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DETERMINANTS OF BEHAVIORAL INTENTION, USE BEHAVIOUR AND ADDICTION TOWARDS SOCIAL NETWORK GAMES AMONG INDIAN COLLEGE STUDENTS

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Abstract: Tremendous development of internet infrastructure and popularity of social networking games among Indians have grabbed the attention of social media game developers. The objective of this study explores the factors that affect behavioral intention, use behaviour and addiction towards social network games (SNG) among Indian college students. The Combined Technology Acceptance Model and Theory of Planned Behaviour (CTAMTPB) model was used as a theoretical background of this study. The questionnaire was distributed to undergraduate and postgraduate students of a private university in south India. The data of about 286 was collected. The structural equation modelling (SEM) analysis was carried out using Smart PLS 2. The results showed improvement in explanatory power with the application of CTAMTPB model in social networking game (SNG) context. Results also reveal that apart from CTAMTPB constructs Perceived Enjoyment, Flow and Social Network Intensity has a significant impact on Behavioral Intention and Use Behaviour towards Social Network Game. The theoretical contribution and policy implications were discussed at the end.

Keywords: Social Media, Social Networks, Gaming, Combined Technology Acceptance Model and Theory of Planned Behaviour (CTAMTPB), Partial Least Squares, Flow, Structural Equation modelling, Addiction, India.

INTRODUCTION

The games that are played through social network platforms such as Facebook or MySpace is called social network games (SNG) (Lee & Wohn, 2012). The special features of SNG is a user can interact with other new or existing players present in the social network and can play by collaborating or challenging with them (Wei & Lu, 2014). Facebook is the top used social media around the world (Statista, 2016). In India, most social network games are played through the Facebook platform (Chaffey, 2016). India is estimated to have a digital market value of 50.7 billion INR by the year 2020. Balsara et. al., (2016) stated that gaming would play an important role in future for digital content consumption due to increase in internet usage among all sects of Indian consumers. India has a large number of social network users than United Staes and European countries (Chaffey, 2016)). India has the second largest market for social networking sites with a large number of users (Shah et. al., 2015 According to statistics (2016) expects 2.95 billion SN users by the year 2020 of which one-third will be from India. Statista (2016) report Candy crush is the largest

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played games on the social network around the world. Indian retailers are spending a lot of investments on social media platform for product promotions (e-marketer, 2016). According to a recent report from e-marketer (2016), 2.34 billion people will be using social network around the world and India and China is expected to have tremendous growth in social network games by the year 2020. Authors such as (Chen et. al., 2016; Lee & Phang, 2015; Kalhour & Ng, 2016; Chae et. al., 2014; Khang et. al., 2013; Lee & Wohn, 2012; Shin & Shin, 2011; Lee et. al., 2015) have tried to explore the factors that affect SNG adoption across the globe. Lee and Phang (2015) urged for more investigation on social media consumption behaviour among South Asian Populations. Khang et. al., (2013) states that online Flow experience might lead to addiction so there is a need for more research on the effect of FLO among SNG users. Chen et. al., (2016) and Lee et. al., (2015) recommended for more investigation on psychological health issues on the excessive usage of virtual games like social network games. Based on this research gap this study will seek to understand the factors that affect Social network games (SNG) use behaviour. There is a need for a more clear understanding of motivation that affects SNG adoption (Chae et. al., 2014) and addiction (Chen & Leung, 2016; Kim & Park, 2015; Lee et. al., 2015).The objective of this research is to explore the factors that affect behavioral intention (BINT), use behaviour (USB) and addiction (GAD) towards social network games (SNG) among Indian college students. The outcome of this research will bring a clear understanding of factors that affect social media users to adopt games through which social media game developers can strategize their business policy accordingly. Apart from social media game developers, this research study will also benefit psychological health department by providing them the understanding of factors that affect game addiction (GAD).

THEORETICAL BACKGROUND

Combined Technology Acceptance Model and Theory of Planned Behaviour (CTAMTPB) was evolved by integrating two psychological theories such as Technology Acceptance Model (TAM) of Davis (1989) and the Theory of Planned Behaviour (TPB) of Ajzen (1991) framed by Taylor and Todd (1995) in the information system adoption context. The basic idea behind integrating TAM and TPB model is to test the improvement in variance explained on Behavioral Intention (BINT). The special feature of CTAMTPB is it includes core constructs of consumer behaviour theories (i.e. Attitude, Subjective Norm and Perceived Behavioral Control) and technology acceptance theory (i.e. Perceived Usefulness and Perceived Ease of Use) which enables it to explain the user behaviour more precisely in technology adoption context. The CTAMTPB is used as the theoretical background of this study and also this study has tried to extend the CTAMTPB model in social network game adoption context.

