertaining to the participants' province of origin, home language, ethnic group and gender were included in the questionnaire to assist in determining the degree to which the sample is representative of the target population.

The following section outlines the selection procedure of the sample size.

3.3.4 Sample size

Malhotra (2010:374) defines a sample size as being the total number of population elements that will be measured during a research study. The selection of a sample size is determined by various factors such as budget constraints, time limitations, sample sizes of similar studies and the ease of accessibility to population elements (Zikmund & Babin, 2010:301-303).

For the purpose of this study, a sample size of 600 full-time Generation Y students was chosen. The sample size is in accordance with similar studies done by Billieux *et al.* (2013:1) (sample size: 690), Kwon and Chidambaram (2000:3) (sample size: 500), Liao *et al.* (2007:765) (sample size: 610), Park *et al.* (2011:748) (sample size: 556). Additionally, to successfully conduct structural equation modelling, Hair, Black, Babin and Anderson (2014:574) advise that studies comprising a large number of constructs that contain three or less measured items should have a minimum sample size of 500. Therefore, the chosen sample size of 600 is deemed as sufficient for the purpose of this study.

The data collection method carried out in this study will be discussed in the following section.

3.4 DATA COLLECTION METHOD

Data collection is the physical collection of data from the selected sample. Researchers must follow a systematic or standardised approach when collecting data; this includes outlining how the data will be collected, specifying how measured items or constructs were chosen or created and stating the motivations for the selections (Maree, 2016:37).

In quantitative studies there are two types of data collection techniques, namely observation methods and survey methods (Sarstedt & Mooi, 2014:58). Observation methods involve directly observing people in a natural environment and recording their natural responses. This is usually done through the use of personal observation or mechanical observation techniques, with the purpose of capturing natural reactions towards an observed variable. Contrastingly, survey methods utilise self-administered questionnaires, mail surveys, or online surveys to collect data from participants regarding their attitudes, beliefs, or thoughts towards a particular construct or topic (Kent, 2007:20-23; Peter & Donnelly, 2012:35). Malhotra (2010:211) states that in a direct survey method, questions are asked in a structured and direct way, making the formulation of a questionnaire a well-planned and systematic process.

The survey method was the chosen data collection method for this study, in which a self-administered questionnaire was utilised to gather the required data from participants. Before the questionnaire was distributed to participants it was submitted to the Ethics Committee of the North-West University (Vaal Triangle Campus) for ethical clearance. The questionnaire received a low/no risk status from the ethics committee and received the following ethical clearance number: **ECONIT 2016-005**. Thereafter, the questionnaire was delivered to lecturers who agreed to partake in the study, who subsequently distributed the questionnaires to their students for completion.

3.4.1 Design of the questionnaire

A questionnaire can be defined as a framework comprising different sets of questions aimed at extracting information from a respondent pertaining to a specific subject matter (Shukla, 2010:43). Bernd and Petzer (2011:186) opine that a questionnaire must be constructed carefully to ensure that questions are understandable, flow effectively and safeguarded against double-barred questions. The researcher must ensure that questions are designed in accordance with the research objectives so as to acquire the desired results from the research study (Sarstedt & Mooi, 2014:61). In addition, any unnecessary questions that do not relate to the research objectives of the study must be excluded and any uncertainties or ambiguities that arise should be detailed in a cover letter or explained before the questionnaire is presented to participants (Malhotra, 2010:337-338).

This research study adhered to the prescribed guidelines in the formulation of a quality questionnaire. The empirical objectives were followed to design the questions contained within this questionnaire. The questionnaire was supported by a cover letter explaining the purpose of the study, as well as brief instructions on how to answer the questions. A pre-test was conducted to ascertain whether or not the language used throughout the questionnaire was simple and easy to understand. Thereafter, the questionnaire was distributed amongst the prescribed sample as detailed in Section 3.3.1.

3.4.2 Questionnaire content

This study utilised validated scales from previously published literature to obtain the necessary data. In order to measure the drivers towards Generation Y students' propensity to adopt mobile games, the following scales were used: use-context (three items) (Liu & Li, 2011:894), perceived attractiveness (three items) (Tao *et al.*, 2009:26), perceived enjoyment (four items) (Liu & Li, 2011:894), habit (three items) (Venkatesh *et al.*, 2012:178), subjective norms (three items) (Fielding *et al.*, 2008:321) and flow (three items) (Jung *et al.*,

2009:127). Generations Y students' attitude (three items) and behavioural intention (three items) towards mobile games were measured using scales adapted from studies by Liu and Li (2011:894) and Agarwal and Karahanna (2000:693).

The questionnaire measured scaled responses by using a six-point Likert scale. Likert scales are popular amongst researchers due to the ease of use and lack of complexity (Zikmund & Babin, 2010:255). The questionnaire compiled for this study contained a six-point Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (6). The six-point Likert scale was chosen because it excludes a neutral response, which is seen to be indecisive and redundant, as indicated by Pallant (2010:10).

In addition, the questionnaire contained particular questions with the aim of obtaining the demographic information of the participants. These questions were measured using nominal scales.

3.4.3 Layout of the questionnaire

Layout, or sequencing, of the questionnaire is important; that is, questions should be arranged according to their difficulty, to make it easier for participants to understand and complete the questionnaire (Maree & Pietersen, 2016b:179; Burns & Bush, 2014:22).

The questionnaire for this research study (refer to Appendix A) consisted of three sections; Section A (A1-A9) contained demographical questions, Section B (B1-B19) measured influential drivers of mobile game adoption and Section C (C1-6) measured the attitudes and behavioural intentions of Generation Y students towards mobile gaming.

3.4.4 Pre-testing and pilot testing of questionnaire

A questionnaire that is tested on a handful of participants before the commencement of a pilot test is known as a pre-test (Burns & Bush, 2014:229). Bradley (2013:216) stresses the importance of conducting a pre-test to determine if any potential errors are present within the questionnaire. This allows an opportunity to rectify any problematic statements before the pilot test is conducted. Failure to detect potential errors in the questionnaire could result in a loss of time and money (Bernd & Petzer, 2011:146).

After the pre-test has been conducted and potential errors screened, a pilot test is conducted on a small sample of participants that are similar to those outlined in the sampling frame (Zikmund & Babin, 2010:179-180). Malhotra (2010:354) states that the purpose of a pilot test is to ascertain if any further errors exist within the questionnaire and aims to determine if the measuring instruments are truly valid and reliable.

In this study, a preliminary questionnaire was pre-tested on four students who were representative of the target population, as well as two experienced academics. The results from the pre-test allowed for the refinement of certain words and questions, which improved the overall comprehensibility of the questionnaire.

Thereafter, the questionnaire was piloted on a convenience sample of 50 Generation Y students that were registered at an HEI that did not form part of the final sample in the study. The results of the pilot test were then analysed using SPSS for Windows, Version 23.0, in order to determine if the measuring instrument was valid and reliable. Once the validity and reliability of the questionnaire were established, it was distributed for the main study.

3.5 QUESTIONNAIRE ADMINISTRATION

A self-administered questionnaire was employed to gather the required data from a sample of 600 participants. The main survey was conducted between February 2016 and April 2016.

Lecturers at the three public HEIs were given the questionnaire to distribute to their students during or after class time. The questionnaire contained a cover letter explaining the nature of the study, as well as instructions on how to complete the questionnaire. Once the questionnaires were completed, they were collected from the participating lecturers.

3.6 DATA PREPARATION

A researcher must ensure that data obtained can be analysed in a meaningful manner. Therefore, the data gathered needs to be edited, coded and tabulated beforehand so that any findings can be correctly contextualised (Nieuwenhuis, 2016:114; Blythe 2005:111).

3.6.1 Step 1: Editing

According to Malhotra (2010:453), editing is a process that involves a thorough analysis of a questionnaire to ensure that there aren't any response errors or missing responses. The main aim of the editing process is to safeguard data quality by checking the accuracy and legibility of a questionnaire before it is used for data capturing (Berndt & Petzer, 2011:33-34).

In this study, all questionnaires which had more than 10 percent of the responses missing, were discarded. Moreover, any questionnaires completed by participants falling outside the age bracket of 18 to 24 years old were removed.

3.6.2 Step 2: Coding

Once the data has been edited, it can then be coded. In coding, all responses contained within a questionnaire are given numerical values (Clow & James, 2014:365). Shukla (2010:40) states that coding is a necessary process which places responses into demarcated groups which enables the effective capturing of data that can be used for further analysis.

In this research study, the questionnaire was pre-coded under the guidance of the two study supervisors. The questionnaire comprised three sections. Section A contained the demographic questions, Section B measured the drivers of mobile game adoption and Section C measured both attitudes and behavioural intentions of Generation Y students toward mobile games. Table 3.1 indicates the coding information utilised in this study.

Table 3.1 Coding of information

TYPE OF DATA	VARIABLE	QUESTION NUMBER
Demographic data	A1 to A9	Section A, Questions A1 to A9
Drivers of mobile games adoption	B1-B19	Section B: Items B1-B25
Use-context	B1 to B3	Section B, Items B1 to B3
Perceived attractiveness	B4 to B6	Section B, Items B4 to B6
Perceived enjoyment	B7 to B10	Section B, Items B7 to B10
Habit	B11 to B13	Section B, Items B11 to B13
Subjective norms	B14 to B16	Section B, Items B14 to B16
Flow	B17 to B19	Section B, Items B17 to B19

Table 3.1 Coding of information (continued...)

TYPE OF DATA	VARIABLE	QUESTION NUMBER
Attitude and behavioural intention toward mobile games	C1-C6	Section C: Items C1-C6
Attitude	C1-C3	Section C, Items C1-C3
Behavioural intention	C4-C6	Section C, Items C4-C6

3.6.3 Step 3: Tabulation

After editing and coding has been completed, the final step is to tabulate the data. Tabulation is the process of adding up the number of responses that are found within each of the groups or variables as outlined in the data coding. There are two types of tabulation: univariate tabulation and multivariate tabulation (Hair *et al.*, 2002:511; Malhotra, 2010:466). For the purpose of this study, univariate tabulation will be used. In univariate tabulation, the number of responses or observations found under each variable is tallied and can be visualised in the form of a frequency table (Sarstedt & Mooi, 2014:99-100). Once the data were correctly prepared, a statistical analysis was conducted. The statistical techniques used in the analysis of the data are outlined in the following section.

3.7 STATISTICAL ANALYSIS

The Statistical Package for Social Sciences (SPSS), Version 23.0 for Microsoft Windows was used to capture and analyse the data. The following sub-sections provide a detailed outline of the statistical methods utilised on the empirical data sets.

3.7.1 Factor analysis

Factor analysis is a statistical method used to reduce a large amount of items or variables into smaller groups called factors. These factors are underlying dimensions that are determined by the inter-correlations in a set of variables (Clow & James, 2014:311; Malhotra, 2010:636). There are two types of factor analysis that can be employed, namely confirmatory factor analysis and exploratory factor analysis (Pallant, 2013:188).

In a confirmatory factor analysis, variables load on predetermined factors outlined in the literature. Thus, the confirmatory factor analysis determines if factors will load as stated in the literature (Hair *et al.*, 2014:602-603). In contrast, an exploratory factor analysis is used when exploring what underlying dimensions exist amongst a new set of variables, as the factors are not predetermined by the literature (Pallant, 2013:188). Therefore, exploratory factor analysis can determine smaller sets of uncorrelated variables which may be useful in explaining potential differences when further analysing the data. This creates multiple applications in marketing research by allowing one to segment participants according to the underlying variables (Malhotra 2010:636-637).

The measuring scales utilised in this study were adapted from existing literature. Therefore, the factors were not predetermined and this study employed an exploratory factor analysis to identify the underlying factors that explain the correlation amongst the new set of variables.

3.7.2 Internal-consistency reliability

In marketing research, the reliability of a measurement instrument is imperative for consistent results. If measuring instruments display no random errors or measurement errors, it may be deemed as a reliable scale (Sarstedt & Mooi, 2014:34). Thus, reliability can be defined as the degree to which the items in a

scale measure what the construct intended to measure (Burns & Bush, 2014:214).

Zikmund and Babin (2010:249) state that when summated scales are used, as in this study, internal-consistency reliability is utilised to determine the reliability of a scale. A commonly used measure of internal consistency is the split-half reliability measure, which involves the splitting of items on a scale into two halves and the values derived from the two halves are correlated. High internal consistency is achieved if the split halves display high correlated values (Malhotra, 2010:318-319). However, choosing which items to split can be a complicated process. Two popular indicators known as the Cronbach alpha coefficient and the Spearman-Brown coefficient are commonly used amongst scholars to determine internal-consistency reliability. The Cronbach alpha coefficient is calculated by determining the average of all split-half coefficients, resulting in values that vary from 0 to 1. The Spearman-Brown coefficient is calculated in a similar manner, however, it replicates the test multiple times to ascertain if reliability remains the same or improves. If reliability scores improve, the scale's reliability is asserted. As such, Spearman-Brown coefficient is considered the best estimate for reliability for two-item scales, while Cronbach alpha coefficient is commonly used for three-item scales and up. In order to prove reliability of a chosen scale, values between 0.60 and 0.70 are considered narrowly acceptable and values between 0.70 and 0.80 deemed acceptable. However, it is recommended that scales produce values of ≥ 0.90 . In addition, the Spearman-Brown coefficient value of a two-item scale must be greater than or equal to the Cronbach alpha value of that same scale in order to prove acceptable reliability (Hair *et al.*, 2014:90; Eisinga, Grotenhuis & Pelzer, 2013:8; Malhotra, 2010:319; Smith & Albaum, 2010:255).

The scales in this study were adopted from various sources of literature (refer to Section 3.4.2). As such, Table 3.2 provides the psychometric properties of the scales.

Table 3.2 Psychometric properties of questionnaire scales

Scales	Author	Sample	Number of items	Reported Cronbach alphas
Use-context	Liu & Li (2011)	267	3	0.89
Perceived attractiveness	Tao <i>et al.</i> (2009)	185	3	0.92
Perceived enjoyment	Liu & Li (2011)	267	4	0.92
Habit	Venkatesh <i>et al.</i> (2012)	1512	3	0.82
Subjective norms	Fielding <i>et al.</i> (2008)	169	3	0.88
Flow	Jung <i>et al.</i> (2009)	208	3	0.85
Attitude	Liu & Li (2011)	267	3	0.91
Behavioural intention	Agarwal & Karahanna (2002)	288	3	0.95

It is evident from Table 3.2 that the scales utilised in this study had achieved Cronbach alpha values of ≥ 0.80 , therefore, achieving recommended levels of reliability.

3.7.3 Validity

The validity of a scale may be tested once the reliability of that scale has been established. Malhotra (2010:320) defines validity of a scale as the degree to which the differences in the observed values of a scale present a true reflection of the differences amongst the variables being measured. Much like reliability, there are no measurement errors when the validity of scale is proven (Shukla,

2010:26). There are three ways in which a researcher can assess validity: content validity, criterion validity and construct validity.

Content validity, also called face validity, is a subjective process in which the items are assessed by an experienced researcher to ascertain whether the item in focus measures what its construct intended it to measure (Sarstedt & Mooi, 2014:36). In other words, an experienced researcher analyses the items in the scale, making sure that there are no confusions or ambiguities in what has been asked.

