

THE INFLUENCE OF FLOW, SUBJECTIVE NORMS AND ATTITUDE ON GENERATION Y STUDENTS' ADOPTION INTENTIONS TOWARD MOBILE GAMES

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ABSTRACT

In South Africa, mobile gaming revenue has eclipsed the revenue of both traditional console and computer video games. It has also become an important marketing medium for marketers wishing to promote their brands. However, there is a lack of knowledge surrounding how mobile games have grown so rapidly worldwide, including in South Africa, and why consumers are adopting them at such high rates. The purpose of this study was to determine the influence of flow, subjective norms and attitude on Generation Y students' behavioural intention to adopt mobile games in South Africa. A self-administered questionnaire was used to collect data from a convenience sample of 502 students registered at the campuses of three higher education institutions. The captured data were analysed using descriptive measures, correlation analysis and structural equation modelling. The findings suggest that flow, subjective norms and attitude have a significant positive influence on Generation Y students' intention to play mobile games.

Key Words: Mobile games, flow, subjective norms, attitude, intention, Generation Y, South Africa.

JEL Classification: M31

1. INTRODUCTION

Mobile application games (hereafter referred to as mobile games) have become a global success over the past decade (Lee & Stewart, 2016; Liu & Li, 2011). Particularly in South Africa, mobile games have generated more revenue than both traditional console and computer video games in 2016 (Pricewaterhouse Coopers, 2016). This is a significant development in the video games industry of South Africa as mobile games have only been officially available for download since 2010 (Mcilhone, 2015). As such, mobile gaming has become the frontrunner in the local video games market.

In addition to the success of mobile games, the sheer amount of consumers playing them has increased their marketing potential tremendously (Amuzo, 2015). Pokémon Go, an augmented reality (AR) game which uses real-life locations, has been the ambassador for mobile gaming marketing due to the sheer number of users playing the game, as well its AR capabilities (Waracle, 2016). During its peak in 2016, Pokémon Go had approximately 30 million users playing the game every day, who spend an average of 30 minutes on the app – which was more time spent than users on Facebook, Twitter and Instagram (Appinstitute, 2017; Smith, 2017). Marketers responded quickly, Mitra a company that enables businesses and brands to capitalise on the marketing potential of Pokémon Go, generated over \$50 million via advertisement revenue within seven days of the game being launched (Waracle, 2016). This underlines the importance of mobile games, such as Pokémon Go, to various organisations who wish to advertise and promote their brands through a social technology format.

Despite the rapid growth rate of mobile games and their sheer marketing potential, there is a lack of published research on what drives a consumer to play mobile games in South Africa. Similarly, only a handful of studies have been conducted in other countries – which mainly focus on the Asian consumer (Liang & Yeh, 2011; Liu & Li, 2011). Over 78 percent of Pokémon Go players are aged between 18 and 34 years old, indicating a youthful market. Similarly, the typical mobile gamer in South Africa also falls into the youth category (Statista, 2016). The Youth are labelled as being members of the Generation Y cohort, a cohort that includes individuals born between 1986 and 2005 (Markert, 2004). At 38 percent, members of this cohort make up a substantial percentage of South Africa's population (Statistics South Africa, 2015). Taking this into account, the Generation Y cohort represents a desirable target market for marketers (Bevan-Dye & Surujlal, 2011).

2. LITERATURE REVIEW

2.1 The rise of mobile games

The earliest mobile games have been around since the introduction of Tetris and Snake in the mid to late 1990s (Wright, 2016; Walton & Pallit, 2012). However, these kinds of mobile games remained basic and were mostly preloaded onto mobile phones, with no revenue structure in place for the companies who created them (Lescop & Lescop, 2014). It was not until 2007, when Apple Incorporated released the first multi-touch interface smartphone called the iPhone, that mobile gaming became a significant form of video gaming (Cusumano, 2008). The iPhone, along with various other smartphones introduced the application (app) store for smartphones, which enabled users to download various mobile services such as mobile games onto a smartphone device (Noyons, Macqueen, Johnstone, Robertson, Palm, Point & Behrmann, 2012). This proved to be a catalyst for a new generation of mobile games as companies could make revenue through consumers that purchased mobile games from the app store (Liu, Au & Choi, 2014). In 2008, the highly popular Angry Birds game was released. The objective of the game was to catapult birds at various objects which led to the game becoming an overnight success and a global phenomenon (Feijoo, Gomez-Barroso, Aguado, & Ramos, 2011). This paved the way for other mobile gaming brands such as Candy Crush Saga, Clash of Clans and Pokémon Go to be successful. In 2010 mobile games became available on the South Africa app store and they were an instant hit with local consumers (Mcilhone, 2015). By the end of 2015, nine of the top ten downloaded applications were mobile games (Pricewaterhouse Coopers, 2015). The latest report released by Pricewaterhouse Coopers (2016) has revealed that in just 6 years mobile gaming has usurped console and computer video games in the local video game industry.