LITERATURE REVIEW

Impact of Perceived Usefulness (PUSE) on Attitude (ATT) and Behavioral Intention (BINT)

Perceived Usefulness is defined as "*the degree to which a person believes that using a particular system would enhance his or her job performance*" (Davis, 1989, p. 320). In current research the operational definition of PUSE could be defined as "*a person will adopt SNG if it gives some sort of benefit to him or her*". Attitude towards behaviour refers to "*the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question*" (Ajzen, 1991, p. 188). In current research the operational definition of ATT could be defined as "*the degree to which a person has a favourable or unfavourable evaluation towards SNG adoption"*. Xu et. al., (2012) and Magni et. al., (2010) stipulated that utilitarian motives for using social media is low in the beginning stage and it becomes important as the time passes. PUSE was found as a significant predictor for social media adoption among Saudi Arabian (Akram & Albalawi, 2016), Indonesian college students (Harsono & Suryana, 2014), USA and South Korean online users (Shin, 2010). PUSE was found to have a positive significant impact on online game adoption among Taiwanese (Lin & Chiang, 2013) and not significant among South Korean (Yoon et. al., 2013) online users. PUSE was found to have a positive significant impact on SNG adoption among South Korean social game users.

Impact of Perceived Ease of Use (PEASE) on Attitude (ATT) and Behavioral Intention (BINT)

Perceived Ease of Use is defined as "*the degree to which a person believes that using a particular system would be free of effort*" (Davis, 1989, p. 320). In current research the operational definition of PEASE could be defined as "*a person will adopt SNG if it is easy to play*". PEASE was found as a predictor for social media adoption among Saudi Arabian consumers (Akram & Albalawi, 2016). PEASE was found to have a strong positive significant impact on BINT towards online game adoption among Chinese (Zhou, 2013), Taiwanese (Lin & Chiang, 2013) online users and social media adoption among Indonesian college students (Harsono & Suryana, 2014). PEASE was found to have no significant impact on ATT towards online game adoption among Taiwanese online users (Yoon et. al., 2013).

Impact of Perceived Behavioral Control (PBCNT) on Behavioral Intention (BINT) and Use Behaviour (USB)

Perceived Behavioral Control is defined as "*an individual's perceived knowledge and availability of resources such as time and money to make use of a given technology*" (Taylor & Todd, 1995, p. 152). In current research the operational

definition of PBCNT could be defined as "*an individual's perceived knowledge towards social network games and availability of resources such as time and money to play the games in social network*". PBCNT plays important role in online game adoption (Yang et. al., 2016). Weiss and Loebbecke (2008) conceptualized PBCNT to have a positive significant influence on BINT and USB towards SNG. PBCNT was found to have a positive significant impact on BINT and USB towards social media adoption among Indonesian college students (Harsono & Suryana, 2014), Chinese (Li et. al., 2015) and Taiwanese online users (Yang et. al., 2016).

Impact of Subjective Norm (SNORM) on Behavioral Intention (BINT)

Subjective Norm is defined as "*perceived social pressure (from peers, superiors, and subordinates) to perform or not to perform the behaviour*" (Ajzen, 1991, p. 188). In current research the operational definition of SNORM could be defined as "*an individual's will adopt the social network game based on the suggestions from his or her friends or family members*". SNORM is an important predictor of online (Yee, 2006) and social network games adoption (Wohn et. al., 2010). The interpersonal relationship was found to have a significant impact on GAD (Kim & Park, 2015). Social influence was found to have a significant influence on social media adoption among Indonesian college students (Harsono & Suryana, 2014) and online game adoption among Taiwanese consumers (Lin & Chiang, 2013). Weiss and Loebbecke (2008) conceptualized SNORM to have a positive significant influence on BINT towards SNG. SNORM was found as a significant predictor for SNG adoption among Chinese (Chen et. al., 2016) and USA online users (Wu & Liu, 2007).

Impact of Perceived Enjoyment (PENJ) on Attitude (ATT) and Behavioral Intention (BINT)

Perceived Enjoyment is defined as "*the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use*" (Venkatesh and Bala, 2008, p. 351). In current research the operational definition of PENJ could be defined as "*the extent to which the activity of using a social media games is perceived to be enjoyable in its own right, aside from any performance consequences resulting from its use*". PENJ is an important element that leads to loyalty towards SNG adoption (Chae et. al., 2014). Internal emotions play important role in SNG adoption (Zhu & Chang, 2015) and addiction (Chen & Leung, 2016; Kim & Park, 2015). Xu et. al., (2012) and Magni et. al., (2010) stipulated that hedonic motives for using social media is high in the beginning stage and it becomes least important as the time passes. Shin (2010) compared social media adoption among the USA and South Korean online users wherein he found PENJ to have a positive significant impact on ATT and

BINT towards social media among South Koreans and had no significant impact on ATT and BINT among USA online users. Shin & Shin (2011) found PENJ to have no significant impact on ATT but it was found to have a positive significant impact on BINT among South Korean social game users. PENJ was found to have no significant impact on SNG addiction among Chinese game users (Chen & Leung, 2016). Loneliness and Boredom will lead to game addiction (Chen & Leung, 2016). PENJ was found to be the strongest predictor of SNG adoption among Chinese online users (Chen et. al., 2016).

