



HABIT AND HEDONISM: SMARTPHONE DEPENDENCY BEYOND UTILITY

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ABSTRACT

Smartphones have evolved beyond their primary function as communication devices, becoming essential tools due to their convenience, advanced features, and usability. This has driven a consistent rise in smartphone adoption, with global users expected to increase from 4 billion in 2021 to nearly 5 billion by 2028. Previous research on smartphone usage has largely focused on students, a group characterized by early adoption of new technologies. While traditional studies examined factors such as Social Needs, Social Influence, and Convenience, emerging aspects like Hedonism and Habit have recently gained attention. However, no study has holistically integrated these factors.

This research investigates the multifaceted nature of smartphone dependency by surveying students from three universities in and around New Delhi, India. A smartphone dependency scale was developed, encompassing five independent variables—Social Needs, Social Influence, Convenience, Habit, and Hedonism—and one dependent variable, Smartphone Dependency. An initial 31-item scale underwent rigorous factor analysis, revealing the significant influence of all proposed factors. Confirmatory Factor Analysis (CFA) refined the scale to 21 items, ensuring greater precision.

Notably, this study highlights the relevance of emerging factors, Hedonism and Habit, in addition to classical factors, in the Indian context. These findings offer a comprehensive framework for understanding smartphone dependency, emphasizing the interplay of traditional and contemporary influences. This research contributes to the literature by providing a validated scale and insights into evolving behavioral dynamics related to smartphone use.

INTRODUCTION

In the current times, the mobile phones are used both for functional as well as emotional purposes and are aptly called smartphones (Yoon & Yun, 2023). The smartphones have become a catalyst in driving mobile usage and have gone beyond the primary role of just being a communication device (Camerini et al., 2021; Khan et al., 2023; Naim et al., 2023).

Smartphones are considered to be an extension of the users' personality (Wu et al., 2023). They enable the users to stay in touch with people as well as express themselves (Chou et al., 2013). Smartphone users utilise phones for a plethora of functions like searching information, digital transactions, using social

media and shopping online (Saleem et al., 2023; Hossain et al., 2020; Aljomaa et al., 2016). The growing digital usage has created dependency on smartphones because of its convenience, amazing features and ease of use (Harun et al., 2015; Khan et al., 2021). Smartphones influence not only the lives of people but also how they connect to the rest of the world (Seid et al., 2024). There has been a constant growth in the demand of smartphones because of its utility and appeal (Mason et al., 2022).

Globally, the number of smartphone users is projected to increase from 4 billion in 2021 to approximately 5 billion by 2028, driven by rising smartphone adoption rates

(Statista.com, 2024). China, the world's most populated country, is leader in terms of smartphone users too and an estimated 68 percent of the Chinese population uses a smartphone (Howarth, 2023). In 2017, India surpassed the USA in the number of smartphone users (www.businessday.in, 2017). By the end of 2023, India was second only to China in terms of total smartphone users and nearly 47 percent of the total population in India owned a smartphone (Howarth, 2023).

The growth of Internet-based smartphones has brought about a path-breaking change in the society. The association of human and smartphones has been stated to be a lasting one (Farnsworth & Austrin, 2010). Smura et al. (2009) opined that phones have emerged as an essential aspect of consumer lifestyle. The utility of smartphones facilitates the day-to-day activities of users, especially students and professionals (Suki, 2013a). Jacob and Isaac (2014) stated that students, in particular, are the most prominent users of smartphones. Hence, the present study attempts to explore and assess students' smartphone usage behaviour.

REVIEW OF LITERATURE

Balakrishnan and Raj (2012) stated that mobile phones may be considered to be the extension of customers' personality. The present-day smartphones have better in-built features making them more interactive. Wei (2008) opined that smartphones have gone beyond voice. Dresler-Hawke and Mansvelt (2008) opined that the smartphone is an integral part of the social life of youth. The consumers keep in touch with each other through these online social interactions, even on the go, with the help of their smartphones.

Researchers have examined the effects of mobile phone dependency on performance in academic and workplace settings (Aljomaa et al., 2016; Khan & Rahman, 2019; Rajan, 2019; Hossain et al., 2020; Padaliya et al., 2022; Wu et al., 2023). One of the primary drivers for smartphone dependency is its ability to offer internet-based services like e-commerce, thereby making them an effective shopping platform (Hubert et al., 2017). Park et al. (2013) discovered that consumers find it easy to use smartphones but use it excessively when they discover its usefulness. Several studies have

explored the impact of smartphone dependency on user behaviour. (Al-Barashdi et al. 2014; Arif et al., 2016; Lee et al., 2016).