Criterion validity utilises an in-depth test aimed at determining the level of correlation between existing variables (criterion variables) and the current scale's variables, both of which measure a common construct (Pietersen & Maree, 2016a:240). Higher levels of correlation indicate a higher degree of validity (Smith & Albaum, 2010:254).

Construct validity involves determining if the constructs in the scale are actually measuring what they intend to measure (Malhotra, 2010:320). In other words, construct validity attempts to bridge the gap between the scale and the theory. There are three types of construct validity, namely convergent validity, discriminant validity and nomological validity. Nomological validity is used to determine how well a construct correlates with other constructs in the measuring instrument (Shukla, 2010:27) and is tested through a correlation analysis as discussed in Section 3.7.5. Convergent validity and discriminant validity are outlined in Section 3.7.6.4 under structural equation modelling.

3.7.4 Descriptive statistics

Descriptive statistics is the summation of findings from each of the questions contained within the questionnaire (Clow & James, 2014:378). These findings are usually illustrated through bar charts, histograms, box plots, pie charts and frequency tables. The use of graphical depictions allows for easy and

meaningful interpretation of the acquired data (Sarstedt & Mooi, 2014:100; Pietersen & Maree, 2016b:204).

For the purpose of this study, three different techniques of descriptive statistics were utilised: measures of variability (standard deviation), measures of location (mean) and measures of shape (skewness and kurtosis).

3.7.4.1 Measures of variability

Also referred to as the spread of a distribution, measures of variability determine the degree to which data-values group together, or the degree to which the data is spread over a range of values (Pietersen & Maree, 2016b:208). These variability measures include the following: range, interquartile range, variance and standard deviation (Malhotra, 2010:487). The standard deviation was the measure of spread that was applied in this study. Bradley (2013:268) loosely defines standard deviation as the average distance of each variable from the mean score.

3.7.4.2 Measures of location

Measures of location, or central tendency, are measured using the mean, median and mode of the responses found on each item in the questionnaire (Zikmund & Babin, 2010:328). Malhotra (2010:486) states that these measures are used to locate the central point of the distribution. Of these measures the mean, or average value, is the most commonly used measure of central tendency (Hair *et al.*, 2002:533). As such, the mean was the chosen measure of location for this study.

3.7.4.3 Measures of shape

There are two numerical measures that are used to describe the shape or normality of a distribution, namely the degree of skewness and the degree of kurtosis (Pietersen & Maree, 2016b:210). The distribution or spread of the data values are best represented by means of a graph, where an upside bell that is

relatively symmetric in shape is considered a normal distribution (Malhotra, 2010:488-489).

With skewness, there are two types of distributions, symmetrical distributions and skewed distributions. A symmetrical distribution contains data values that are the same on both sides of the centre of the distribution; meaning that the mean, mode and median are all equal (Malhotra, 2010:488). When the distribution is skewed, the standard deviation from the mean is larger in one direction than in another (Shukla 2010:45). When the distribution is skewed to right it is considered to be positively skewed and when it is skewed to the left it is considered to be negatively skewed (Pietersen & Maree, 2016b:210).

Kurtosis refers to the degree to which a distribution displays a relative peakedness or flatness. Moreover, kurtosis is linked to the standard deviation of a distribution and can be classified into three types of distributions: normal distribution (data values near or equal to zero), abnormally peaked distribution (positive values) and abnormally flat distribution (negative data values) (Malhotra, 2010:488; Pietersen & Maree, 2016b:211).

3.7.5 Correlation analysis

Correlation analysis is used to determine the strength of the relationship between two variables (Berndt & Petzer, 2011:239). Therefore, the stronger a relationship is between two variables, the more likely it is that a change in one variable will affect the other (Burns & Bush, 2014:396). There are various correlation techniques, however, The Pearson's Product Moment correlation (r) is the most commonly used technique amongst researchers and, as such, was the chosen method correlation for the purpose of this study (Malhotra, 2010:562).

In Pearson's Product Moment correlation, data values range between -1 and +1, with r denoting the strength between the two observed variables (Sarstedt & Mooi, 2014:106). When conducting a correlation analysis using Pearson's

Product Moment (r), a perfect positive relationship occurs between two observed variables when $r = 1$; a perfect negative relationship between two observed variables is observed when $r = -1$; and no relationship exists between variables when $r = 0$ (Hair *et al.*, 2014:152-153). A Person's Product Moment correlation analysis will be conducted to determine the nomological validity of the measurement model, before conducting structural equation modelling. Nomological validity is proven when different constructs in a measurement model are correlated. (Smith & Albaum, 2010:254)

3.7.6 Structural equation modelling

Structural equation modelling (SEM) is a unified approach to answering formulated hypotheses by combining multiple statistical techniques at once. This approach consists of two procedures: the generation of structural equations through the use of regression to answer formulated hypotheses and the graphical representation of those structural equations in a conceptually appealing manner (Malhotra, 2010:724; Byrne, 2010:3). Hair *et al.*, (2014:565) states that there are six stages that need to be followed in order to conduct SEM successfully; these six stages are outlined in Figure 3.3.

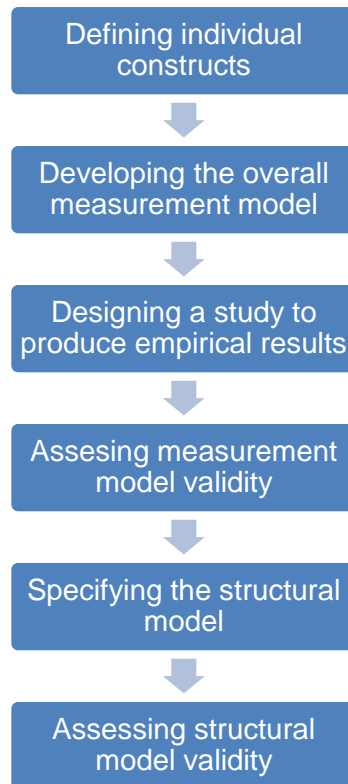


Figure 3.3: Six-stages in Structural Equation Modelling (Hair *et al.*, 2014:565).

As seen in Figure 3.3, the six stages in SEM consist of defining the constructs, developing the overall measurement model, designing a study to produce empirical results, assessing the measurement model validity, specifying the structural model and assessing structural model validity. The structural modelling process is outlined below.

3.7.6.1 Defining the constructs

Characteristically, SEM is based on sound theoretical roots and prior knowledge (Lei & Wu, 2007:35). As such, it is vital to make use of measures whose psychometric properties are astute; failure to do so may lead to biased results (Kline, 2011:6). Additionally, when defining constructs, Hair *et al.* (2014:567) state that a validated measurement theory is critical to obtaining optimal results. As such, this study made use of adapted scales from prior academic research that have been previously validated and considered reliable measures.

3.7.6.2 Development of the overall measurement model

Once the constructs have been defined, a measurement model must be developed and specified. A measurement model is used to test hypothesised constructs as specified by the literature (Malhotra, 2010:729). As such, the purpose of a measurement model is to prove if previously unexpressed relationships between observed variables and latent (unobserved) variables are valid (In'namie & Koizumi, 2013:25). This process is graphically represented by arrows from the defined constructs to each of the measured variables assigned to those constructs. On completion of this, the degree to which latent variables are related to their assigned constructs are displayed by their individual factor loadings. This is achieved through a confirmatory factor analysis (Kline, 2011:95; Teo, Tsai & Yang, 2013:6).

Thereafter, the measurement model is assessed to ensure that there are no problematic estimates. Negative error variances, also known as Heywood cases, as well as any standardised factor loadings that are above 1.0 or below -1.0 must be avoided. Any problematic estimates that occur may result in the corresponding loading(s) being dropped to rectify the measurement model (Malhotra, 2010:735).

3.7.6.3 Designing a study to produce empirical results

In the third stage, designing a study to produce empirical results, Hair *et al.* (2014:569) indicate that various issues in sample size or model estimation techniques must be looked at before proceeding with the assessment of the measurement model's validity. Byrne (2010:76) asserts that careful consideration should be given to the sample size chosen for the research design, as smaller sample sizes (≤ 100) generally produce unreliable results. When a model is complex in nature, by having multiple constructs or constructs with less than three measured variables, Malhotra (2010:731) recommends the use of a sample size in excess of 400 participants.

In model estimation, the values of the unknown parameters are determined as is the error associated with the estimated value (Teo *et al.*, 2013:12). Hair *et al.* (2014:575) propose the use of maximum likelihood estimation (MLE), as it is commonly used by researchers due to its efficiency in assuming multivariate normality.

3.7.6.4 Assessing measurement model validity

In SEM, the use of composite reliability and average variance extracted (AVE) is recommended when assessing reliability and validity (Afari, 2013:101). Malhotra (2010:733) defines composite reliability (CR) as the relationship between true score variance and total score variance extracted from the variables. Hair *et al.* (2014:619) states that the measurement model is deemed reliable when the calculated CR value is calculated above 0.70; with any value ranging between 0.60 and 0.70 also considered to be acceptable. After CR is proven, the construct validity of the measurement model may now be assessed.

Construct validity is made up of convergent validity, discriminant validity and nomological validity (Sarstedt & Mooi, 2014:57). Nomological validity will be assessed through a correlation analysis as stipulated in Section 3.7.5. Convergent validity and discriminant validity will be assessed through SEM. Convergent validity is the degree to which the measures of a construct are correlated and whether or not those measures are supposed to be correlated (Clow & James, 2014:271). Malhotra (2010:734) states that in SEM, convergent validity can be determined by two measures, namely the size of the factor loadings or by estimating the average variance extracted (AVE). Factor loadings calculated above 0.50 and an AVE of more than 0.50 are considered acceptable values in determining acceptable construct convergence (values above 0.70 are ideal) (Hair *et al.*, 2014:618-619).

According to Zikmund and Babin (2010:251), discriminant validity provides evidence of how measures of a construct are unique to that particular construct and do not show signs of high correlation between other constructs. In SEM, discriminant validity can be evaluated by assessing the average variance

extracted (AVE) or by comparing correlation coefficients of the measurement model to the square root of the construct AVE values (Byrne, 2010:290-291). When looking at the correlation coefficients of the measurement model, discriminant validity exists when the square root of the AVE of one construct is higher than the correlation coefficients of the remaining constructs (Hair *et al.*, 2014:620).

Thereafter, the measurement model must be assessed for acceptable levels of goodness-of-fit indices. Hair *et al.* (2014:576) describe goodness-of-fit as an indicator of “how well the measurement model reproduces the covariance matrix amongst the indicator items”. According to Malhotra (2010:731), there are three types of goodness-of-fit measures; these are, absolute fit indices, incremental fit indices and parsimony fit indices. Absolute fit indices are used to determine how well a measurement model recreates observed data. Incremental fit indices are used to determine “improvement in fit of a model compared with a statistical baseline model” (Malhotra, 2010:731; Kline, 2011:196). Teo *et al.* (2013:14) state that parsimony fit indices are used to compare models of different complexities. The absolute fit indices utilised in this study include the chi-square, degrees of freedom and the root mean square error of approximation (RMSEA). Moreover, this study also utilised the following incremental fit indices: the comparative fit index (CFI), incremental fit index (IFI) and Tucker-Lewis index (TLI). According to Hair *et al.* (2014:631), values greater than 0.90 are considered acceptable for CFI, IFI and TLI indices. Regarding the RMSEA, a values below 0.08 is indicative of acceptable model fit (Teo *et al.*, 2013:15; Malhotra, 2010:732).

3.7.6.5 Specifying the structural model

Once the measurement model has attained validity and shows acceptable goodness-of-fit, the next step is to specify the structural model. Hair *et al.*, (2014:585) state that the specification of a structural model is done by drawing path arrows from one construct to another, thus showing a relationship between the two as defined by the theory.

These paths, also known as a path analysis, are used to assess a pattern of relationships between constructs, with these patterns indicating direct or indirect effects of independent constructs on other dependant constructs (Seker, 2013:159). The path effects are determined by using the correlation estimates or covariance between the constructs in question (Malhotra, 2010:749). Hair *et al.* (2014:585) state that the relationships, or paths, found between constructs are based on previous existing hypothesised literature, where each individual path represents a hypothesised relationship.

3.7.6.6 Assessing structural model validity

The final stage in SEM is to assess the validity of the structural model. This stage cannot be performed if the validity of the measurement model (refer to Section 3.7.6.4) was deemed unsatisfactory. The hypothesised theoretical relationships as well as the validity of the structural model will now be tested using the methods outlined Section 3.7.6.4 (Hair *et al.*, 2014:587). In addition, the proposed structural model will also be assessed with competing models (Malhotra, 2010:736). Kline (2011:220) suggests that when comparing two or more models, a researcher should take into consideration the Akaike's information criterion (AIC) and Bozdogan's consistent version of the AIC (CAIC), where smaller values between competing models suggest better fit.

3.7.7 Two independent-samples t-test

In previous literature, the Z-test was commonly used to determine the location of a distribution in a data set (Malhotra, 2010:504-505). However, justification of Z-test results proved to be troublesome (Smith & Albaum 2010:299). As a result, the *t*-test was formed that utilises the *t*-distribution. The *t*-test removes any rigid assumptions that are prevalent in a Z-test by focusing only on sample means and variances (Hair *et al.*, 2002:542).

A *t*-test is used to determine if there are any statistically significant differences between two samples or groups. There are three different types of *t*-tests: the

one sample *t*-test, the two independent-samples *t*-test and the paired-sample *t*-test (Pietersen & Maree, 2016c:250; Zikmund & Babin, 2010:378,382). This study utilised a two independent-samples *t*-test in order to determine if there are any statistically significant differences in gender in terms of Generation Y students' propensity to adopt mobile games.

3.7.8 Cohens D-statistic

According to Pallant (2013:218), the Cohens D-statistic (denoted as D) is calculated after conducting a *t*-test in order to determine the size of statistically significant differences. The levels of practical significance according to Cohen's D-statistic are as follows:

- $0.20 \leq d \leq 0.50$: denotes a small practical significance
- $0.50 \leq d \leq 0.80$: denotes a medium practical significance
- $0.80 \leq d$: denotes a large practical significance.

3.8 SYNOPSIS

The research methodology used in the study was discussed in this chapter and comprised the following: the research design and approach (Section 3.2), the sampling strategy (Section 3.3), the measuring instrument and its implementation (Section 3.4 and Section 3.5). Moreover, the method of data preparation (Section 3.6) and the statistical methods (Section 3.7) used to analyse the data were discussed in this chapter.

The proceeding chapter, Chapter 4, details the analysis and interpretation of the research data that was obtained during the main study.

CHAPTER 4

ANALYSIS AND INTERPRETATION OF EMPIRICAL FINDINGS

4.1 INTRODUCTION

The purpose of this chapter is to report and interpret the empirical findings of the study. Chapter 4 outlays the results gathered from the pilot test in Section 4.2, the data gathering process in Section 4.3 and a summary of the preliminary data analysis in Section 4.4. The demographic characteristics of the sample are outlined in Section 4.5. Thereafter, results of the exploratory factor analysis, descriptive statistics, tests of significance and a correlation analysis are detailed in Section 4.6, Section 4.7, Section 4.8 and Section 4.9 respectively. This is followed by Section 4.10 and Section 4.11, both of which focus on hypothesis testing and SEM. Lastly, Section 4.12 presents the results from a two independent-samples *t*-test.