Impact of Trust (TRST) on Attitude (ATT) and Behavioral Intention (BINT)

Trust is defined as "*Individual believes that a party will keep their promises intact*" (Gefen et. al., 2003). Trust is also defined as "*whether users are willing to become vulnerable to the online technology providers after considering their characteristics (such as security, brand name, post service guarantees*)" (Chong et. al., 2012). In current research the operational definition of TRST could be defined as "*the individual will adopt the SNG if he or she believes that the personal information shared through social media will be kept confidentially"*. TRST was found to have a positive significant impact on ATT but was found to have no significant impact on BINT towards online game adoption among USA college students (Wu & Liu, 2007). TRST was found to have a significant impact on online game adoption among USA consumers (Choi et. al., 2013) and Chinese online users (Chen et. al., 2016).

Impact of Attitude (ATT) on Behavioral Intention (BINT)

Attitude towards behaviour refers to "*the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question*" (Ajzen, 1991, p. 188). Attitude is an important factor that predicts general consumer behaviour (Ajzen & Fishbein, 1975) and also it act as an important factor for online game technology adoption (Lee et. al., 2015; Wu & Liu, 2007; Shin & Shin, 2011). ATT was found to have a positive significant impact on social media (SM) adoption among the USA and South Korean online users (Shin, 2010). ATT was found to have a positive significant impact on BINT towards online game adoption among Taiwanese consumers (Yoon et. al., 2013). Weiss and Loebbecke (2008) conceptualized ATT to have a positive significant influence on BINT towards SNG. The ATT was found to positive influence towards social network game adoption among South Korean game users (Shin & Shin, 2011).

Impact of Use Behaviour (USB) on Game Addiction (GAD)

Addiction in a clinical psychology context is defined as "*as a medical condition characterized by compulsive engagement in rewarding stimuli, despite adverse consequences*" (Nestler, 2013). Addiction in technology context can be defined as

a "*non-chemical (behavioural) addictions that involve human–machine interaction* (Widyanto & Griffiths, 2006). "*Behaviours that includes six core components of addiction, namely salience, mood modification, tolerance, withdrawal symptoms, conflict and relapse towards internet use is called internet addiction* (Griffiths, 2000). In current research the operational definition of GAD could be defined as "*a human behaviour characterized by compulsive behaviour engagement towards online games despite adverse consequences*". There are three major subtypes of internet addiction such as (a) Excessive gaming, (b) Sexual preoccupations and (c) Text messaging (Block, 2008) of which only "excessive gaming" is proven to be highly problematic for human psychological health as per American Psychological Association (2013) (Block, 2008). Chen and Leung (2016) stipulated that excessive use of social network game causes the game addiction, on a contrary Griffiths (2010) states that the excessive use of SNG does not always lead to addiction instead it can also sometimes leads to positive psychological empowerment. Andreassen et. al., (2016) investigated the psychological health problems that occur due to excessive usage of social media and video games wherein they found the addictive use of game has an adverse impact on males, and young consumers. Excessive use of online game was found to have a significant impact on GAD among Taiwanese school students (Lee et. al., 2015).

Impact of Flow (FLO) on Behavioral Intention (BINT) and Game Addiction (GAD)

Flow in a computer-mediated environment is defined as "*a person's mind experience flow state when irrelevant thoughts and perceptions are screened out and his/her attention gets completely focussed on the machine interaction"* (Hoffman & Novak, 1996, p. 57). In current research the operational definition of FLO could be defined as "*it is a state of mind when a social media gamer gets completely immersed without aware of the events that occur around him or her*". Flow is a long studied concept in online gaming context (Merhi, 2016). Flow was found to have a positive significant impact on BINT towards social media adoption (Shin, 2010), online game adoption (Hamari et. al., 2016), SNG adoption among South Korean (Shin & Shin, 2011) and Taiwanese (Chang, 2013) online users. Merhi (2016) found FLO to have no significant impact on BINT among USA online users. FLO was found to have a significant impact on GAD among Taiwanese online users (Liu & Chang, 2016; Wu et. al., 2013) and USA college students (Khang et. al., 2013).

Impact of Social Network Intensity (SNINT) on Use Behaviour (USB) and Game Addiction (GAD)

Social network intensity is defined as "*the time people spend on their SNS as well as the frequency they visit* it" (Salehan & Negahban, 2013, p. 2635). In other words,

the social network intensity can be defined as how repeatedly a user logs into the social networking websites in a day and also how much amount of time he/she spends logging into the social network sites. The more the number of visits to the social media websites the more the chances of getting feedbacks and get involved in the game. SNINT was found to have a significant impact on use behaviour among USA college students (Salehan & Negahban, 2013; Xu et. al., 2012). SNINT was found to have a positive significant impact on GAD (Kim & Park, 2015).