Suki and Suki (2013) investigated students' dependency on smartphones and the influence of factors such as "Social needs", "Social influences", and "Convenience". Their findings revealed that "Social needs" had the most significant impact on students' smartphone dependency, followed by "Convenience" and "Social influence". Additionally, they identified a positive correlation between smartphone dependency and purchasing behaviour. Ting et al. (2011) discovered that social influences, social needs, and convenience contribute to smartphone dependency among students, which is positively linked to purchasing behaviour. Aykanat et al. (2016) found that product features, price, brand name, social influence, and social needs significantly impact smartphone dependency. Using a sample of university students, the study revealed a positive relationship between smartphone dependency and factors such as social influence and social needs. Additionally, it suggested that product price has a negative effect on smartphone dependency.

Arif et al. (2016), in one of the significant studies on smartphone dependence, found factors like Social Needs, Social Influence and Convenience to be influencing smartphone dependency. They also established a positive relationship between smartphone dependence and purchase behaviour of students. Kim and Shin (2016) observed that Social Influences and Social Needs positively contribute to smartphone dependency, which subsequently impacts customer satisfaction and loyalty. They suggested that businesses could leverage this dependency to cultivate satisfied and loyal customers.

Enjoyment has been recognized as a key focus area in information systems research (Sanakulov & Karjaluoto, 2015; Tojib & Tsarenko, 2012). Numerous studies in the field of information technology suggest that individuals who engage with technology on a hedonic level are more likely to develop addictive tendencies (Chou & Ting, 2003; Yang et al., 2016). Habit plays a significant role in the development of smartphone addiction (Chauhan et al., 2023). Lee et al. (2014) stated

that habit influences both proximal Information System (IS) use as well as distal IS usage behaviour. Habit also helps in explaining behaviour of consumers (Chen et al., 2015).

After thorough review of extant literature, five factors were identified for the purpose of the study, namely:

1. Social Needs

Social Needs explains the importance of connection and communication of one human with the other (Harun et al., 2015). Social needs are comprised of necessity for emotions like being loved, receiving affection, belonging to someone and getting social acceptance (Schiffman et al., 2009). It is essentially the necessity for social interaction which denotes the need for remaining connected with peers and social circles (Tikkanen, 2009). Social needs are readily fulfilled nowadays by smartphones that provide prompt access to social media platforms (Ting et al., 2011). Smartphones have ingrained technology which help the users connect with their social groups (Carayannis et al., 2013). The ease, with which smartphones enable the users to connect and communicate with others, proves to be a critical reason of smartphone dependency (Lippincott, 2010). Ting et al. (2011) also established a positive association between social needs and smartphone dependence.

2. Social Influence

Social influence refers to the impact of peers and social groups on an individual's beliefs, opinions, and behaviour (Mason et al., 2007). Often, people are unaware of how social influences shape their personality traits (Klobas & Clyde, 2001). Schiffman et al. (2009) found that a customer's approval and adoption of any product is shaped by their social class, which reiterates the impact of social influence. Social practices have also been proven to affect customer's attitude towards brands and their purchase intention (Jamil & Wong, 2010). With regard to smartphone also, the consumers are affected by the thoughts and opinions of people around them (Suki & Suki, 2007). Smartphone users are inspired by social circles and peers who play a critical role in creating dependency (Auter, 2007). Alternatively, smartphone dependency creates a rippling effect on other

users when the users gain appreciation from their social groups (Ting et al., 2011). Social influence has been found to have a positive association with smartphone dependence (Ting et al., 2011).

3. Convenience

Convenience may be described as anything that provides comfort and is useful (Harun et al., 2015). Today's smartphones are easy to use, multi-utility and provide comfort too. Holub et al. (2010) opined that modern day phones are portable, steadfast and customizable. The consumers conveniently use smartphones when they have paucity of time and space (Lu & Su, 2009). Stephen and Davis (2009) opined that modern day smartphones a convenient blend of phone and computers. The plethora of features that these devices (phone and computer) used to offer drove are now conveniently placed into one device (Hahn, 2010). Users conveniently scan through their e-mails, social media platforms, and chat with others on the go (Hudson, 2010). Consumers, nowadays, rely heavily on their smartphones as they can explore infinite information much more conveniently (Genova, 2010). Ting et al. (2011) discovered a positive association of Convenience with smartphone dependence.