2.2 Drivers of mobile games adoption

The instant rise and success of mobile games amongst consumers have made them one of the most popular mobile services available (Browne & Anand, 2012). Academics have begun researching this phenomenon to better understand how mobile games have become so popular in such a short space of time (Liang & Yeh, 2011; Liu & Li, 2011). Various drivers of mobile services adoption such as flow (Liu & Li, 2011), subjective norms (Fielding, McDonald & Louis, 2008) and attitude (Liu & Li, 2011) have been used in prior studies to explain the behavioural intentions of consumers when adopting mobile services.

2.3 Flow

Flow is described as a perceived “holistic sensation” that a person experiences when they become wholly focused, or cognitively absorbed, in an experience (Ha, Yoon & Choi, 2007). Zaman, Anandarajan and Dai (2010) state that flow is experienced when a person overcomes a challenge by utilising and mastering a new set of skills that are required in order to progress. This allows a person to enjoy the moment and grow more knowledgeable from the experience. The concept of flow has become popular in studies focused on mobile services. Zhou and Lu (2011) posit that mobile services, like mobile games or mobile TV, are created to entertain consumers and are enjoyed more by consumers who become immersed in the experience when using them. Liu and Li’s (2011) research into mobile games revealed that flow is a salient predictor of consumers’ (players’) behavioural intentions to play mobile games.

2.4 Subjective norms

Subjective norms considers an individual’s perception of their significant others concerning if they would want them to perform a specific behaviour or not (Fielding *et al.*, 2008:319). Lopez-Nicolas, Molina-Castillo and Bouwman (2008) indicate that existing social norms can have an important impact on an individual’s behavioural intentions. Social norms, also referred to as subjective norms, stem from various cultural or religious differences that exist within society (Yang & Jolly, 2009). In modern times, social norms are formed through influences on social media, as well as the opinions of family members, peers and friends. These social norms shape an individual’s belief that certain actions are deemed acceptable, while others may be unacceptable (Teo, Tsai & Yang, 2012). As such, the study of subjective norms and its impact on a person’s behavioural intentions has become important to researchers wanting to understand an individual’s decision-making process (Fielding *et al.*, 2008).

Limited research exists that explains the influence of subjective norms on the adoption of mobile games. However, most of the popular mobile games available all have a core social component embedded in their gameplay (Pricewaterhouse Coopers, 2015). They comprise various multiplayer elements, for example sharing a player’s high score on social media to compare with their friends. Another example is the formation of teams (clans) in which players work together to further their game progress (Chen, 2014). In addition, a survey by TNS (2016) revealed

that mobile games that offer social connections and multiplayer functionalities for players are more likely to be played.

2.5 Attitude and behavioural intentions

Lee, Park, Chung and Blakeney (2012) describe a person's attitude as a predisposition of beliefs and perceptions toward an object or topic. Attitudes are formed through life experiences and are considered to be a strong predictor of behavioural intentions (Clow & Baack, 2014). A behavioural intention is the likelihood of an individual to partake in any given behaviour and any action taken by that individual in a given situation (Ajzen, 2011). Hsiao and Yang (2011) note the importance of studying the attitude and behavioural intentions of an individual, as it has a major influence on their decision-making process. The outcome of such research can give organisations valuable insight into consumer acceptance and adoption of various technologies, allowing for the formulation of streamlined strategies (Liu & Li, 2011). Furthermore, Lii and Sy (2009) posit that understanding consumers' attitude and behavioural intentions toward technologies or services can aid marketers and organisations in predicting their future purchase behaviour.