CONCEPTUAL FRAMEWORK AND HYPOTHESES FORMATION

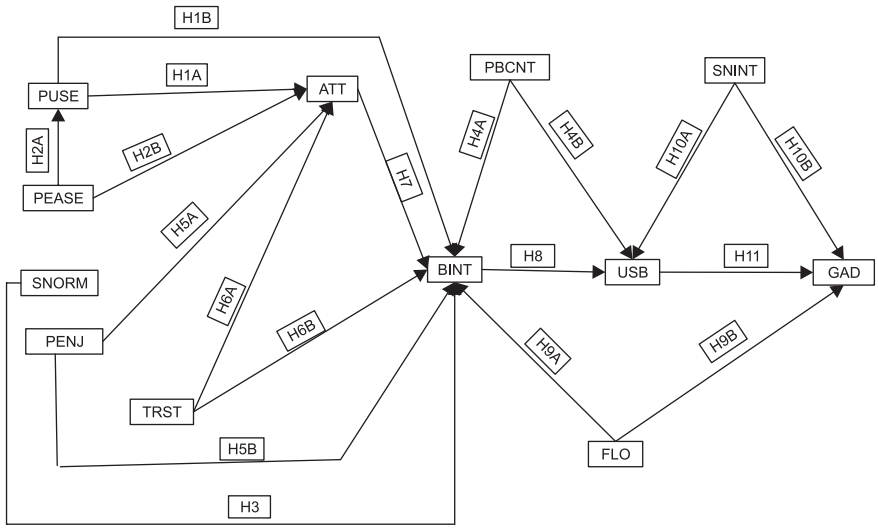

Figure 1: Conceptual Framework

Hypotheses

H1A PUSE will have a positive significant influence on ATT to play SNG.
H1B PUSE will have a positive significant influence on BINT to play SNG.
H2A PEASE will have a positive significant influence on PUSE to play SNG.
H2B PEASE will have a positive significant influence on BINT to play SNG.
H3 SNORM will have a positive significant influence on BINT to play SNG.
H4A PBCNT will have a positive significant influence on BINT to play SNG.
H4B PBCNT will have a positive significant influence on USB to play SNG.
H5A PENJ will have a positive significant influence on ATT to play SNG.
H5B PENJ will have a positive significant influence on BINT to play SNG.
H6A TRST will have a positive significant influence on ATT to play SNG.
H6B TRST will have a positive significant influence on BINT to play SNG.

H7 ATT will have a positive significant impact on BINT to play SNG.
H8 BINT will have a positive significant influence on USB to play SNG.
H9A FLO will have a positive significant influence on BINT to play SNG.
H9B FLO will have a positive significant influence on GAD.
H10A SNINT will have a positive significant influence on BINT to play SNG.
H10B SNINT will have a positive significant influence on BINT to play SNG.
H11 USB will have a positive significant influence on GAD.

METHODOLOGY

Measuring Instrument

All the forty-two items were adapted from the existing literature and were slightly modified to suit the context of this study. The three items of Perceived Usefulness (PUSE) were adapted from (Davis, 1989; Shin & Shin, 2011). The three items of Perceived Ease of Use (PEASE) were adapted from (Davis, 1989; McGowan et. al., 2012). The three items of ATT were adapted from (Davis, 1989; Wu & Liu, 2007; Shin & Shin, 2011). The three items of Perceived Enjoyment (PENJ) were adapted from (Koufaris, 2000; Wu & Liu, 2007). The three items of Subjective Norm (SNORM) were adapted from (Hsu & Lu, 2004; Wu & Liu, 2007). The three items of Perceived Behavioral Control (PBCNT) were adapted from Taylor and Todd (1995). The three items of Trust (TRST) was adapted from Wu and Liu (2007). The three items of Behavioral Intention were adapted from Davis (1989). The three items of Use Behaviour (USB) were adapted from Chen et. al., (2015). The three items of Flow (FLO) were adapted from (Shin & Kim, 2008; Shin & Shin, 2011). The five items of Social Network Intensity (SINT) were adapted from Salehan and Negahban (2013). The seven items of Game Addiction (GAD) were adapted from (Lemmens et. al., 2009; Andreassen et. al., 2016). Except for the items of Use Behaviour (USB) and Game Addiction (GAD) constructs all other items were rated using a five-point Likert scale ranging from 1 as 'Strongly Disagree to 5 as 'Strongly Agree'. The first statement of Use Behaviour variable USB1 was rated using 1 as 'Never' to 5 as 'Several times a week', for second statement of USB2 was rated using 1 as 'less than one hour per day' to 5 as 'more than 10 hours per day' and finally the third statement USB3 was rated using 1 as 'Never' to 5 as 'Very Frequently'. All the statements of Game Addiction (GAD) variable was rated using 1 as 'Never' to 5 as 'Very often'.

Sample and Data Collection

A purposive sampling method was employed to collect the data from a specific set of people in the population. The questionnaire was distributed to only those who have played social media games at least once in their lifetime. A self-administered

questionnaire was prepared and distributed to four hundred students of a private university in south India. A total response of two ninety-two was received. The final data consists of two eighty-six responses.