In order to perform the statistical data analysis needed for this study, SPSS and AMOS versions 23.0 for Windows were used. The data analysis was recorded in two stages. The first stage analysed the pilot test results of the questionnaire and the second stage reported on the findings from the main survey. In the proceeding section, the findings that emerged from the pilot test of the questionnaire are detailed.

4.2 PILOT TESTING OF QUESTIONNAIRE

As discussed in Chapter 3 (Section 3.4.4), the preliminary questionnaire was first tested on a small group of random students and two experienced academics to ascertain face validity and content validity. Thereafter, minor changes were made to refine the questionnaire before it was piloted. The pilot study was conducted on 50 Generation Y students at a registered South African HEI that did not form part of the sampling frame stipulated in Chapter 3 (Section 3.3.2). Once the questionnaires were screened for errors, 48 viable

questionnaires remained for analysis. As indicated in Table 4.1, the findings gathered from the pilot study indicate that the reliability is satisfactory.

Table 4.1: Pilot testing results

Items	Number of variables	Mean	Std. deviation	N	Cronbach alpha
Section B:					
B1-B3	3	4.257	1.223	48	0.794
B4-B6	3	4.403	1.121	48	0.766
B7-B10	4	4.759	0.947	48	0.743
B11-B13	3	2.997	1.522	48	0.888
B14-B16	3	2.983	1.183	48	0.749
B17-B19	3	4.444	1.311	48	0.905
Section C:					
C1-C3	3	4.354	1.202	48	0.887
C4-C6	3	4.264	1.324	48	0.942

As indicated in Table 4.1, all scales achieved acceptable Cronbach alpha values greater than 0.60 (Hair *et al.*, 2014:90). As such, the scales displayed acceptable internal consistency reliability and the measurement instrument was deemed suitable for the main study.

The data gathering process is briefly summarised in the following section.

4.3 DATA GATHERING PROCESS

The final questionnaire utilised in the study contained 34 items that were grouped into three sections (refer to Chapter 3 Section 3.4.3). The data were collected from registered full-time students enrolled at three HEIs located in the Gauteng province. The lecturers of the three participating HEIs were contacted for permission with regard to allowing their students to complete the questionnaire, avoiding any unintended disruptions to a learning session. Once permission had been solicited, a self-administered questionnaire was handed

out to the full-time Generation Y students. All participants were informed that participation of the questionnaire was strictly on a voluntary basis. As indicated by the sampling procedure set out in Chapter 3 (Section 3.3), 600 questionnaires were distributed equally between the three HEIs chosen; a total of 200 questionnaires per HEI.

The next section details the preliminary data analysis conducted in this study.

4.4 PRELIMINARY DATA ANALYSIS

A preliminary data analysis must be conducted on the data before analysing the data set. This is done through the use of coding, data cleaning and the tabulation process, which are outlined below.

4.4.1 Coding

In coding, numeric values are assigned to all possible responses within in the questionnaire (Malhotra, 2010:454). In this study, the questionnaire comprised three sections; Section A, Section B and Section C. Section A contained questions regarding the demographic nature of the participants. Section B pertained to the potential drivers of mobile game adoption and Section C measured attitude and behavioural intentions of the participants. All participants received the same questionnaire. Table 4.2 presents the variable codes and assigned values.

Table 4.2: Coding

Section A: Demographical data			
Question	Code	Variable	Value assigned to responses
Question 1	A1	Name of institution	A (1); B (2); C (3)
Question 2	A2	Year of study	1 st (1); 2 nd (2); 3 rd (3); Post-graduate (4)
Question 3	A3	Gender	Female (1); Male (2)
Question 4	A4	Ethnicity	African (1); Coloured (2); Indian/Asian (3); White (4)
Question 5	A5	Home province	Eastern Cape (1); Free State (2); Gauteng (3); KwaZulu-Natal (4); Limpopo (5); Mpumalanga (6); North West (7); Northern Cape (8); Western Cape (9)
Question 6	A6	Home Language	Afrikaans (1); English (2); IsiNdebele (3); IsiXhosa (4); IsiZulu (5); Sesotho sa Leboa (6); Sesotho (7); Setswana (8); SiSwati (9); Tshivenda (10); Xitsonga (11)
Question 7	A7	Age	Younger than 18 (1); 18 (2); 19 (3); 20 (4); 21 (5); 22 (6); 23 (7); 24 (8); Older than 24 (9)
Question 8	A8	Smart Phone usage experience (years)	Less than 1 (1); 1-2 (2); 2-3 (3); 3-4 (4); 4-5 (5); More than 5 (6)
Question 9	A9	Frequency of playing computer games	Everyday (1); 3-4 times a week (2); Twice a week (3); once a week (4); Never (5)
Section B: Drivers of mobile gaming			
Item	Code	Construct	Value assigned to responses
Item 1	B1	Use-Context	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 2	B2		
Item 3	B3		
Item 4	B4	Perceived Attractiveness	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 5	B5		
Item 6	B6		

Table 4.2: Coding (continued...)

Section B: Drivers of mobile gaming			
Item	Code	Construct	Value assigned to responses
Item 7	B7	Perceived	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 8	B8	Enjoyment	
Item 9	B9		
Item 10	B10		
Item 11	B11	Habit	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 12	B12		
Item 13	B13		
Item 14	B14	Subjective norms	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 15	B15		
Item 16	B16		
Item 17	B17	Flow	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 18	B18		
Item 19	B19		
Section C: Attitude and behavioural intention scales			
Item	Code	Construct	Value assigned to responses
Item 1	C1	Attitude	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 2	C2		
Item 3	C3		
Item 4	C4	Behavioural intention	Strongly disagree (1), Disagree (2), Slightly disagree (3), Slightly agree (4), Agree (5), Strongly agree (6)
Item 5	C5		
Item 6	C6		

4.4.2 Data cleaning

Data cleaning is a process whereby a questionnaire is discarded if it has been completed incorrectly or contains missing responses and/or suspect entries (Berndt & Petzer, 2010:218). For the purpose of this study, questionnaires that contained more than 10 percent of missing responses were discarded. Furthermore, the questionnaires where less than 10 percent of the responses were missing were not discarded; rather, the missing responses were extrapolated by using the mode of the total responses for those items.

4.4.3 Tabulation of variables

Following coding and cleaning of the data, is the tabulation process. Table 4.3 displays the frequency of responses observed in the study.

Table 4.3: Frequency table of responses

Section B: Drivers of mobile gaming						
Scale item	Strongly disagree	Disagree	Slightly agree	Slightly agree	Agree	Strongly agree
	1	2	3	4	5	6
B1	49	39	34	97	154	129
B2	69	70	59	101	102	101
B3	45	47	51	111	145	103
B4	47	50	84	127	119	75
B5	27	45	36	104	133	157
B6	44	82	78	131	121	46
B7	14	22	30	68	171	197
B8	13	28	59	163	159	80
B9	34	50	57	135	152	74
B10	23	29	33	82	172	163
B11	119	93	71	96	69	54
B12	183	104	74	72	43	26
B13	149	93	67	79	62	52
B14	119	102	84	95	68	34
B15	64	74	103	129	93	39
B16	148	130	92	72	46	14
B17	27	49	57	131	123	115
B18	25	40	59	100	157	121
B19	31	55	71	152	137	56

Table 4.3: Frequency table of responses (continued...)

Section C: Attitude and behavioural intention scales						
Scale item	Strongly disagree	Disagree	Slightly agree	Slightly agree	Agree	Strongly agree
	1	2	3	4	5	6
C1	29	42	64	154	149	64
C2	32	45	54	150	155	66
C3	31	35	53	139	152	92
C4	45	56	58	122	151	70
C5	46	54	58	126	141	77
C6	50	49	61	150	123	69

The following section contains an in-depth analysis of the demographic data obtained from the participants observed in this study.

4.5 DEMOGRAPHIC ANALYSIS

A total of 600 questionnaires were distributed, of which 540 were returned. Of the 540 questionnaires that were returned, only 502 were useable after data cleaning. Thus, the response rate for this study amounted to 84 percent. Note that the percentages in the figures have been rounded off to the nearest second decimal unit.

As illustrated in Figure 4.1, there was almost an equal response rate amongst the selected HEIs. University A made up 36 percent of the sample, followed by University B with 33 percent and University C made up the remaining 31 percent.

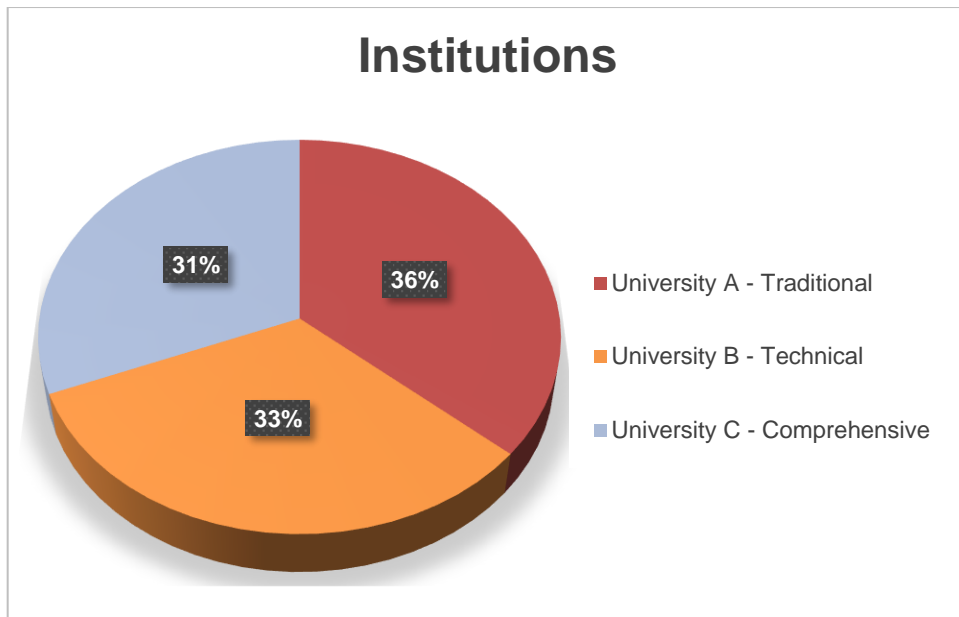


Figure 4.1: Response rate of Institutions

Figure 4.2 displays the participants' current year of study. 60 percent of the sample were first year students, 12 percent were second year students and 28 percent were third year students. There were no responses from post-graduate students.

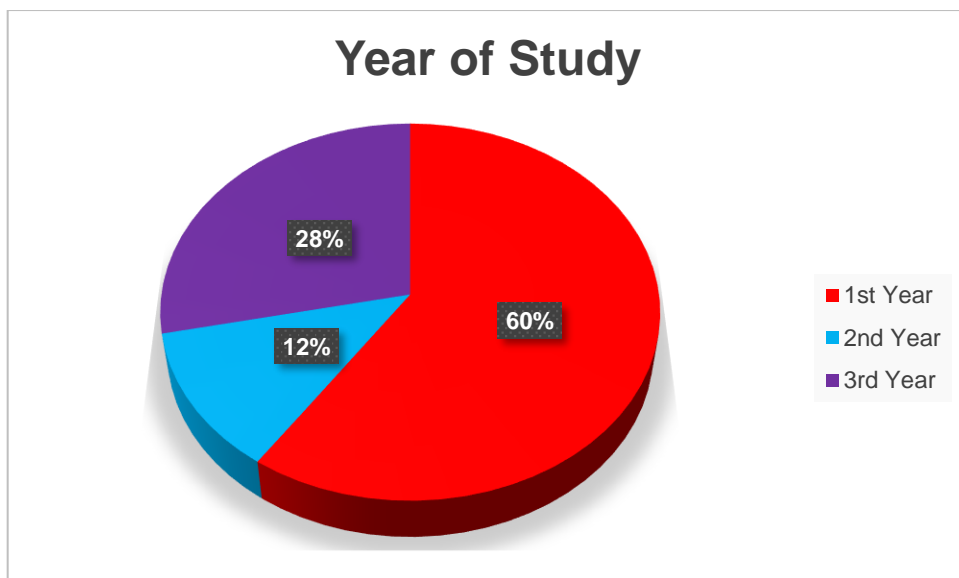


Figure 4.2: Participants' current year of study

As seen in Figure 4.3, there were slightly more female participants (51%) than male participants (49%) from the data gathered.

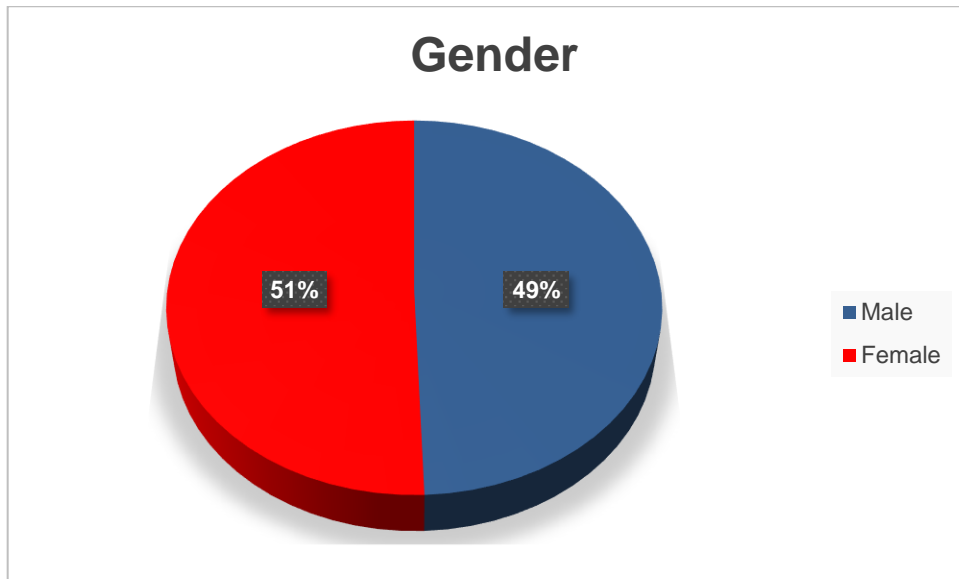


Figure 4.3: Gender profile of participants

Figure 4.4 depicts the designated ethnic groups of participants in the sample. The majority of participants indicated their designated group as being African (87%), followed by White (8%), Coloured (3%) and lastly, Indian/Asian (2%).