2.6 Generation Y

As previously mentioned the typical mobile gamer in South Africa is aged between 16 and 34 (Statista, 2016). This implies that majority of mobile gamers in South Africa can be categorised into the Generation Y cohort. Markert (2004) defines the Generation Y individual as any persons born between 1986 and 2005. This places the current Generation Y individuals between 12 and 31 years of age. Generation Y individuals are characterised as tech savvy consumers who tend to adopt new technologies quicker than other generational cohorts (Noble, Haytko & Phillips, 2009). This is attributed to Generation Y growing up in a time of rapid technological development (Parment, 2013). Marketers have also noted the importance of understanding University students in the Generation Y cohort, as they generally manifest as trendsetters amongst their peers (Bevan-dye & Surujlal, 2011).

3. PROBLEM INVESTIGATED

Limited studies exist that are aimed at determining the driving forces behind consumers' adoption intentions toward mobile gaming. This research gap has also been experienced in South Africa. Thus, the purpose of the study is to investigate the influence of flow, subjective norms and attitude on Generation Y students' intentions to adopt mobile games in the South African context.

4. RESEARCH OBJECTIVES

The study was guided by the following research objectives:

- Determine the level of flow Generation Y students experience when playing mobile games.
- Determine the influence of subjective norms on Generation Y students' adoption of mobile games.
- Determine Generation Y students' attitudes towards mobile gaming.
- Determine Generation Y students' mobile gaming adoption intentions.
- Determine the influence of flow, subjective norms and attitude on Generation Y students' behavioural intentions toward playing mobile games.

4.1 Research Hypotheses

The following hypotheses were formulated in line with the research objectives guiding this study:

- H_{o1}: Flow does not have a positive significant influence over Generation Y students' behavioural intentions toward playing mobile games.
- H_{a1}: Flow does have a positive significant influence over Generation Y students' behavioural intention toward playing mobile games.
- H_{o2}: Subjective norms does not have a positive significant influence over Generation Y students' behavioural intention toward playing mobile games.
- H_{a2}: Subjective norms does have a positive significant influence over Generation Y students' behavioural intentions toward playing mobile games.
- H_{o3}: Attitude does not have a positive significant influence on the behavioural intentions of Generation Y students' toward playing mobile games.
- H_{a3}: Attitude does have a positive significant influence on the behavioural intentions of Generation Y students' toward playing mobile games.

5. RESEARCH METHODOLOGY

5.1 Sampling method

26 public registered South African Higher Education Institutions (HEIs) made up the sampling frame for this study comprised the (Higher Education in South Africa, 2015). The 26 HEIs were then narrowed down to three campuses using non-probability judgement sampling. The three campuses comprised one traditional university, one university of technology and one comprehensive university which were based in the Gauteng province. 600 questionnaires were distributed equally between the three campuses to students strictly on a voluntary basis.

5.2 Measurement instrument

To gather the required data, a structured, self-administered questionnaire was designed and distributed to the target population by trained field workers. The questionnaire included scales from prior literature which were adapted for use in this study. The scales included flow (3 items) and attitude (3 items) adapted from Liu and Li (2011), subjective norms (3 items) from Fielding et al. (2008) and behavioural intention (3 items) from Agarwal and Karahanna (2000). Scaled items were measured on a six-point Likert-type scale ranging from “strongly disagree” (1) to “strongly agree” (6). The questionnaire was presented to the Ethics Committee of the North-West University (Vaal Triangle Campus). The ethics committee screened the questionnaire and deemed the undertaking to be a low/no risk study and awarded the questionnaire the ethical clearance number of: Econit-2016-005.

5.3 Data analysis

The collected data were analysed using IBM’s Statistical Package for Social Sciences (SPSS) and Analysis of Moment Structures (AMOS), Versions 23.0 for Windows. To determine the internal-consistency reliability of the scales, the Cronbach statistic alpha was used, where a value of ≥ 0.60 is considered acceptable reliability (Hair, Black, Babin & Anderson, 2014).