TABLE 1: DESCRIPTIVE STATISTICS

Descriptive statistics		*Frequency*	*Percent*
Gender	Male	191	66.78
	Female	95	33.22
You are using social network since	Less than a year	44	15.38
	1-2 years	72	25.17
	More than 2 years	170	59.44
Playing social network games since	Less than a year	58	20.28
	1-2 years	79	27.62
	More than 2 years	149	52.10
	Total	286	100

Table 1 shows descriptive statistics of respondents. The total number respondents were two eighty-six. The samples consist of sixty percentage of males compared to thirty-three percentage of females. Almost sixty percentage of the respondents were using social media and social network games more than two years.

DATA ANALYSIS AND RESULTS

The data was analyzed using variance-based structural equation modelling (VB-SEM). The variance-based structural equation modelling (VB-SEM) is recommended when the model of the study is too complex (Henseler, Ringle, & Sinkovics, 2009; Hair et. al., 2013) and has more number of constructs (Chin, 1998; Hair et. al., 2013; Hair et. al., 2013) in it. Also, when the objective of the research study is to extend the existing theory and identify the key constructs then Partial least Squares SEM (PLS-SEM) analysis is preferred as per Hair et. al., (2011) criteria. When the sample size assumptions are not constrained PLS-SEM is preferred (Ghozali, 2006; Hair et. al., 2011). This research follows two-step method (i.e. Measurement model and Structural model) of Anderson and Gerbing's (1988) recommendations. The measurement model will evaluate reliability and validity of each measuring constructs and the structural model will evaluate the significance relationship between the constructs (i.e. hypotheses testing).

Measurement Model

Under the measurement model, the reliability and validity of the constructs are analyzed. The reliability of the constructs is evaluated based on three criteria's they are (a) Internal Consistency of items within the constructs, (b) Cronbach's

Alpha and (c) Composite Reliability. The Hair et. al., (2013) procedure of PLS-SEM was followed.

Items loading

The items loading of each construct is evaluated based on Hair et. al., (2006) criteria which states the loading values of all measuring items should be above 0.7. Our results show that the loadings of all items vary from (0.745- 0.934) thus fulfills the criteria of Hair et. al., (2006) cut off value above 0.7. The measuring items have good internal consistency.

TABLE 2: ITEM LOADINGS, AVERAGE VARIANCE EXTRACTED, COMPOSITE RELIABILITY, CRONBACH'S ALPHA VALUES OF THE CONSTRUCTS.

Constructs	*Items*	*Loadings*	*Average Variance Extracted*	*Composite Reliability*	*Cronbach Alpha*
Perceived Usefulness	PUSE1	0.915	0.873	0.922	0.899
	PUSE2	0.909			
	PUSE3	0.929			
Perceived Ease of Use	PEASE1	0.807	0.833	0.904	0.858
	PEASE2	0.910			
	PEASE3	0.919			
Subjective Norm	SNORM1	0.802	0.836	0.903	0.849
	SNORM2	0.901			
	SNORM3	0.903			
Perceived Behavioral Control	PBCNT1	0.840	0.861	0.900	0.839
	PBCNT2	0.812			
	PBCNT3	0.862			
Perceived Enjoyment	PENJ1	0.870	0.780	0.914	0.859
	PENJ2	0.873			
	PENJ3	0.845			
Social Network Intensity	SNINT1	0.844	0.786	0.918	0.865
	SNINT2	0.820			
	SNINT3	0.889			
	SNINT4	0.842			
	SNINT5	0.927			
Flow	FLO1	0.830	0.775	0.912	0.856
	FLO2	0.840			
	FLO3	0.893			

Constructs	*Items*	*Loadings*	*Average Variance Extracted*	*Composite Reliability*	*Cronbach Alpha*
Game Addiction	GAD1	0.811	0.730	0.909	0.858
	GAD2	0.868			
	GAD3	0.825			
	GAD4	0.821			
	GAD5	0.853			
	GAD6	0.887			
	GAD7	0.915			
Trust	TRST1	0.888	0.791	0.919	0.867
	TRST2	0.930			
	TRST3	0.819			
Attitude	ATT1	0.926	0.834	0.908	0.889
	ATT2	0.908			
	ATT3	0.869			
Behavioral Intention	BINT1	0.934	0.810	0.907	0.881
	BINT2	0.915			
	BINT3	0.849			
Use Behaviour	USB1	0.912	0.720	0.884	0.841
	USB2	0.745			
	USB3	0.880			

Cronbach's Alpha

The Cronbach's Alpha value of above 0.7 is preferred for adapted constructs as per Hair et. al., (2006) criteria. The value Cronbach's Alpha of above 0.7 for a construct is considered to be good and reliable (Nunnally, 1978). Our results show that the Cronbach's Alpha of all constructs vary from (0.839-0.889) thus fulfills the criteria of Nunnally (1978) and the constructs are said to be reliable.

Composite Reliability

The composite reliability (CR) value of above 0.7 for each construct is considered to be reliable (Bagozzi & Yi, 2012; Nunnally & Bernstein, 1994). Our results show that the composite reliability of all constructs vary from (0.884-0.922) thus fulfills the criteria of Nunnally (1978) and the constructs of this study are said to be reliable.