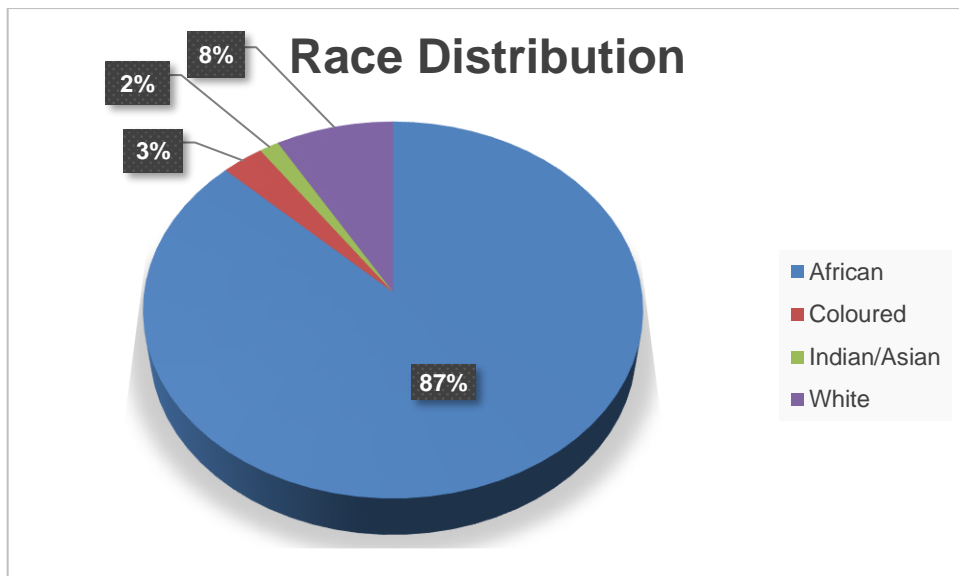


Figure 4.4: Race distribution of participants

Although the study was carried out in Gauteng, HEIs are known to have a diverse range of students that originate in various areas around the country. Figure 4.5 shows that the sample is represented by participants from each of

the provinces in South Africa, except for the Western Cape. The bulk of the participants originate from Gauteng (54%), followed by Limpopo (13%), Mpumalanga (10%), Kwa-Zulu Natal (8%), Free State (7%), North-West (4%), Eastern Cape (3%) and Northern Cape (1%).

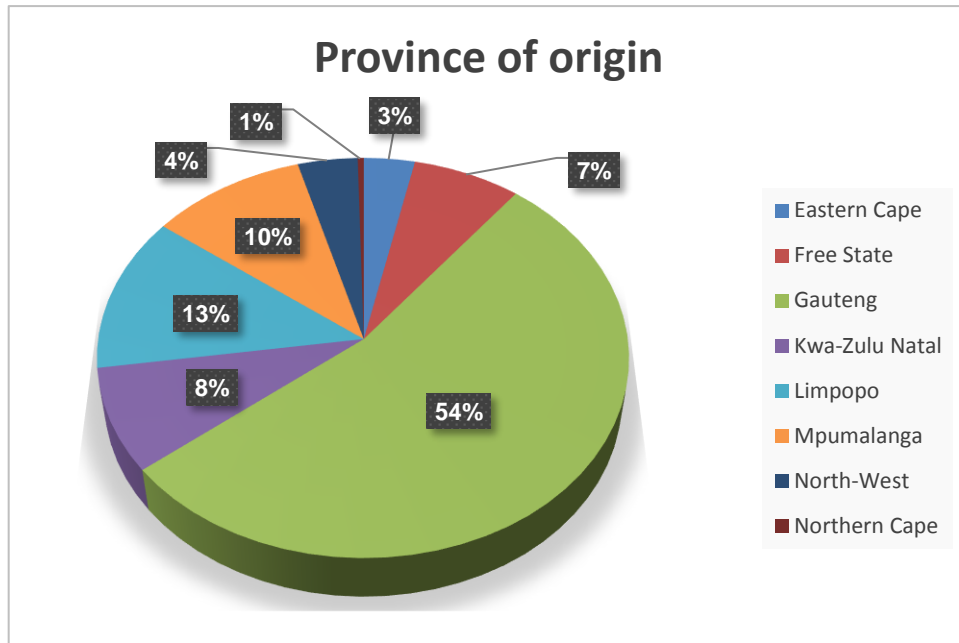


Figure 4.5: Participants' province of origin

Figure 4.6 indicates the participants' home language. Results show 24 percent of participants indicated that their home language is Zulu, followed by, Sesotho (22%), Sesotho sa Leboa (9%), Setswana (9%), Xitsonga (7%), English (7%), Afrikaans (7%), Xhosa (5%), SiSwati (5%), Tshivenda (3%) and Ndebele (2%). As such, all of South Africa's official languages are represented in the sample.

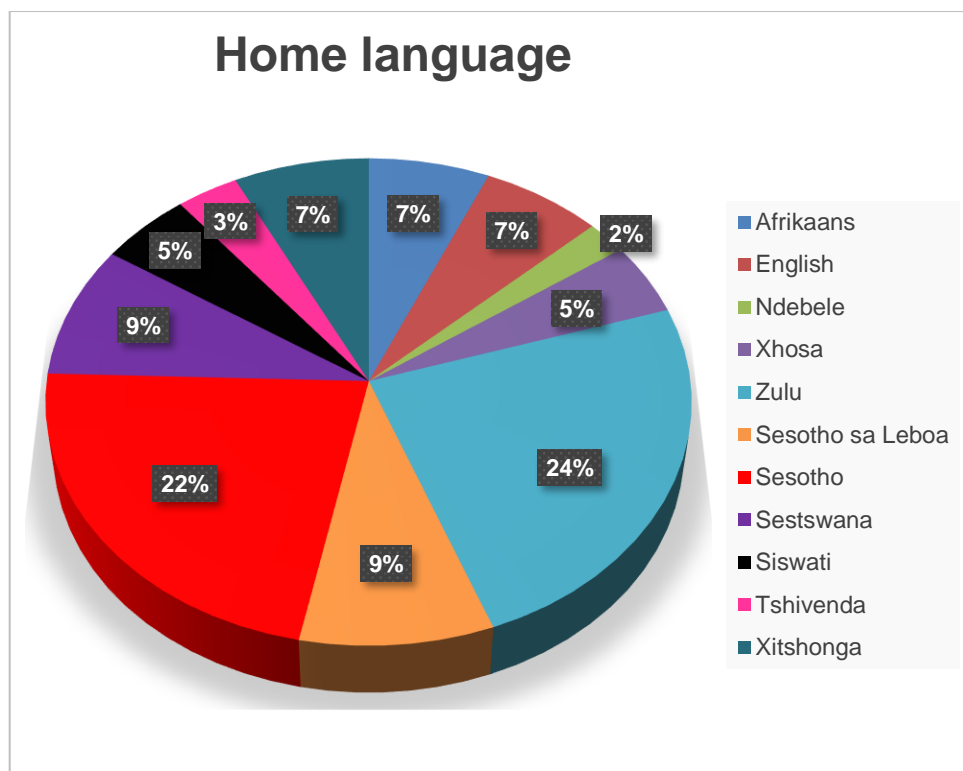


Figure 4.6: Participants' home language

As illustrated by Figure 4.7, the participants' age distribution ranged from 18 to 24. This indicates a representative sample of the target population as outlined in Chapter 3 (Section 3.4.1). The participants aged between 19 (22%) and 20 (22%) years make up for most of the sample size, closely followed by participants of the age of 21 (20%). The rest of the age distribution is as follows: 18 years old (14%), 22 years old (11%), 23 years old (6%) and 24 years old (5%).

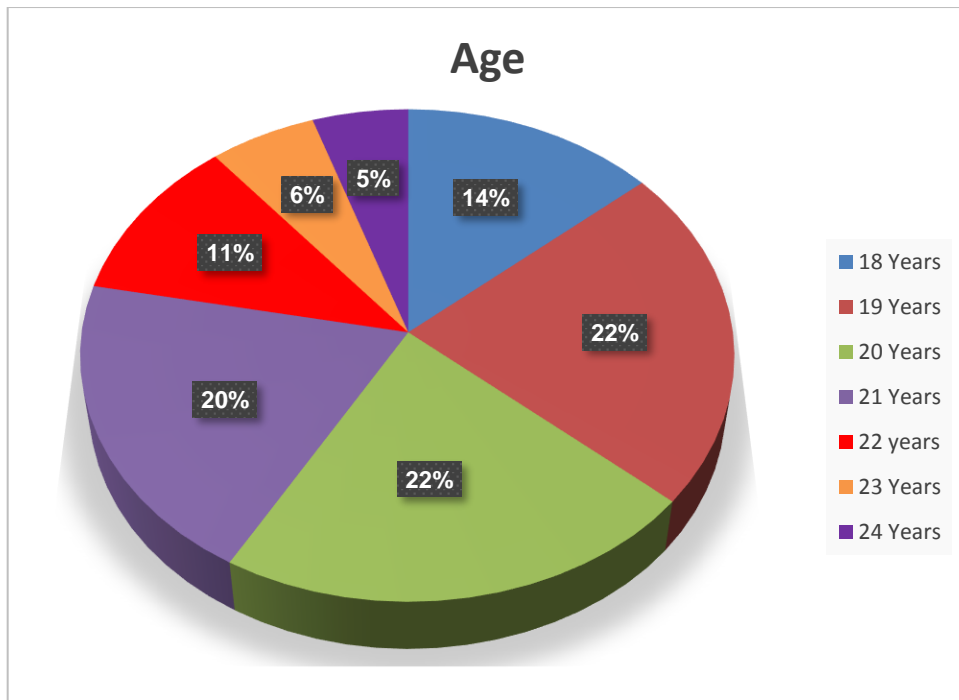


Figure 4.7: Age distribution of participants

The proceeding section outlines the exploratory factor analysis conducted.

4.6 EXPLORATORY FACTOR ANALYSIS

Malhotra (2010:636) describes factor analysis as a procedure that uses methods such as the Bartlett's Test of Sphericity, a correlation matrix, a scree plot, a factor matrix, or a KMO test, to assess the factorability of the data. In this study, a KMO test and the Bartlett's Test of Sphericity were performed on the data to determine the underlying factors. Hair *et al.* (2014:116) advise that a value of 0.50 and above for a KMO test and a Bartlett's Test of Sphericity is indicative of feasible significance and sampling sufficiency. For Section B and C, both tests returned satisfactory values with a KMO=0.929 and chi square Bartlett test=8030 (df=300) at a significance level of $p=0.000 < 0.05$. Once the factorability of the data was established, principle component analysis was performed using promax rotation. Eight factors were specified for extraction based on eigenvalues greater than one and explained 76.92 percent of the total variance.

Five factors showed a positive association with the measured scales. The items in the construct of use-context factored out in a similar manner to the study conducted by Liu and Li (2011). The same was observed for flow, which was derived from Jung *et al.*'s (2009) study. Lastly, the constructs of subjective norms (Fielding *et al.*, 2008) and behavioural intention (Agarwal & Karahanna, 2000) factored out correctly as in their respective studies as well.

There were minor issues observed in the loadings of the following items. Item B10 from perceived enjoyment (Liu & Li, 2011) and item B13 from habit (Venkatesh *et al.*, 2012) cross loaded or loaded on the incorrect factor, while item B6 from perceived attractiveness (Tao *et al.*, 2009) loaded below the satisfactory level of 0.50. Upon careful examination, it was decided that only items B6 and B10 would be deleted without altering the intended purpose of those original constructs. As such, perceived enjoyment becomes a three-item scale and perceived attractiveness becomes a two-item scale. For the habit construct, the cross loading for item B13 is marginally close to 0.50 while having a significant correct loading of 0.690. Therefore, it was deemed necessary to keep item B13 to avoid having a second two-item scale.

The rotated factors from the pattern matrix are presented in Table 4.4.

Table 4.4: Rotated factors for Section B and C

Items	Factors							
	1	2	3	4	5	6	7	8
B1			0.890					
B2			0.834					
B3			0.868					
B4								0.871
B5								0.857
*B6								0.426
B7						0.680		
B8						0.973		
B9						0.837		
*B10			0.372			0.399		
B11					0.833			
B12					0.954			
B13				0.482	0.690			
B14							0.853	
B15							0.835	
B16							0.748	
B17		0.851						
B18		0.930						
B19		0.912						
C1				0.734				
C2				0.815				
C3				0.836				
C4	0.969							
C5	0.869							
C6	0.817							

Note: *Starred items were deleted

The following section details the descriptive statistics derived from the data.

4.7 DESCRIPTIVE STATISTICS

Measures of location, shape and variability were computed for all measured items. Given that the six-point Likert scale ranged from 'strongly disagree' (1) to 'strongly agree' (6), higher mean values are associated with a positive attitude or behaviour towards mobile games and a positive influence of an adoption driver on mobile games adoption amongst the sampled Generation Y students. Table 4.5 presents the descriptive statistics.

Table 4.5: Descriptive statistics summary

Items	Valid N	Mean	Standard deviation	Skewness	Kurtosis
Use-context					
Overall construct	502	4.081	1.608	-0.570	-0.725
B1	502	4.305	1.582	-0.832	-.393
B2	502	3.797	1.699	-0.281	-1.181
B3	502	4.141	1.542	-0.645	-.600
Perceived attractiveness					
Overall construct	502	4.183	1.490	-0.619	-0.493
B4	502	3.888	1.495	-0.395	-0.740
B5	502	4.478	1.485	-0.842	-0.246
Perceived Enjoyment					
Overall construct	502	4.435	1.292	-0.869	0.375
B7	502	4.894	1.265	-1.334	1.315
B8	502	4.329	1.193	-0.656	0.237
B9	502	4.082	1.418	-0.617	-0.425
Habit					
Overall construct	502	2.866	1.649	0.430	-1.023
B11	502	3.129	1.683	0.214	-1.213
B12	502	2.534	1.551	0.691	-0.678
B13	502	2.936	1.712	0.385	-1.177

Table 4.5: Descriptive statistics summary (continued...)

Items	Valid N	Mean	Standard deviation	Skewness	Kurtosis
Subjective norms					
Overall construct	502	3.002	1.488	0.258	-0.870
B14	502	2.986	1.580	0.282	-1.083
B15	502	3.458	1.466	-0.120	-0.901
B16	502	2.562	1.418	0.612	-0.627
Flow					
Overall construct	502	4.184	1.412	-0.607	-0.421
B17	502	4.233	1.449	-0.578	-0.513
B18	502	4.369	1.425	-0.747	-0.287
B19	502	3.950	1.362	-0.495	-0.463
Attitude					
Overall construct	502	4.139	1.363	-0.679	-0.164
C1	502	4.084	1.336	-0.627	-0.185
C2	502	4.094	1.367	-0.673	-0.215
C3	502	4.239	1.387	-0.736	-0.093
Behavioural intention					
Overall construct	502	3.953	1.494	-0.529	-0.658
C4	502	3.972	1.494	-0.551	-0.679
C5	502	3.982	1.506	-0.536	-0.682
C6	502	3.904	1.483	-0.499	-0.614

As seen in Table 4.5, all kurtosis values provide no indication of irregularity and all skewness values in fall within the -2 or +2 range, therefore all measured items can be considered to be distributed normally (Berndt & Petzer, 2011:243-244).