4. Hedonism

Hedonism involves prioritizing pleasure in one's life, actions, or thoughts. It is one of the three key components of customer value, alongside utilitarian value and social value (Rintamäki et al., 2006). Perceived hedonic value is defined as the overall experience of arousal, gained experiences (social, cognitive, and emotional), and perceived autonomy (Kazakeviciute & Banyte, 2012). Hedonism is identified as a key driver of online shopping and technology adoption (Kuan et al., 2008; Gupta & Kim, 2010; Kim et al., 2012; Rahman et al., 2017). Hedonism also significantly contributes to mobile device usage (Wakefield & Whitten, 2006). Chen et al. (2015) established that those who use value-added features of smartphone experience greater levels of enjoyment and may gradually develop smartphone dependency.

5. Habit

Habit may be defined as "the extent to which people tend to perform behaviours automatically because of learning" (Venkatesh

et al., 2012). Personal habits influence information system usage (Limayem et al., 2001). Researchers have found that prior habits induce positive feelings and influence intentions to continue (Kim & Malhotra, 2005). Habit is also associated as a strong antecedent of continued behaviour, particularly with regard to technology (Bhattacharjee et al., 2012; Venkatesh et al., 2012). Consumers who have a habit of using electronic devices tend to accept new technologies without even using it

(Eriksson et al, 2008; Venkatesh & Zhang, 2010). Habit also influences continued usage in the e-commerce scenario (Liao et al., 2006). Khalifa and Liu (2007) discovered that habit has a positive impact on the repurchase intention of online shoppers.

In the present study it was theorized that if the use of the smartphone becomes habitual to students, then they will have the tendency to be dependent on it.

Table 1: Review of Major Studies on Smartphone Dependency*

Country	Author	Sample Population	Statistical Analysis
India	J. K. Nayak	Students	Structural Equation Modelling
Turkey	Gokcearslan et al.	Students	Structural Equation Modelling
China	Jiang & Li	Students	Structural Equation Modelling
South Korea	Lee & Lee	Students	Regression Analysis
Lebanon	Hawi & Samaha	Students	Binary Logistic Regression & Structural Equation Modelling
USA	King & Dong	Students	Structural Equation Modelling
Korea	Kwon & Paek	Students	Hierarchical Multiple Regression
US & South Korea	Lee & Shin	Students	Structural Equation Modelling
Turkey	Aykanat et al.	Students	Structural Equation Modelling
Japan	Ezoe et al.	Students	Exploratory Factor Analysis
Israel	Yehuda et al.	Students	Multivariate Regression
China	Lian et al.	Students	Independent Samples t-Test & Bivariate Correlation Analysis
Italy	Pavia et al.	Students	Confirmatory Factor Analysis
Saudi Arabia	Aljomaa et al.	Students	Independent Samples t-Test, ANOVA & Bonferroni Test
Turkey	Gokcearslan et al.	Students	Structural Equation Modelling
South Korea	Houng et al.	Senior Citizens	Factor Analysis & Independent Samples t-Test
Pakistan	Arif et al.	Students	Structural Equation Modelling
India	Bisen & Deshpande	Students	Descriptive Statistics & Independent Samples t-Test
South Korea	Kim & Shin	General Population	Structural Equation Modelling
Turkey	Gokcearslan et al.	Students	Structural Equation Modelling
China	Long et al.	Students	Logistic Regression Analysis
Lebanon	Samaha & Hawi	Students	Correlation
Taiwan	Wang Y.	Tourists	Correlation & Regression
Malaysia	Harun et al.	General Population	Structural Equation Modelling
US & South Korea	Shin & Lee	Students	Path Analysis
South Korea	Kim et al.	Students	Hierarchical Regression Analysis
China	Chen et al.	Students	Structural Equation Modelling
Singapore	Lin et al.	Students	t-Test & Correlation
Switzerland	Haug et al.	Students	Logistic Regression Analysis
Turkey	Demirci et al.	Students	t-Test, Correlation & Linear Regression