TABLE 3: DISCRIMINANT VALIDITY (FORNELL AND LARCKER, 1981)

	ATT	*BINT*	*FLO*	*PBCNT*	*PENJ*	*PEASE*	*PUSE*	*GAD*	*SNORM*	*USB*	*SNINT*	*TRST*
ATT	**0.913**											
BINT	0.512	**0.900**										
FLO	0.123	0.429	**0.88**									
PBCNT	0.152	0.381	0.110	**0.928**								
PENJ	0.284	0.579	0.300	0.244	**0.883**							
PEASE	0.417	0.447	0.187	0.066	0.294	**0.912**						
PUSE	0.340	0.283	0.079	0.095	0.181	0.343	**0.944**					
GAD	0.159	0.382	0.254	0.162	0.280	0.064	0.1054	**0.854**				
SNORM	0.020	0.335	0.155	0.212	0.144	0.038	0.058	0.168	**0.914**			
USB	0.289	0.641	0.317	0.291	0.463	0.262	0.242	0.352	0.301	**0.848**		
SNINT	0.320	0.468	0.337	0.275	0.328	0.333	0.209	0.358	0.127	0.412	**0.886**	
TRST	0.225	0.196	0.162	0.039	0.148	0.207	0.102	0.064	0.007	0.059	0.081	**0.889**

Note: The diagonally bolded values are the square-root of Average Variance Extracted Values.

The validity of the constructs is evaluated based on two criteria's they are: (a) Convergent Validity and (b) Discriminant Validity. Hair et. al., (2013) procedure of PLS-SEM was followed.

Convergent Validity

Convergent validity is defined as "*the extent to which a measure correlates positively with alternative measures of the same construct*" (Hair et. al., 1998; 2006). The Average Variance Explained (AVE) is defined as "*the grand mean value of the squared loadings of the indicators associated with the construct (i.e., the sum of the squared loadings divided by the number of indicators*)" (Hair et. al., 1998; 2006). The AVE values should be more than 0.50 to have -convergent validity (Hair et. al., 1998; 2006). All the constructs of this study have AVE values above 0.5 which satisfies the thumb rule of Hair et. al., (2006) and Fornell & Larcker (1981). The AVE values range from (0.720-0.920).

Discriminant Validity

Discriminant Validity is defined as "*the extent to which a construct is truly distinct from other constructs by empirical standards*" (Hair et. al., 1998; 2006). It is important for every construct to be distinct from each other to have good discriminant validity. The Fornell Larcker criterion method was used to evaluate discriminant validity (Hair et. al., 1998: 2006). According to Fornell and Larcker (1981), "*the AVE of a construct should be greater than the square of the correlation estimates with the other constructs*". Under Fornell-Larcker criterion the square root of AVE values should be greater than its highest correlation with any other construct (Fornell & Larcker, 1981; Hair et. al., 2010).

Structural Model

Under the structural model, the significant hypothesized relationships between constructs were evaluated. The Hair et. al., (2013) procedure of PLS-SEM was followed. The bootstrapping procedure of PLS-SEM was used (Hair et. al., 2013). Under bootstrapping procedure "*a large number of subsamples (i.e., bootstrap samples) are drawn from the original sample with replacement"* (Hair et. al., 2013). As per Hair et. al., (2013) procedure, a minimum of 5000 samples is used to estimate path coefficients of the relationships. Each hypothesis is evaluated with a minimum of 95% (i.e. *t*-value = ranging from 1.96-2.56) percentage of confidence level. Based on bootstrapping procedure of Hair et. al., (2013) the significant relationships between the constructs and path coefficient values are estimated using Smart PLS 2 M3 software (Hair et. al., 2013).

Results of Hypothesis

Table 4 shows the path coefficient values of each hypothesis. Based on Hair et. al., (2013) bootstrapping procedure except for the hypotheses H1B, H4B, and H6B, all other hypotheses are accepted and significant at a minimum of ρ= < 0.05 levels. When looked individually following results arrived from the PLS-SEM analysis that explains the hypotheses framed. The path between PUSE, PEASE, PENJ and TRST towards ATT was found to be positively significant at a minimum of ρ= < 0.05 levels with β=0.205, 0.277, 0.147 and 0.126 respectively, which also supports the previous studies (Shin, 2010; Lin & Chiang, 2013; Yoon et. al., 2013; Zhou, 2013; Harsono & Suryana, 2014).The path between SNORM, PBCNT, PENJ, TRST, ATT, FLO, towards BINT was found to be positively significant at a minimum of ρ= < 0.001 levels with β=0.230, 0.172, 0.321, 0.335 and 0.225 respectively, which also supports the previous studies (Chae et. al., 2014; Chen et. al., 2016; Zhu & Chang, 2015; Shin & Shin, 2011;Wu & Liu, 2007).The path between FLO, SNINT, and USB towards GAD was found to be positively significant at a minimum of ρ= < 0.001 levels with β=0.105, 0.231 and 0.224 respectively, which also supports the previous studies (Salehan & Negahban, 2013; Xu et. al., 2012; Kim & Park, 2015). The path between SNINT and BINT towards USB was found to be positively significant at a minimum of ρ= < 0.05 levels with β=0.138 and 0.562 respectively, which also supports the previous studies (Kim & Park, 2015; Salehan & Negahban, 2013; Xu et. al., 2012).The path between PUSE and TRST was found to have no significant relationships towards BINT, which supports the study of (Wu & Liu, 2007; Yoon et. al., 2013). The path between PBCNT was found to have no significant relationships towards USB.