Means above 3 were computed on each of the following constructs: use-context (mean=4.081), perceived attractiveness (mean=4.183), perceived enjoyment (mean=4.435), subjective norms (mean=3.002), flow (mean=4.184), attitude (mean=4.139) and behavioural intention (mean=3.953). This indicates that Generation Y students perceive that the environment in which a mobile game is played can influence the adoption process. Moreover, Generation Y students display positive perceptions towards mobile games that are easy and fun to play, have an attractive design and create a good sense of flow. It was also indicated that they consider the opinions of those they hold in high esteem, such as their family and friends, when choosing mobile games. Generally, Generation Y students displayed positive attitudes and behavioural intentions towards mobile gaming.

Contrastingly, the lowest mean recorded was for habit (mean=2.866). This suggests that Generation Y students might not acknowledge habitual play as much as other aspects, which could be attributed to habit first needing a triggering process, such as a familiar environment (Use-context) (Venkatesh *et al.*, 2012:164).

The internal-consistency reliability of the scales used in the main survey is discussed in the following section.

4.8 RELIABILITY OF THE MAIN STUDY

The Cronbach alpha coefficient was used in this study to determine the internal-consistency reliability of the scales utilised in the measuring instrument. Table 4.6 provides a description of the internal-consistency reliability measures of the research instrument used in this study.

Table 4.6: Internal-consistency reliability values of the scales in the main study

Constructs	Number of items in scale	Cronbach alpha	Spearman-Brown
Use-context	3	0.787	
Perceived enjoyment	3	0.801	
Flow	3	0.880	
Subjective norms	3	0.760	
Perceived attractiveness	2	0.812	0.812
Habit	3	0.815	
Attitude	3	0.898	
Behavioural intention	3	0.928	

As shown in Table 4.6, all Cronbach alpha values exceeded the recommended level of 0.60, thereby indicating satisfactory internal-consistency reliability (Hair *et al.*, 2014:90). As perceived attractiveness was reduced to a two-item scale, Eisinga *et al.* (2013:8) suggest using the Spearman-Brown coefficient as a better estimate for reliability than the Cronbach alpha. A Spearman-Brown value greater than or equal to the Cronbach alpha value indicates acceptable reliability for two-item scales. The Cronbach alpha value for perceived attractiveness (0.812) exceeded the recommended level of 0.60. In addition, the Spearman-Brown value for perceived attractiveness (0.812) equalled the Cronbach alpha value, thus, providing sufficient evidence of reliability and warranting its inclusion in the study.

The following section includes the correlation analysis that was conducted for the purpose of determining if the relationships between the hypothesised constructs (drivers) of mobile game adoption were significant.

4.9 CORRELATION ANALYSIS

Malhotra (2010:321,565) opines a practical method for asserting nomological validity of a proposed structural model is to make use of a correlation matrix. As such, a correlation matrix was constructed using the Pearson's Product-Movement correlation coefficients.

The correlation matrix thereof is reported on in Table 4.7.

Table 4.7: Correlation matrix

Constructs	1	2	3	4	5	6	7	8
1. Use-context	1							
2. Perceived attractiveness	0.436**	1						
3. Perceived enjoyment	0.522**	0.530**	1					
4. Habit	0.410**	0.373**	0.421**	1				
5. Subjective norms	0.175**	0.278**	0.242**	0.309**	1			
6. Flow	0.514**	0.535**	0.663**	0.446**	0.191**	1		
7. Attitude	0.420**	0.544**	0.576**	0.487**	0.279**	0.522**	1	
8. Behavioural intention	0.431**	0.460**	0.563**	0.437**	0.361**	0.460**	0.690**	1

**Correlation is significant at the 0.01 level (2-tailed)

Nomological validity is proven in Table 4.7. It exhibits significant positive correlations at a significance level of $\alpha=0.01$ between each of the corresponding constructs.

The hypotheses to be tested using SEM and a two independent-samples *t*-test are set out in the following section.

4.10 HYPOTHESIS TESTING

This study implemented hypothesis testing in accordance with the empirical objectives set out in Chapter 1, the literature reviewed in Chapter 2 and the observed significant positive relationships calculated in table 4.7. The significance level was fixed at the normal level of $\alpha=0.05$. The following hypotheses were promulgated:

H₀1: Drivers of mobile games adoption is not an eight-factor structure comprising use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention.

H_a1: Drivers of mobile games adoption is an eight-factor structure comprising use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention.

H₀2: Use-context (+) does not positively influence the perceived attractiveness, perceived enjoyment, habit and subjective norms of Generation Y students' mobile gaming.

H_a2: Use-context (+) does positively influence perceived attractiveness perceived enjoyment, habit and subjective norms of Generation Y students' mobile gaming.

H₀3: Perceived attractiveness (+) does not positively influence Generation Y students' mobile gaming flow.

- Ha3: Perceived attractiveness (+) does positively influence Generation Y students' mobile gaming flow.
- Ho4: Perceived enjoyment (+) does not positively influence Generation Y students' mobile gaming flow.
- Ha4: Perceived enjoyment (+) does positively influence Generation Y students' mobile gaming flow.
- Ho5: Habit (+) does not positively influence Generation Y students' mobile gaming flow.
- Ha5: Habit (+) does positively influence Generation Y students' mobile gaming flow.
- Ho6: Subjective norms (+) do not positively influence Generation Y students' mobile gaming flow.
- Ha6: Subjective norms (+) do positively influence Generation Y students' mobile gaming flow.
- Ho7: Subjective norms (+) do not positively influence behavioural intentions of Generation Y students towards mobile gaming.
- Ha7: Subjective norms (+) do positively influence behavioural intentions of Generation Y students towards mobile gaming.
- Ho8: Flow (+) experienced by Generation Y students does not positively influence attitude towards mobile gaming.
- Ha8: Flow (+) experienced by Generation Y students does positively influence attitude towards mobile gaming.

H₀9: Attitude (+) does not positively influence behavioural intentions of Generation Y students towards mobile gaming.

H_a9: Attitude (+) does positively influence behavioural intentions of Generation Y students towards mobile gaming.

H₀10: There is no difference between male and female Generation Y students' use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention concerning mobile gaming.

H_a10: There is a difference between male and female Generation Y students' use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention concerning mobile gaming.

The following section details the SEM used to test the proposed model of the drivers influencing Generation Y students' propensity to adopt mobile games.

4.11 STRUCTURAL EQUATION MODELLING

The process followed to conduct SEM in order to test the formulated hypotheses, H₀1 to H₀9, is detailed in this section.

4.11.1 Measurement model specification

The measurement model to be tested in accordance with the first hypothesis, H₀1, is an eight-factor structure which comprises the following unobserved variables: use-context (F1) (three indicators), perceived attractiveness (F2) (two indicators), perceived enjoyment (F3) (three indicators), habit (F4) (three indicators), subjective norms (F5) (three indicators), flow (F6) (three indicators), attitude (F7) (three indicators) and behavioural intention (F8) (three indicators).

The hypothesised measurement model is specified in Figure 4.8.

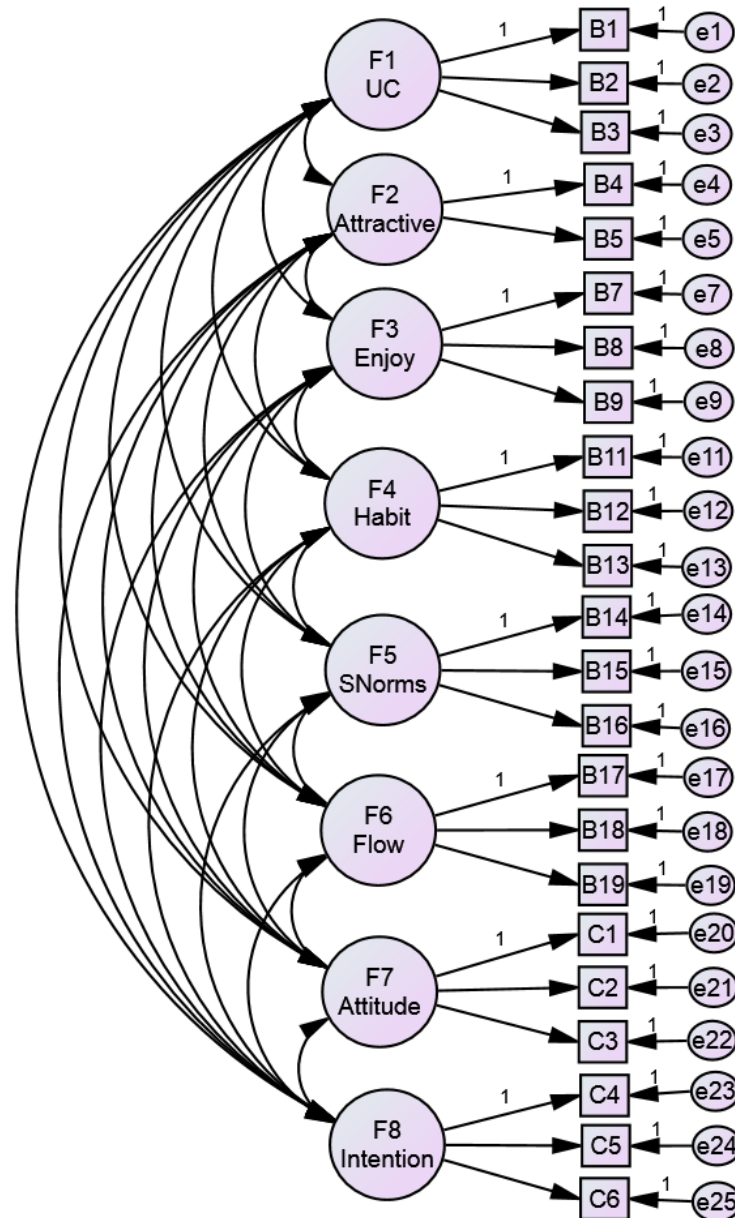


Figure 4.8: Specified measurement model

UC = Use-context; **Attractive** = Perceived attractiveness; **Enjoy** = Perceived enjoyment; **Habit** = Habit; **SNorms** = Subjective norms; **Flow** = Flow; **Attitude** = Attitude; **Intention** = Behavioural intention.

For model identification purposes, the first loading of all eight factors were fixed at 1.0. There are 276 distinct sample moments and 74 parameters to estimate. There were 202 degrees of freedom (df) based on the over-identified model and a chi-square value of 441 at a probability level equal to $p=0.000 < 0.05$. Furthermore, the measurement model was tested for any problematic estimates

by looking at the standardised factor loadings and error variance estimates. Hair *et al.* (2014:618) state that negative error variances must be avoided. Factors should load above 0.50, while avoiding values below -1.0 or above 1.0. As such, Table 4.8 details the standardised coefficients of the measurement model.

Table 4.8: Standardised coefficients of the measurement model

Latent factors	Constructs	Indicators	Factor loadings		Error variance
F1	Use-context	B1	0.81	+	0.65
		B2	0.62	+	0.38
		B3	0.82	+	0.67
F2	Perceived attractiveness	B4	0.83	+	0.69
		B5	0.82	+	0.68
F3	Perceived enjoyment	B7	0.75	+	0.56
		B8	0.76	+	0.57
		B9	0.77	+	0.59
F4	Habit	B11	0.88	+	0.78
		B12	0.81	+	0.66
		B13	0.63	+	0.40
F5	Subjective norms	B14	0.70	+	0.50
		B15	0.69	+	0.47
		B16	0.76	+	0.57
F6	Flow	B17	0.82	+	0.68
		B18	0.88	+	0.78
		B19	0.83	+	0.68
F7	Attitude	C1	0.82	+	0.68
		C2	0.89	+	0.78
		C3	0.89	+	0.79

Table 4.8: Standardised coefficients of the measurement model (continued...)

Latent factors	Constructs	Indicators	Factor loadings	Error variance
F8	Behavioural intention	C4	0.84 +	0.71
		C5	0.96 +	0.92
		C6	0.90 +	0.82

As seen in Table 4.8, there is no evidence of any problematic estimates.

The model fit was assessed using the following indices produced by AMOS: absolute fit indices of the chi-square, RMSEA, GFI, IFI, CFI and TLI. An acceptable chi-square value of 441 with 202 degrees of freedom was computed. Furthermore, the remaining fit indices displayed an acceptable degree of fit between the measurement model and the data; with RMSEA=0.049, GFI=0.926, IFI=0.966, CFI=0.966 and TLI=0.957.

With the above results found to be satisfactory, reliability and validity of the measurement model is assessed below.

4.11.2 Reliability and validity of the measurement model

Before continuing to the structural model, it is important to ascertain the validity of the scales used to form the drivers of the measurement model for mobile game adoption. Therefore, CR, AVE and the correlation coefficients were calculated in order to determine the reliability and validity of the scale. Table 4.9 displays the calculated results on the CR, AVE, the square root of the AVE and the correlation coefficients.

Table 4.9: Measurement model: construct reliability, average variance extracted and correlation matrix

	CR	AVE	$\sqrt{\text{AVE}}$	1	2	3	4	5	6	7	8
Use-context	0.79	0.57	0.75	1							
Perceived attractiveness	0.81	0.68	0.83	0.53	1						
Perceived enjoyment	0.80	0.57	0.76	0.66	0.66	1					
Habit	0.82	0.61	0.78	0.51	0.44	0.50	1				
Subjective norms	0.76	0.51	0.72	0.20	0.36	0.30	0.39	1			
Flow	0.88	0.71	0.85	0.62	0.63	0.78	0.51	0.22	1		
Attitude	0.90	0.75	0.87	0.51	0.64	0.67	0.54	0.33	0.58	1	
Behavioural intention	0.93	0.82	0.90	0.50	0.53	0.66	0.47	0.42	0.51	0.74	1

As indicated in Table 4.9, all CR values are above the recommended cut-off level of 0.70, indicating the reliability of the constructs. Moreover, the AVE values were all calculated above the 0.50 level, indicating convergent validity (Hair *et al.*, 2014:632-633). For discriminant validity, all correlation coefficients were smaller than the square root of the AVE, except for one out of 45 cases (Hair *et al.*, 2014:633). As the eight-dimension model measured various facets of mobile gaming, a certain degree of inter-correlation was to be expected. Additionally, the sheer size of the correlation matrix may cause some violations through chance.

In conclusion, the specified measurement model provides evidence of acceptable levels of reliability, convergent validity, discriminant validity and demonstrates an acceptable model fit. Based on this evidence, it may be concluded that the null hypothesis, H_01 be rejected and the alternate hypothesis H_{a1} be concluded. As such, drivers of mobile game adoption can be considered to be an eight-factor structure.

In the following section, the hypothesised structural model will be presented.

4.11.3 Structural model

Structural Model A was used to test the hypotheses H_02 to H_09 . As such, it was hypothesised that use-context (F1) has a direct positive influence on perceived attractiveness (F2), perceived enjoyment (F3), habit (F4) and subjective norms (F5). Thereafter, it was assumed that the drivers F2, F3, F4 and F5 have a direct positive influence on flow (F6), which in turn, positively influences attitude (F7). Lastly, it was hypothesised that subjective norms (F5) and attitude (F7) have a direct positive influence on behavioural intention (F8).

Figure 4.9 depicts the regression path estimates for Structural Model A. For the complete diagram, refer to Annexure B.