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). The relationship between the latent factors proposed for inclusion in the model were measured using Pearson’s Product-Movement correlation coefficient to determine the nomological validity of the model and to assess if there were any multicollinearity concerns (Smith & Albaum, 2010:254). Statistically significant relationships between pairs of latent factors in a model are indicative of nomological validity (Malhotra, 2010) and evidence of serious multicollinearity occurs when factors correlate above 0.80 (Field, 2009).

Structural equation modelling was then conducted by specifying a measurement model and structural model. The reliability and construct validity of the measurement model is measured by computing the composite reliability (CR) and average variance extracted (AVE) as well as the standardised loading estimates. CR values of ≥ 0.70 indicate adequate composite reliability. Standardised loading estimates and AVE values of ≥ 0.50 indicate convergent validity, while a square root value of the AVE that exceeds the correlation coefficients is indicative of discriminant validity (Hair et al., 2014).

As the chi-square statistic is known to be sensitive to large sample sizes, this study made use of absolute fit and incremental fit indices to achieve acceptable model fit (Hair et al., 2014; Malhotra, 2010). Model fit was measured using the root mean square error of approximation (RMSEA), and standardised root mean residual (SRMR), where values of ≤ 0.08 are indicative of good fit, together with the comparative fit index (CFI), incremental fit index (IFI) and Tucker-Lewis index (TLI), where values of ≥ 0.90 suggest good model fit (Malhotra, 2010).

6. RESULTS

Of the 600 distributed questionnaires, 502 usable ones were returned, indicating a response rate of 84 percent. The distribution of the sample consisted of 49 percent males and 51 percent females, where majority of the participants (78%) age ranged between 18 and 21. The sample also included participants from each of the country's provinces, with the exception of the Western Cape.

For 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 1 presents the descriptive statistics.

Table 1: Descriptive statistics summary

Constructs	Means	Standard deviations	Skewness statistic	Kurtosis statistic
Flow	4.18	1.41	-0.61	-0.42
Subjective norms	3.00	1.49	0.26	-0.87
Attitude	4.14	1.36	-0.68	-0.16
Behavioural intention	3.95	1.49	-0.53	-0.66

As seen in Table 1, all kurtosis values provide no indication of irregularity and all skewness values in fall within the recommended -2 or +2 range, as such the data can be considered to be distributed normally (Berndt & Petzer, 2011). Means above 3 were computed for subjective norms (mean=3.00), flow (mean=4.18), attitude (mean=4.14) and behavioural intention (mean=3.95). This indicates that Generation Y students display positive perceptions towards a mobile game that creates a good sense of flow. It also indicates that they consider the opinions of those they hold in high esteem, such as their family, friends and peers when choosing mobile games. Lastly, Generation Y students displayed positive attitudes and behavioural intentions towards mobile gaming.

The Cronbach alpha was then computed to assess internal-consistency reliability and a correlation matrix was constructed to assess both nomological validity and multicollinearity. The results are reported in Table 2.

Table 2: Correlation coefficients and Cronbach alphas

	Flow	Subjective norms	Attitude	Cronbach alpha
Flow				0.88
Subjective norms	0.19**			0.76
Attitude	0.52**	0.28**		0.90
Behavioural intention	0.46**	0.36**	0.69**	0.93

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

As can be seen in Table 2, all Cronbach alpha values exceed the recommended 0.60 value indicating internal-consistency reliability. Each pair of latent factors represents a statistically significant correlation coefficient at the p 0.01 level. These findings assert nomological validity in the data set. Furthermore, there is no clear

evidence of multicollinearity as none of the correlations exceeded 0.90 and thus it was presumed safe to conduct structural equation modelling.

The specified measurement model was assessed by computing the standardised loading estimates, error variance estimates, CR and AVE values. These results are reported in Table 3.