TABLE 4: PATH COEFFICIENT

Path	*Hypotheses*	*β*	*t-statistics*	*ρ*	*Support*
PUSE –> ATT	H1A	0.205	4.247	<.001	Supported
PUSE –> BINT	H1B	0.087	1.754	NS	Not Supported
PEASE –> PUSE	H2A	0.343	6.438	<.001	Supported
PEASE –> ATT	H2B	0.277	4.751	<.001	Supported
SNORM –> BINT	H3	0.230	6.942	<.001	Supported
PBCNT –> BINT	H4A	0.172	3.769	<.001	Supported
PBCNT –> USB	H4B	0.039	0.675	NS	Not Supported
PENJ –> ATT	H5A	0.147	2.536	<.05	Supported
PENJ –> BINT	H5B	0.321	7.081	<.001	Supported
TRST –> ATT	H6A	0.126	2.229	<.05	Supported
TRST –> BINT	H6B	0.033	0.890	NS	Not Supported

Path	*Hypotheses*	*β*	*t-statistics*	*ρ*	*Support*
ATT –> BINT	H7	0.335	7.850	<.001	Supported
BINT –> USB	H8	0.562	8.517	<.001	Supported
FLO –> BINT	H9A	0.225	5.792	<.001	Supported
FLO –> GAD	H9B	0.105	2.254	<.05	Supported
SNINT –> USB	H10A	0.138	2.595	<.001	Supported
SNINT –> GAD	H10B	0.231	3.924	<.001	Supported
USB –> GAD	H11	0.224	3.608	<.001	Supported

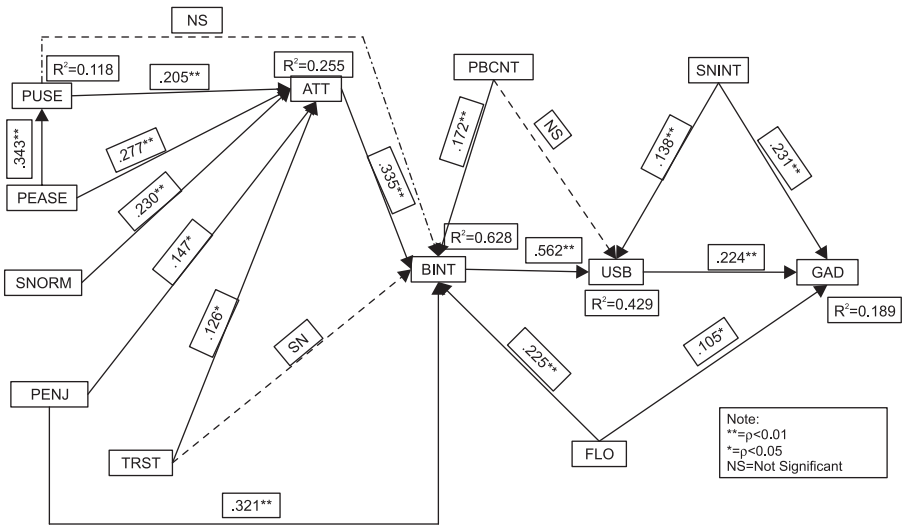

Figure 2: Path Coefficient values obtained using Smart PLS 2.0 M3

CONCLUSION AND IMPLICATIONS

The results of this study show that ATT, PENJ, FLO and PBCNT was found to be the top most significant factors that affect BINT towards SNG. PEASE, PUSE, PENJ and TRST was found to have a significant influence on BINT. BINT and SNINT were found to have a significant impact on USB. SNINT, USB, and FLO was found to have a significant influence on GAD. PUSE and TRST were found to have no significant impact on BINT towards SNG. PBCNT was found to have no significant relationship with USB. The total variance explained on BINT (R^2 = 0.628), USB (R^2 = 0.429) and GAD (R^2 = 0.189). This study has extended CTAMTPB model with extra constructs such as PENJ, TRST, FLO, SNINT and GAD in SNG context. The empirical results of this study have proved that CTAMTPB has good explanatory power on BINT which explains more than sixty percentage of variance thus the argument of Taylor and Todd (1995) is supported.