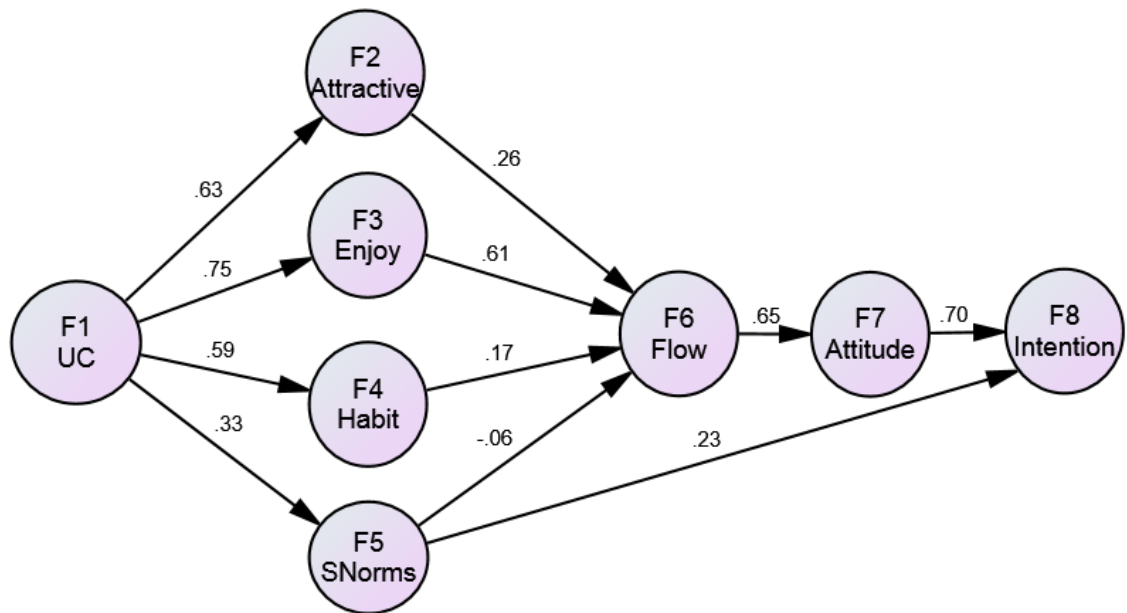


Figure 4.9: Structural Model A

UC = Use-context; **Attractive** = Perceived attractiveness; **Enjoy** = Perceived enjoyment; **Habit** = Habit; **SNorms** = Subjective norms; **Flow** = Flow; **Attitude** = Attitude; **Intention** = Behavioural intention.

Structural Model A provided a problematic chi-square value of 684 with 219 degrees of freedom at a probability level of $p=0.000 < 0.05$. However, the model computed acceptable model fit indices of RMSEA= 0.065, IFI= 0.934, CFI= 0.934 and TLI= 0.924.

The results from Structural Model A revealed that use-context (F1) ($p=0.000 < 0.05$) has a significant positive impact on perceived attractiveness (F2), perceived enjoyment (F3), habit (F4) and subjective norms (F5). This infers that null hypothesis H_{02} can be rejected and the alternate hypothesis H_{a2} concluded. Similarly, perceived attractiveness (F2) ($p=0.000 < 0.05$), perceived enjoyment (F3) ($p=0.000 < 0.05$) and habit (F4) ($p=0.000 < 0.05$), all displayed a direct positive significant influence towards flow (F6). As such, null hypothesis H_{03} , H_{04} and H_{05} may be rejected and their alternate hypothesis concluded. Subjective norms (F5) ($p=0.149 > 0.05$) did not have a positive significant influence over flow (F6). Therefore, the null hypotheses H_{06} cannot be rejected. This finding could be attributed to flow being created from a direct experience with a mobile game, therefore influencing one's attitude towards that mobile game. Contrastingly, studies show that subjective norms is a powerful indicator

of behavioural intentions rather than attitudes, as social influences take place prior to direct experience (Park, Yang & Lehto, 2007:203; Hsu & Lu, 2004:862; Taylor & Todd, 1995:150). Finally, flow (F6) ($p=0.000<0.05$) had a direct positive significant impact on attitude (F7), while attitude (F7) ($p=0.000<0.05$) and subjective norms (F5) ($p=0.000<0.05$) had a direct positive impact on behavioural intention (F8). As such, null hypothesis H_{o7} , H_{o8} and H_{o9} may be rejected and the alternate hypotheses H_{a7} , H_{a8} and H_{a9} concluded.

Hair *et al.* (2014:542) suggests introducing a competing model to determine if the original structural model provides the best possible model fit. Furthermore, Kline (2011:220) proposes using Akaike's information criterion (AIC) and Bozdogan's consistent version of the AIC (CAIC) when determining a better model fit, lower AIC and CAIC suggest a better fitting model. Structural Model A delivered an AIC value of 797.84 and a CAIC value of 1095.

As such the competing model was reviewed to determine if the removal of the non-significant path ($F3 \leftrightarrow F4$, $p=0.149>0.05$) would improve model fit. In Structural Model B the omitted path between subjective norms ($p=0.149>0.05$) and flow (F6) is in accordance with the literature (Park *et al.*, 2007:203; Taylor & Todd, 1995:150). Figure 4.10 depicts the competing Structural Model B:

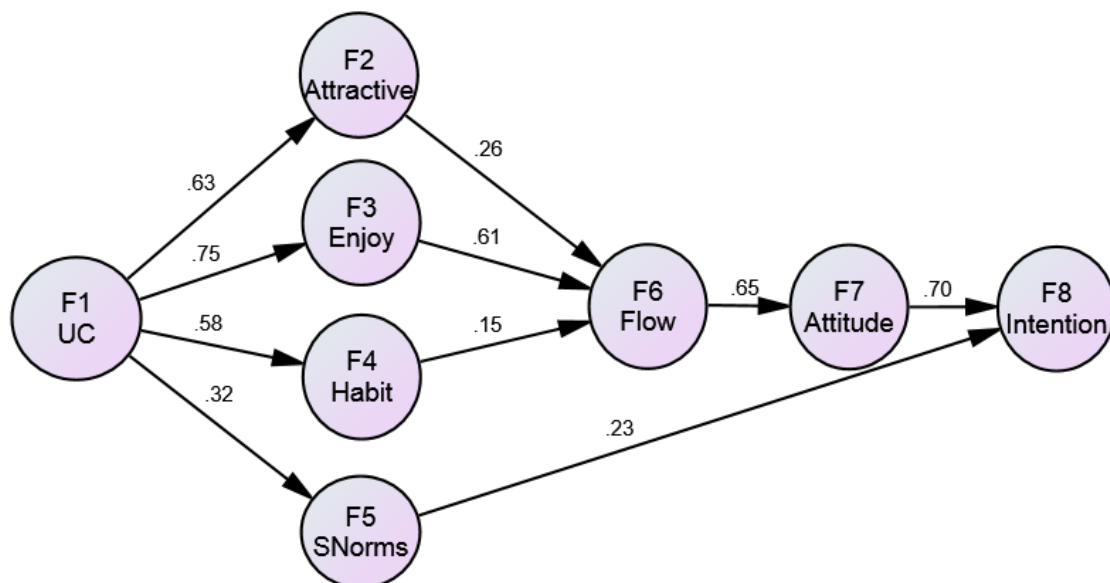


Figure 4.10: Structural Model B

Structural model B produced a chi-square of 686 (df=220) and reported the same model fit indices of RMSEA= 0.065, IFI= 0.934, CFI= 0.934 and TLI= 0.924. More importantly, Structural model B provided slightly lower AIC (797.73) and CAIC (1090) values than Structural Model A, which suggests an improvement of model fit.

The results from Structural Model B show that use-context (F1) has a direct positive significant influence on perceived enjoyment (F3) (path estimate=0.75, $p<0.05$) and subjective norms (F5) (path estimate=0.32, $p<0.05$). This finding is in accordance with prior literature (Engl & Nacke, 2013:90; Yang, Lu, Gupta, Cao & Zhang, 2012:138; Liang & Yeh, 2011:194; Liu & Li, 2011:896). Use-context (F1) also displayed a direct positive significant influence on perceived attractiveness (F2) (path estimate=0.63, $p<0.05$) and habit (F4) (path estimate=0.58, $p<0.05$). These findings are new and require further research investigation.

Generation Y students' perceived attractiveness (F2) (path estimate=0.26, $p=0.000<0.05$), perceived enjoyment (F3) (path estimate=0.61, $p=0.000<0.05$) and habit (F4) (path estimate=0.15, $p=0.000<0.05$) have a significant positive influence on flow (F6). Subjective norms (F5) (path estimate=0.23, $p=0.000<0.05$) showed a positively significant impact on behavioural intentions. This finding has been the same in past studies, but proves to be new in the mobile gaming context (Fielding *et al.*, 2008:323; Hsu & Lu, 2004:862).

Flow (F6) (path estimate=0.65, $p=0.000<0.05$) had a direct positive impact on attitude (F7) which is in line with other studies done by Liu & Li (2011:896) and Ha *et al.* (2007:283). Finally, Generation Y students' attitude towards mobile gaming (F7) (path estimate=0.70, $p=0.000<0.05$) has a strong positive influence on behavioural intentions to play that mobile game (F8).

A comparison of the results produced from Structural Model A and B are provided in Table 4.10.

Table 4.10: Structural model comparison

Measures	Recommended value	Model A	Model B
χ^2	Low χ^2 value	684	686
IFI	≥ 0.90	0.934	0.934
TLI	≥ 0.90	0.924	0.924
CFI	≥ 0.90	0.934	0.934
RMSEA	≤ 0.08	0.065	0.065
AIC	Small positive values	797.84	797.73
CAIC	Small positive values	1095	1090

Table 4.10 shows all fit indices remained the same from Model A to Model B, except for χ^2 , AIC and CAIC values. Although Structural Model A had a lower final χ^2 value, AIC and CAIC values for Structural Model B slightly improved when compared to Structural Model A. These results suggest that the competing Structural Model B demonstrates a better model fit than the initial hypothesised Structural Model A.

The outcome of the two independent-samples t -test is detailed in the next section.

4.12 TWO INDEPENDENT-SAMPLES T-TEST

This study utilised a two independent-samples t -test to determine if any significant differences exist between male and female participants. The significance level was set at the standard 5 percent level; that being, $\alpha=0.05$. The two independent-samples t -test addressed the last hypothesis, H_{010} .

Table 4.11 reports on the mean, standard deviation, t -statistic and p-value for the genders concerning use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention.

Table 4.11: Gender Difference

	Male Mean N=248	Male Std. Dev.	Female Mean N=254	Female Std. Dev.	t-value	p- value	Cohen's D
Use-context	3.983	1.398	4.177	1.286	1.624	0.105	****
Perceived attractiveness	4.133	1.260	3.900	1.228	-2.097	0.037	0.19*
Perceived enjoyment	4.530	1.095	4.460	1.078	0.031	0.467	****
Habit	2.902	1.379	2.832	1.439	-0.555	0.579	****
Subjective norms	2.902	1.212	3.098	1.230	1.815	0.070	****
Flow	4.187	1.284	4.181	1.256	-0.051	0.960	****
Attitude	4.247	1.233	4.033	1.246	-1.939	0.053	****
Behavioural intention	4.081	1.367	3.828	1.416	-2.032	0.043	0.18*
*	Small effect, practically non-significant						
**	Medium effect and moving toward practical significance						
***	Large effect, practically significant						
****	Cohen's D-statistic not calculated as the variable was not statistically significant						

As Table 4.11 shows, there was no statistical significant difference between male and female Generation Y students with regards to the following drivers of mobile game adoption: use-context, perceived enjoyment, habit, subjective norms, flow and attitude. There was a statistical difference observed in both perceived attractiveness and behavioural intention. However, the effect of these differences are practically non-significant according to Cohen's D-statistic. As such, the null hypothesis H_0 may be rejected and the alternate hypothesis H_a concluded.

The last section of Chapter 4 is a brief synopsis of the analysis and interpretations of the findings in this study.

4.13 SYNOPSIS

This chapter reported on and interpreted the empirical findings of the study. Section 4.2 contains a discussion of the results derived from the pilot test as well as the interpretation of those results. The data gathering process is outlined in Section 4.3, followed by the preliminary data analysis which comprises the coding, cleaning and tabulation of data in Section 4.4. In Section 4.5, the demographic attributes obtained from the sample are explained and illustrated.

Section 4.6 detailed the exploratory factor analysis conducted to determine the factorability of the data. Thereafter, Section 4.7 provides a summary of the descriptive statistics of the data set and Section 4.8 determined the reliability of the measuring instrument used for the main study. A correlation analysis was conducted to determine the nomological validity of the measuring scales by using Pearson's Product-Movement correlation coefficients, with the results thereof presented in a correlation matrix in Section 4.9.

Finally, the hypotheses drawn up for this study were presented in Section 4.10. The hypotheses were tested through SEM in Section 4.11 and a two independent-samples *t*-test in Section 4.12.

The next chapter, Chapter 5, presents the findings, recommendations and concluding remarks of this study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The video gaming industry has for the most part consisted of 'traditional' video games such as console video games, computer games and online-only games. However, the rapid advancement of technology has led to the creation of 'smart' mobile devices. These devices contain advanced operating systems and high resolution display screens that ushered in the mobile gaming revolution. Mobile games became an instant success with consumers, with global revenue eclipsing \$35 billion by the end of 2015. In South Africa, revenue generated from mobile games is more than double that of traditional video games (Section 2.3.6). As such, researchers have tried to understand why mobile gaming has become such a profound success. A handful of studies have been conducted in the Asian market to determine why mobile games have become so successful (Section 2.1).

A survey revealed that majority of consumers playing mobile games in South Africa are aged between 16 and 34 years. These individuals fall under the Generation Y cohort age classification category (Section 2.5.1). Data gained from Generation Y members is proving to be invaluable for marketers (Section 2.5.1). This can be attributed to the cohort's significant size and the potential future spending power the members possess as a result of obtaining a tertiary qualification. Furthermore, this cohort's tendency to adopt new technologies at a rapid pace makes them ideally suited for technological studies (Section 2.5.1).

Understanding the drivers of mobile game adoption of the Generation Y cohort is likely to make a valuable contribution to marketing strategies. As such, the primary objective of this study was to propose and empirically test a model of potential antecedents that may determine the mobile gaming adoption habits of Generation Y students in the South African context. The findings could provide

video game developers the necessary insights to adapt future projects and marketing approaches to this cohort.

The purpose of this chapter is to summarise the entirety of the study. The chapter begins with an overview of the study provided in Section 5.2., whilst the main findings of the empirical portion of the study are presented in Section 5.3. The contributions of the study are discussed in Section 5.4, followed by the recommendations outlined in Section 5.5. Section 5.6 details the limitations and future research opportunities and Section 5.7 concludes the chapter with brief remarks.

5.2 OVERVIEW OF THE STUDY

In order to provide comprehensive recommendations based on the study's findings it is vital to highlight the observations concluded from the preceding four chapters.