Table 3: Estimates for measurement model

Latent factors	Standardised loading estimates	Error variance estimates	CR	AVE	$\sqrt{\text{AVE}}$
Flow	0.81	0.66	0.88	0.71	0.85
	0.89	0.79			
	0.83	0.69			
Subjective Norms	0.72	0.52	0.76	0.52	0.72
	0.70	0.49			
	0.74	0.54			
Attitudes	0.82	0.68	0.90	0.75	0.87
	0.89	0.79			
	0.89	0.79			
Behavioural intentions	0.84	0.71	0.93	0.82	0.90
	0.96	0.92			
	0.90	0.82			
Correlations	F1↔F2: 0.23	F2↔F3: 0.33			
	F1↔F3: 0.58	F2↔F4: 0.43			
	F1↔F4: 0.51	F3↔F4: 0.74			

According to Table 3, all CR values exceeded 0.70, indicating acceptable composite reliability. In addition, with all standardised loading estimates and AVE values above 0.50, there is evidence of convergent validity. The square root value of the AVE exceeded all correlation coefficients, suggesting that there is evidence of discriminant validity (Hair et al., 2014). While a significant chi-square value was returned, the other fit indices of the measurement model suggest good model fit

A structural model was then specified to test whether flow experience, subjective norms and Generation Y students' attitude towards mobile games have a significant positive direct influence on their behavioural intentions toward playing mobile games. The hypotheses were tested at a 95 percent confidence interval ($p=0.000 < 0.05$) (Byrne, 2010) and results of these hypothesised paths are reported on in Table 4.

Table 4: Standardised regression estimates and p -values

	Estimates	p-values	Results
Flow → Behavioural intention	0.107	0.016	Significant
Subjective norms → Behavioural intention	0.196	0.000	Significant
Attitude → Behavioural intention	0.615	0.000	Significant

The results in Table 4 indicate that flow ($\beta = 0.107, p = 0.016 < 0.05$), subjective norms ($\beta = 0.196, p = 0.000 < 0.05$) and attitude ($\beta = 0.615, p = 0.000 < 0.05$) have a positive significant impact on Generation Y students' behavioural intentions toward playing mobile games. These findings are in line with research conducted by Liu and Li (2011), Fielding et al. (2008) and Hsu and Lu (2004). As such, null hypotheses H_{o1} , H_{o2} and H_{o3} may be rejected and the alternate hypotheses H_{a1} , H_{a2} and H_{a3} concluded.

In terms of the squared multiple correlation coefficient, flow, subjective norms and attitudes explained 59 percent of the variance in their behavioural intentions towards mobile games. While a significant chi-square value was once again returned, the other fit indices of the structural model suggest good model fit with a SRMR of 0.03, a RMSEA of 0.05, a GFI of 0.97, a IFI of 0.99, a CFI of 0.99 and a TLI of 0.98.

7. CONCLUSIONS

The main aim of this study was to investigate the influence of flow, subjective norms and attitude on Generation Y consumers' propensity to adopt mobile games in South Africa. The insights gained from consumer behaviour studies may provide researchers, marketers and game development companies with a clearer understanding of what influences Generation Y consumers' behavioural intention towards mobile games. In line with previous research (Liang & Yeh, 2011; Liu & Li, 2011; Fielding et al., 2008), the findings of this study indicate that a flow experienced, subjective norms and attitudes have a statistically significant positive

influence on Generation Y students' behavioural intention to play mobile games. The influence of subjective norms on behavioural intention proves to be a new finding in the terms of the mobile gaming context and warrants further investigation. Overall, if a mobile game creates a perceived state of flow and has a social appeal, a consumer – especially those who are part of Generation Y - is more likely to respond positively and adopt that mobile game.

8. MANAGERIAL APPLICATIONS

Marketers should consider the influence that flow and subjective norms have on mobile games adoption among consumers, and adapt their marketing strategies accordingly. For subjective norms, marketing campaigns can utilise the power and reach of social media to engage with consumers and promote their games. This could create a “hype” amongst consumers and possibly increase positive word-of-mouth. In addition, advertising campaigns can depict friends or family members playing a mobile game together, thus possibly promoting a social need to play the game. For flow, marketers and video game developers should ensure that their games contain fair challenges to keep players cognitively absorbed in the playing experience. This can lead to total immersion and positively impact a consumer's behavioural intentions to continue playing that game. It may also be wise for marketers and video game developers to aim their advertising campaigns and mobile games towards the Generation Y cohort, specifically University students. This is due to their positive attitude and behavioural intentions toward mobile games, the overall tech-savvy nature of Generation Y and the trend-setting characteristics of Generation Y University students.

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