At least for this study samples the PEASE and PUSE factors have the strongest impact on ATT. The SNG providers must try to make games which are easy to play which will help in attracting more number of subscribers. PENJ, SNORM, and FLO was found to be the top three strong significant factors on BINT towards SNG. The SNG providers must develop social network games with more entertainment features. The SNG developers must also make note that the samples of this study have shown that they were highly influenced by their friends and family recommendations to adopt SNG. If the gamers feel satisfied with the SNG then they would share their experience with their friends, family, cousins etc. The SNG developers must also make a note on the effect of flow that was found to have a strong effect not only on BINT but also on GAD. At least for the samples of this study, the effect of flow was shown to be significant when they play SNG. On one hand the effect of FLO towards BINT is a good news to the game developers but on the other hand, the effect of FLO towards SNG has shown to have a positive significant impact on GAD which is bad news for Human health sector. Spending long time in social network and SNG has also resulted in GAD which is a bad news for Human health sector. In the health point of view, it is advised to the SNG users to maintain proper usage time on the social network and optimally make of SNG to avoid addiction. The previous research has shown a lot of mixed opinion on the psychological advantages and disadvantages of the excessive use of online games (Griffiths, 2010). On one hand Griffiths (2010) and Kalhour and Ng (2016) says excessive use of SNG does not always lead to addiction instead, it helps in relieving mental stress among humans and on the other hand Khang et. al., (2013), Andreassen et. al., (2016) and Salehan and Negahban (2013) concludes that excessive use of SNG may prove fatal to human health. So there is still some paradox lies on the effect of excessive use towards game addiction which has to be clearly distinguished in future studies. Salehan and Negahban (2013) advised parents to take control of their children's by restricting their playing time of SNG.

THEORETICAL CONTRIBUTION

This study has extended CTAMTPB model with extra constructs such as PENJ, TRST, FLO, SNINT and GAD in SNG context. This study has empirically supported the argument of Taylor and Todd (1995) which stipulated that the CTAMTPB have good explanatory power on BINT. This study has shown more than sixty percent ($R^2 = 0.628$) of variance explained with the application of CTAMTPB. As per Hair et. al., (2011:2013) recommendations R^2 square values of "*0.25, 0.50, and 0.75 is considered as small, medium and substantial respectively*". Venkatesh et. al., (2012) developed a theoretical model called unified theory of acceptance and use of technology (UTAUT2) wherein they argue that their model has more explanatory power on BINT so future research should use UTAUT or UTAUT2 model in SNG context.

LIMITATIONS AND FUTURE RESEARCH

The limitations of this study are (a) The sampling design was a non-parametric in nature, so future studies should adopt parametric sampling method to have a more accurate prediction, (b) The effect of demographic factors such as Age, Gender and Experience were not considered in this study so future studies should investigate the moderating effect of such factors. Gender plays an important role in virtual technology adoption among Indians (Ahmed and Sathish, 2014) so future research should investigate the moderating effect of Gender on PMGA. Loyalty was found to have a significant impact on CINT and WOM among South Korean consumers (Chae et. al., 2014). Shin (2010) empirically proved that level of involvement towards social media also plays a significant role in its adoption so future research should investigate on that particular aspect. Correa (2016) found digital skills to have a major impact on social media usage among Chile social media users so future research should focus on the effect of digital skills on social network game adoption. There is need of more extensive research on the relevant factors that affect Social network game (SNG) adoption across different genres of the game (Chen et. al., 2016). The perceived social value has an impact on willingness to pay for virtual product purchase in online gaming (Badrinarayanan et. al., 2015; Vock et. al., 2013; Lu & Hsiao, 2010) so future research should focus on the effect of social value on willingness to pay (Tseng & Teng, 2015). There is a need for more research on intention to pay for virtual game products in online SNG (Kalhour & Ng, 2016; Tseng & Teng, 2015). Hedonic motives, utilitarian motives and social motives play a major role in predicting continuance online game adoption (Li et. al., 2015) so future research should focus on this aspect as well. Kaur et. al., (2016) developed a new scale to measure flow experience in social network game context so future studies should use such specific scales to measure the impact of flow in social network game adoption context. Zhu and Chang (2015) urged for more research on virtual product purchase in social media so future research should also focus on virtual product purchase through social media. Lee and Wohn (2012) recommended investigating more on the effect of culture and personal innovativeness on SNG adoption.

Notes: SNG = Social Network Games, CTAMTPB = The Combined Technology Acceptance Model and Theory of Planned Behaviour, TRA = Theory of reasoned Action, TPB = Theory of Planned Behaviour, TAM = Technology Acceptance Model, UTAUT2 = Unified Theory of Acceptance and Use of Technology, PUSE = Perceived Usefulness, ATT = Attitude and BINT = Behavioral Intention, PEASE = Perceived Ease of Use, SNORM = Subjective Norm, PENJ = Perceived Enjoyment, PBCNT = Perceived behavioral Control, FLO = Flow, TRST = Trust, USB = Use Behaviour, Social Network Intensity, GAD = Game Addiction, CR = Composite Reliability, CA = Cronbach's Alpha, β = Beta Coefficient, AVE = Average Variance Extracted.

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