Chapter 1 provided an introduction to the topic of mobile gaming and outlines the current driving factors influencing mobile game adoption (Section 1.1). The problem statement (Section 1.2) highlights why there was a need to undertake this study in the South African context. This culminated in the formulation of the primary objective (Section 1.3.1). Thereafter, the primary objective was broken down into four theoretical and 10 empirical objectives (Section 1.3.2 and Section 1.3.3). Section 1.4 included the hypotheses formulated for the study. The proposed research design and methodology was outlined in Section 1.5, followed by the ethical considerations in Section 1.6. The study's contributions are discussed in Section 1.7 and the chapter classifications are outlined in Section 1.8.

Chapter 2 comprised a literature review that was conducted in accordance with the theoretical objectives set out in Section 1.3.2. An in-depth review on video games was detailed in Section 2.2. It revealed that video games have been a great success since their introduction in the 1970s. Moreover, the video gaming

market has become a powerful marketing tool for organisations to incorporate in-game advertising, which has resulted in global video game advertising expenditure amounting to R70 billion in 2016.

Section 2.3 contained a comprehensive review on mobile gaming. Mobile gaming has become the most popular form of video games and adoption rates of mobile games are the highest amongst available mobile services. This has created a lucrative market for organisations and game developers alike (Section 2.3.1). The recent mobile gaming success has alerted marketers to the advertising potential of mobile games as the case of McDonald's Japan who have paid millions of dollars to have their brand included in the Pokémon Go mobile game (Section 2.3.5).

Factors that influence the use of mobile games were discussed in Section 2.4. Rapid technological changes over the past two decades led researchers to study various antecedents of consumer adoption to better understand the modern day consumer's attitude and behavioural intentions. The potential antecedents of mobile game adoption were fully discussed from Section 2.4.1 to Section 2.4.7. This revealed that multiple factors are considered by video gamers before adopting any form of a mobile game. However, these antecedents are greatly influenced by contextual factors surrounding the user (Section 2.4.1). In addition, these factors should lead to a flow experience, which is a vital predictor of consumers' attitudes and behavioural intentions towards mobile service technologies (Section 2.4.6 and Section 2.4.7).

Section 2.5 reviewed the literature on generational cohorts and, in particular, the characteristics of Generation Y. The differences in characteristic traits between the three main generational cohorts were specified (Section 2.5). Thereafter, Section 2.5.1 provided insight into the Generation Y cohort and reviewed their importance to marketers in technological adoption. Generation Y individuals are the largest generational cohort in South Africa and the typical South African mobile gamer belongs to this cohort (Section 2.5.2). The final section in Chapter 2 outlined the proposed theoretical model of mobile games adoption amongst Generation Y students (Section 2.6).

Chapter 3 provided an in-depth discussion and review of the research design and methodology followed in the empirical portion of this study. A descriptive single cross-sectional research design was undertaken in Section 3.2. Section 3.3 provided an overview of the sampling procedure employed. A non-probability convenience sample of 600 full-time Generation Y students registered at three South African HEIs was selected as the target population (Section 3.3.3). This was in accordance with previous studies and falls within the boundaries required to conduct SEM (Section 3.3.4). Section 3.4 and Section 3.5 detailed the data collection method and how the questionnaire was distributed. Finally, data preparation and statistical techniques utilised in the study were discussed in Section 3.6 and Section 3.7.

Chapter 4 presents the empirical findings of the study. The results provide insights on the empirical objectives set out in Section 1.3.3.

5.3 MAIN FINDINGS OF THE STUDY

The main findings of Chapter 4, in accordance with the empirical objectives set out in Section 1.3.3, are presented below:

An exploratory factor analysis conducted in Section 4.6 specified eight-factors for extraction, namely use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitudes and behavioural intentions, which collectively explained 76.92 percent of the total variance.

Descriptive statistics (Section 4.7) were used to address the first eight empirical objectives formulated in Chapter 1. Descriptive means were used to determine associations towards the investigating drivers; where means exceeding a value of three, represented positive associations. The results showed that Generation Y students perceive that the environment or use-context can influence whether they adopt and play mobile games. In addition, they have a positive perception of mobile games that have an attractive design and are enjoyable to play. The

Generation Y cohort considers the opinions of those they hold in high esteem, such as their family and friends, when selecting mobile games. They also felt positively towards mobile gaming that allows them to become fully immersed in virtual game reality. Habitual play had the least significant impact as a driver of mobile game adoption amongst Generation Y students; this may be attributed to habit being dependant on a triggering process. Finally, Generation Y students indicate that they have positive attitudes towards mobile games as well as positive behavioural intentions towards playing mobile games.

The measurement scales in Section 4.8 computed Cronbach alpha values greater than 0.70, indicating satisfactory internal-consistency reliability. Before undertaking SEM, correlation analysis (Section 4.9) was performed to ascertain if nomological validity was present. This aided in determining if casual relationships existed amongst the constructs. The results revealed positive significant correlations between each of the corresponding constructs, set at a significance level of $\alpha=0.01$, providing sufficient evidence of nomological validity. As such, SEM was deemed appropriate.

SEM was conducted to address the ninth empirical objective; that being, to test a proposed model of Generation Y students' drivers to adopt mobile games. A measurement model of eight latent factors was specified and comprised use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention. The model fit was assessed using the chi-square, RMSEA, GFI, IFI, CFI and TLI. All fit indices computed acceptable degrees of fit (Section 4.11.1). Moreover, satisfactory levels of composite reliability, convergent validity and discriminant validity were found in the measurement model (Section 4.11.2). Based on the literature review discussed in Chapter 2, a structural model (Structural Model A) was constructed from the measurement model to test the formulated hypothesis in Section 4.10. Structural Model A (Section 4.11.3) revealed that use-context (F1) has a significant positive impact on perceived attractiveness (F2), perceived enjoyment (F3), habit (F4) and subjective norms (F5). Thereafter, perceived attractiveness (F2), perceived enjoyment (F3) and habit (F4) had a direct positive impact on flow (F6); while flow (F6) had a direct positive impact on

attitude (F7). Subjective norms (F5) did not have a positive significant impact on flow (F6), but did have a direct positive impact on behavioural intentions (F8). Lastly, attitude (F7) had a direct positive impact on behavioural intentions (F8). The findings are in accordance with previous studies (Engl & Nacke, 2013:90; Yang *et al.*, 2012:538; Liang & Yeh, 2011:194; Liu & Li, 2011:896; Fielding *et al.*, 2008:323; Park *et al.*, 2007:203; Hsu & Lu, 2004:862; Taylor & Todd, 1995:150). Additionally, Structural Model A produced acceptable fit indices that indicated a working structural model (Section 4.11.3).

Hair *et al.* (2014:542) suggest introducing a competing model to test if the hypothesised model (Structural Model A) is the best possible model. Therefore, Structural Model B (competing model) was introduced. Structural Model B omitted the non-significant path (F6←F5) between subjective norms and flow in accordance with the literature (Park *et al.*, 2007:203; Hsu & Lu, 2004:862; Taylor & Todd, 1995:150). Structural model B produced the same incremental fit indices as Structural Model A, however, lower AIC and CAIC values were recorded. Thus, suggesting that Structural Model B is a better fitting model than Structural Model A (Section 4.11.3).

Taking into account the results, the proposed model presented in Figure 5.1 will explain the drivers of mobile games adoption amongst Generation Y students in South Africa.

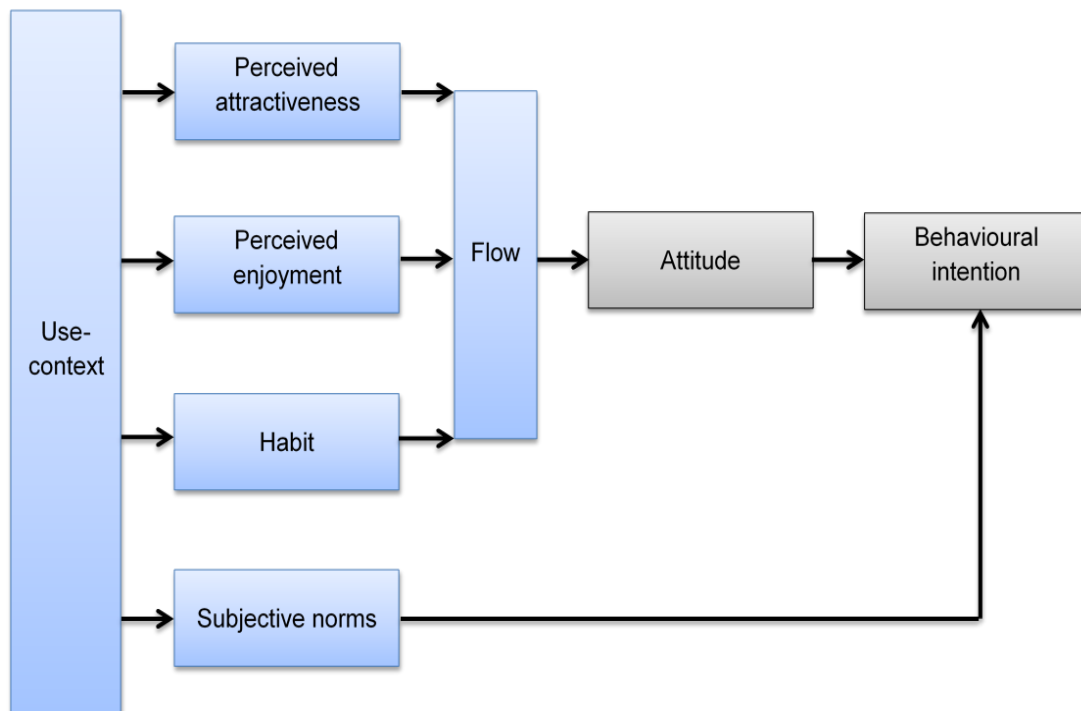


Figure 5.1: Drivers of mobile games adoption amongst Generation Y students

The final empirical objective aimed to determine if any statistically significant difference was present between male and female Generation Y students' adoption of mobile games. A two independent-samples *t*-test was conducted using Cohen's D-statistic at the standard 5 percent level ($\alpha=0.05$) (Section 4.12). The results showed no statistically significant difference between male and female Generation Y students with regards to use-context, perceived enjoyment, habit, subjective norms, flow and attitude. Despite potential statistical differences observed in perceived attractiveness and behavioural intention, the effects of these differences were deemed non-significant according to the Cohen's D-statistic. These findings support a study conducted by Amory and Molomo (2012:193), that posits young (Generation Y) male and female South Africans play similar games and evaluate their experiences in a similar manner (Section 2.5.2).

The contributions of the study are discussed in the following section.

5.4 CONTRIBUTIONS OF THE STUDY

The findings of this study contribute to the lack of available literature aimed at understanding consumer behaviour towards mobile gaming in the South African context. Empirical testing was used to create a model of influential drivers that affect Generation Y students' adoption of mobile games. A hypothesised eight-factor model for mobile games adoption was developed comprising use-context, perceived attractiveness, perceived enjoyment, habit, subjective norms, flow, attitude and behavioural intention. This model may help predict the behaviour of Generation Y students in the South African mobile games market and provide an in-depth understanding of the Generation Y consumer. These findings will create numerous opportunities for organisations to directly serve this considerably large market segment in South Africa. Furthermore, marketers and video game developers may tentatively use this model to predict the behaviour of other generational cohorts. Lastly, the findings will contribute to the ProGenY (profiling the consumer behaviour of Generation Y in South Africa) project at North-West University (Vaal Triangle Campus).

The recommendations included in the following section may further enlighten marketers and video game developers, thus allowing them to fine-tune their product offerings and marketing campaigns accordingly.

5.5 RECOMMENDATIONS

As Generation Y consumers have positive attitudes and behavioural intentions towards mobile games, the following recommendations emanate from the findings of the main study:

5.5.1 Pay attention to the various contexts in which a mobile game are likely to be played

Situational and use-contexts have become important influencing factors in the consumer adoption process. The findings from this study proved the

significance of use-context in mobile game adoption. Use-context had a positive significant influence over all drivers of mobile games adoption, much like the study done by Liu and Li (2011:891). Thus, a consumer's perception of a mobile game is greatly influenced by the environment surrounding them. This finding further warrants using situational contexts to better understand consumer behaviour and is in line with prior studies which have found that the adoption process of consumers has become more complex as technology has rapidly advanced (van der Heijden *et al.*, 2005:8; Bouwman, Van de Wijngaert & de Vos, 2008:191).

Liang & Yeh (2011:195) state that a player's perception of a mobile game is dependent on use-context as well as the social context that the player finds himself/herself in. As such, use-context and different social groups should be taken into consideration by marketers and video game organisations when introducing new mobile games. In addition, Liu & Li (2011:891) propose that people play mobile games when they feel bored or when they want to pass the time. Surveys also indicate that twice as many people play mobile games at night (TNS, 2016; Verto Analytics, 2015). This suggests that consumers' lifestyle, task obligations and place of play (work vs. home) should all be considered before designing marketing campaigns for a mobile game (Liang & Yeh, 2011:194-195).

As such, video game developers should consider designing mobile games similar to Angry Birds, Candy Crush and Temple Run. These types of mobile games are ubiquitous amongst players as they are unique, simple and fun to play, therefore allowing players to easily pass time or relax when they get home from work (Hill, 2014). Marketers would be wise to pursue Generation Y students as a social group, as this study proved that their use-context, such as lifestyle (a student vs a professional), place of play (at home vs at work) and importance of social influences (social media and friends) play a positively significant role in their adoption of mobile games (Liang & Yeh, 2011:194-195; Noble *et al.*, 2009:617).

5.5.2 Create mobile games that are fun to play and that are aesthetically attractive

This study concluded that Generation Y consumers react in a positive manner towards mobile games that are both fun to play and possess an attractive appeal to them. Attractive and enjoyable mobile games have the ability to create experiences with a sense of flow for players. Flow induces positive attitudes towards mobile games, thus increasing adoption rates (Liu & Li, 2011:897). As such, video game developers should consider focusing more on creating mobile games that are fun to play, rather than concentrating solely on other predictors such as habitual play, attractiveness, or subjective norms (Liu & Li, 2011:896; Ha *et al.*, 2007:284; Hsu & Lu, 2007:1653-1654). In addition, Generation Y students may have higher mobile game adoption rates when a game is attractive, fun to play and is situated in the right context. Use-context was found to have the strongest impact on Generation Y students' enjoyment towards mobile gaming. Therefore, in the right setting, a mobile game that is fun to play (creating flow) will be adopted at a faster rate than a game that is seen as mundane. This finding is supported by Liang and Yeh (2011:193). The authors posit that adoption intentions of a consumer towards a mobile game significantly increases if they are in a relaxed environment and come across a mobile game that is enjoyable to play.

Another facet video game developers should consider is the attractive appeal of mobile games. Mobile games should be aesthetically appealing to consumers, not only in graphics but in overall game design. Even though mobile games are simpler in nature as opposed to traditional console video games, Ha *et al.* (2007:285) state that overall attractiveness is still a crucial component to a video game player wishing to play a mobile game. The results from this study attest to this finding, as perceived attractiveness was the second strongest predictor of flow. This is a new finding for mobile games adoption and warrants further exploration in future research.

To conclude, marketers should focus on 'fun' elements of a mobile game in their marketing campaigns. Furthermore, marketers must consider the aesthetic nature of a mobile game's overall design. This may assist in creating positive attitudes towards mobile games.

5.5.3 Promote the idea that playing in the right environment improves the flow experience for players

This study revealed that habitual play has a positive significant impact towards the flow of a game. This suggests that Generation Y students' playing habits can lead to a positive flow experience which, in turn, creates favourable attitude and behavioural intentions towards mobile games. This implies that Generation Y students find mobile games that are suited to a particular environment can create both habitual play and a flow experience, thus developing positive attitudes towards that mobile game. For instance, a consumer may only play a particular mobile game when commuting with public transport to work, because he/she has become familiar to playing a mobile game in that specific situation on a daily basis. Therefore, playing a mobile game in that context has become an autonomous behaviour for that consumer. However, there is a possibility that the mobile game may no longer be played if he/she leaves that environment (Limayem *et al.*, 2007:709). As such, marketers can strategically exploit these habitual tendencies in their marketing campaigns by creating advertisements that demonstrate how a particular mobile game is played in an environment familiar to a target group. This could establish the notion that a mobile game is ideal for a particular environment setting.

5.5.4 Promote the social acceptability and social aspect of engaging in mobile gaming

Prior research (Section 2.4.5) conducted in the mobile service adoption field has produced contrasting results on how subjective norms influences consumers purchase decisions. Academic consensus assumed that the impact of social norms on behavioural intentions of consumers differed according to

the mobile service used (Teo *et al.*, 2012; Lu *et al.*, 2008; Lu *et al.*, 2005). This study revealed that subjective norm has a direct significant impact on Generation Y students' behavioural intentions towards mobile gaming. This finding is in line with previous studies that have shown that Generation Y are influenced by societal norms (Section 2.5.1). Lu *et al.* (2008:55) explain that the opinions of friends, peers or family members on a particular mobile service is likely to influence a consumer's decision-making process. As such, mobile games that incorporate core social elements, such as online score sharing or team-based play, are more likely to be adopted by a non-user (TNS, 2016).

In order to fully realise the potential of subjective norms, marketers could make use of social media to interact with consumers to promote mobile games. This can develop a strong social media following which, in turn, may promote mobile gaming to other consumers. Advertising is another possible avenue to explore, for example by depicting friends or family members playing a mobile game, which could possibly create a social need to play that mobile game. More importantly, video game developers should avoid creating mobile games that are devoid of any social interaction, as this might decrease its appeal to consumers.

5.5.5 Ensure that mobile games create a state of flow

Flow remains a crucial factor in the process of mobile game adoption amongst consumers. Previous research on mobile service technologies revealed that flow is a major predictor of attitude (Section 2.4.6). This study produced similar results to prior research and revealed that flow can create positive attitudes towards a mobile game (Liu & Li, 2011:896). Generation Y students displayed positive attitudes towards mobile games that allow them to become fully immersed when playing the game. Furthermore, Generation Y students indicated that flow is created as a result of perceived attractiveness, habitual play and perceived enjoyment experienced when playing a mobile game. To achieve full gameplay immersion, video game developers should consider these factors when creating mobile games (Caroux *et al.*, 2013:1865). This will

allow positive attitudes to form that may translate to positive behavioural adoption intentions. In addition, flow is created through cognitive challenges that add a degree of difficulty to the gameplay of a mobile game (Liu & Li, 2011:892). As such, video game developers should ensure that mobile games offer players a fair challenge in the gameplay, as well as incentives and rewards.

5.5.6 Target the Generation Y cohort

Market segmentation is an important tool for marketers and organisations to fully reach their intended target audience. The identification and targeting of homogenous groups who find a particular product or service appealing is crucial to the success of any organisation's marketing efforts (Jansen van Rensburg, 2014:132; Iacobucci, 2013:43; Burgess, 2011:38). This study found that Generation Y students had positive attitudes and behavioural intentions towards mobile gaming. As such, it would be noteworthy for both marketers and organisations to actively pursue this cohort when developing or promoting their mobile games.

Marketers should avoid using conventional marketing techniques, as the Generation Y cohort is known to be hesitant to adopt traditional marketing techniques (Bolton *et al.*, 2013:247). Intrusive pop-up advertisements should be avoided as they have been known to produce negative attitudes towards the brand being promoted (Kim *et al.*, 2015:68). Product placement, much like in console video games, is a possible advertising medium for marketers, provided the products are integrated into the mobile game in a realistic manner (Mau *et al.*, 2008:827).

5.5.7 Formulate streamlined industry regulations that will encourage local video game developers

Owing to industry regulations and legislation, South African video game organisations experience a lack of freedom when trying to develop and distribute their mobile games (see Chapter 2, Section 2.3.6). In South Africa, approval and classification of mobile games are costly and time-consuming processes. Therefore, by the time the game gets published, its relevance will have passed (Fripp, 2016). Currently, 99 percent of revenue generated from mobile games in South Africa is distributed to international video game developers, which is detrimental to the media sector of the local economy (Alfreds, 2016; Fripp, 2016). The findings of the study bring to light the market value of the mobile gaming industry for the South African economy and possibly for small to medium sized organisation development. Furthermore, these findings can be used to encourage local government to implement improved legislation and industry regulations that will aid local video game organisations (Oxford, 2014).

The following section discusses the limitations and future research opportunities for the study.

5.6 LIMITATIONS AND FUTURE RESEARCH OPPORTUNITIES

No study is without its limitations, as is the case with this study. The sampling method of this study used a non-probability technique to select the sample. Despite the various demographic questions used to determine the representativeness of the sample, caution should be taken in generalising convenience sampling results to the population. Furthermore, a single cross-sectional research design was employed, which supplies a single snapshot in time, as opposed to a longitudinal design that takes multiple observations over an extended period of time. Future research could include studying non-student members of South Africa's Generation Y cohort and determine the adoption rates of the other Generational cohorts concerning mobile gaming. Further

research could possibly include other potential adoption drivers of mobile games adoption not mentioned in this study. Moreover, research geared towards determining what influences Generation Y members' attitudes towards advertising in mobile gaming may shed light on what forms of advertising would make a positive impact on Generation Y video game players.

5.7 CONCLUDING REMARKS

Video games continue to be an important advertising platform for organisations and marketers. However, mobile games have surpassed traditional video games as the biggest form of video game. Despite this, limited studies are available which could help marketers and video game developers better understand consumers' behaviour towards mobile games. As such, this study endeavoured to empirically test a model comprising certain drivers of mobile games adoption amongst Generation Y students. This model may be used by marketers and video game developers to recognise and interpret the various influences on the attitudes and behavioural intentions of a targeted segment towards mobile gaming, allowing for the modification of marketing and development strategies.

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APPENDIX A

QUESTIONNAIRE



NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

Drivers of mobile game adoption: An empirical study on Generation Y students

Dear Student

My name is Dylan Price. I am registered as a full-time student for a MCom in Marketing Management at the North-West University (Vaal Triangle Campus) and I am currently working towards my thesis under the supervision of Dr C. Synodinos and Prof A.L. Bevan-Dye.

The purpose of this study is to investigate the drivers that influence Generation Y students to adopt mobile games. A mobile game is a video game played on a feature phone, smartphone, smart-watch, PDA, tablet computer or portable media player. A video game is any of the various interactive games played with a means to control graphic images. The study specifically focuses on Generation Y members as they make up 38 percent of South Africa's total population. Generation Y refers to any individual born between 1986 and 2005.

Please take a few minutes to assist me and complete the attached questionnaire. It should not take you longer than 15 minutes to complete. All responses are confidential and will merely be outlined in the form of statistical data in the analysis. All data will only be used for research purposes. The questionnaire has gone through the North West Universities ethical committee and passed ethical clearance. The ethical clearance number is: **ECONIT 2016-005**.

Thank you for your important contribution to this study.

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Questionnaire

Section A: Demographical information

Please mark each question with a cross (X) in the appropriate box.

A1	Name of institution	Traditional University	University of Technology	Comprehensive University
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A2	Year	1 st year	2 nd year	3 rd year	Post-graduate
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A3	Gender	Female	Male
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A4	Race	African	Coloured	Indian/Asian	White
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A5	Home province	Eastern Cape	Free state	Gauteng	KwaZulu-Natal	Limpopo
		Mpumalanga	North West	Northern Cape	Western Cape	

A6	Please indicate your mother tongue language:					
	Afrikaans	English	IsiNdebele	IsiXhosa	IsiZulu	Sesotho sa Leboa
	Sesotho	Setswana	SiSwati	Tshivenda	Xitsonga	

A7	Please indicate your current age:								
	Younger than 18	18 years old	19 years old	20 years old	21 years old	22 years old	23 years old	24 years old	Older than 24

A8	Smart Phone usage experience (years)	Less than 1 year	1 year to 2 years	2 to 3 years	3 to 4 years	4 to 5 years	More than 5 years
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A9	How often do you play computer games	Everyday	3-4 times a week	Twice a week	Once a week	Never
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Section B: Drivers towards mobile game adoption

Please indicate the extent to which you agree or disagree with each of the following statements using a cross (X) where 1= Strongly disagree and 6= Strongly agree.

Drivers towards mobile game adoption		Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
B1	When bored, I will consider playing a mobile game.	1	2	3	4	5	6
B2	For me, playing mobile games is a good way to kill time.	1	2	3	4	5	6
B3	When I have nothing to do, I will consider playing a mobile game.	1	2	3	4	5	6
B4	I am attracted by the general appearance of the mobile game.	1	2	3	4	5	6
B5	I am attracted by the graphics (quality of the visual content) used in the mobile game.	1	2	3	4	5	6
B6	I am attracted to mobile games as a whole.	1	2	3	4	5	6
B7	I think it is fun to play mobile games.	1	2	3	4	5	6
B8	I think the process of playing mobile games would be pleasant.	1	2	3	4	5	6
B9	I think playing mobile games would bring me pleasure.	1	2	3	4	5	6
B10	I enjoy playing mobile games.	1	2	3	4	5	6
B11	Playing mobile games has become a habit for me.	1	2	3	4	5	6
B12	I am addicted to playing mobile games.	1	2	3	4	5	6
B13	I must play mobile games.	1	2	3	4	5	6
B14	People who are important to me play mobile games.	1	2	3	4	5	6
B15	People who are important to me would approve of me playing mobile games.	1	2	3	4	5	6
B16	People who are important to me encourage me to play mobile games.	1	2	3	4	5	6
B17	During the playing of a mobile game, I am usually intensely absorbed in the activity.	1	2	3	4	5	6
B18	During the playing of a mobile game, I concentrate fully on the activity.	1	2	3	4	5	6
B19	When I play mobile games, I become totally immersed in the activity.	1	2	3	4	5	6

Section C: Intention to use and Attitude towards mobile games.

Please mark each question with a cross (X) in the appropriate box.

Intention to use and attitude toward mobile games		Strongly Disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
C1	I think playing mobile games is a good idea.	1	2	3	4	5	6
C2	I have positive feelings towards playing mobile games.	1	2	3	4	5	6
C3	I am in favour of the idea of playing mobile games.	1	2	3	4	5	6
C4	I plan to play mobile games in the future.	1	2	3	4	5	6
C5	I intend to continue playing mobile games in the future.	1	2	3	4	5	6
C6	I expect to continue playing mobile games in the future.	1	2	3	4	5	6

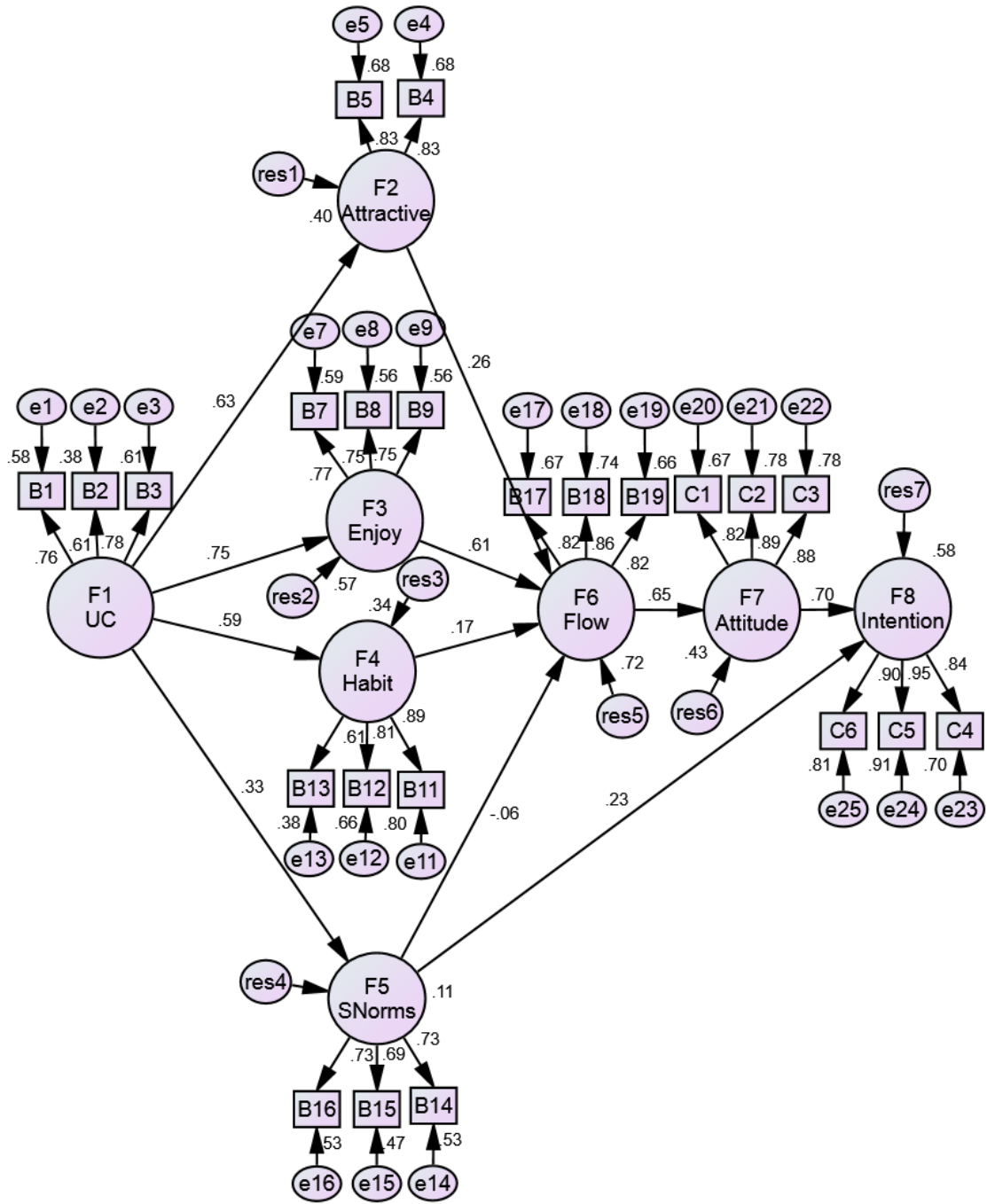
Thank you for your cooperation

Ethical clearance number is: ECONIT 2016-005.

APPENDIX B

STRUCTURAL MODELS

Structural Model A



Structural Model B