Country	Author	Sample Population	Statistical Analysis
US	Roberts et al.	Students	Structural Equation Modelling
Netherlands	Van Deursen et al.	General Population	Structural Equation Modelling
China	Wang et al.	General Population	Exploratory Factor Analysis
Taiwan	Chiu S.	Students	Structural Equation Modelling
US	Roberts et al.	Students	Structural Equation Modelling
Turkey	Demirci et al.	Students	Exploratory Factor Analysis
China	Bian & Leung	Students	Exploratory Factor Analysis
Taiwan	Lee et al.	General Population	Structural Equation Modelling
Korea	Lee et al.	Students	Independent Samples t-Test & Welch-Aspin test
Malaysia	Suki	Students	Structural Equation Modelling
South Korea	Kwon et al.	Students	t-Test, ANOVA & Correlation Analysis
US	Salehan & Nigahban	Students	Structural Equation Modelling
South Korea	Park et al.	General Population	Structural Equation Modelling
Canada	Persaud & Azhar	General Population	ANOVA & Regression Analysis
South Korea	Chun et al.	Students	Structural Equation Modelling
Malaysia	Ting et al.	Students	Structural Equation Modelling
US	Emanuel et al.	Students	Descriptive Statistics
Korea	Park & Lee	General Population	Structural Equation Modelling
Finland	Verkasolo	General Population	Confirmatory Factor Analysis

***Prepared by the Researchers**

Previous research on smartphone usage has primarily examined user behaviour. Most studies have focused on students, possibly due to their early adoption of new technologies. Students have been a primary target group for research on communication technologies (Suki, 2013a; Nayak, 2018; Purohit et al., 2022). While many studies have explored traditional factors like Social Needs, Social Influence, and Convenience, others have considered emerging factors such as Hedonism and Habit. However, no study has comprehensively examined all these factors together.

Furthermore, there's a notable gap in research on smartphone dependency, especially regarding emerging factors, especially within the Indian context. Therefore, this study aims to identify the factors influencing students' dependence on smartphones.

RESEARCH METHODOLOGY

1. Research Objectives

The present research work attempted to study the underlying motivations of Indian smartphone users; thus, the researcher has set the study objectives as follows:

- To identify the factors affecting smartphone dependence of students in India.
- To establish the relationship between the factors that affect dependency on smartphone.
- To suggest a refined parsimonious scale for measuring smartphone dependence.

2. Unit of Analysis

Researchers have discussed that university students are the primary adopters of innovative technology, even when it comes to smartphones (Sultan et al., 2009; Persaud & Azhar, 2012; Kim & Park, 2014; Camerini et al., 2021; Mason et al., 2022; Wu et al., 2023). Similarly, approximately 53% of smartphone

owners belong to the 18-24 age group (Start.com, 2023). The majority of Indian smartphone users (85%) fall within the 18-34 age range, with usage among those above 34 years also steadily increasing (Start.com, 2023). Consequently, university students were selected as the focus of analysis for this study.

3. Sampling Method

The target population for this study consisted of students enrolled in universities funded by the Central Government of India. University students are often regarded as active, frequent internet users and behavioral proxies for non-student populations (Yoo & Donthu, 2001a; Guth et al., 2007; Jones, 2008; Abeler et al.,

2014). A non-probability sampling method, specifically convenience sampling, was used to select the study sample.

4. Survey Instrument

The research instrument for the present study has been developed from scales suggested by various researchers in the area (Childers et al., 2001; Limayem & Hirt, 2003; Ting et al., 2011; Arif et al., 2016; Ahmad et al., 2017). The details of items borrowed from previous studies are provided in Table 2. The responses were collected from smartphone owners on a 5-point Likert scale (1 = Strongly Disagree, and 5 = Strongly Agree) employing the paper-pencil approach.

Table 2: Items Used in Survey Instrument and their Sources

Construct	Item Code	Statements
Social Needs		
Ting et al. (2011) Arif et al. (2016)	SN1	Smartphone allows me to stay connected with those I care about
	SN2	I use smartphone to stay connected with friends and family through social networking websites (Twitter, Facebook, Instagram, WhatsApp etc.)
	SN3	It is easy for me to observe others' happening by using the smartphone
	SN4	I use my smartphone to catch up with friends and relatives
	SN5	Smartphone allows me to transfer photo/audio or share data
Social Influence		
Ting et al. (2011); Arif et al. (2016)	SI1	The pressure from friends and family is likely to influence the usage rate of smartphone
	SI2	It is important that my friends like the brand of smartphone I'm using
	SI3	I would buy a smartphone if it helped me fit in with my social group better
	SI4	I would be open to be persuaded into using a smartphone if I had low self-esteem
	SI5	I have seen that smartphone attract people's attention
Convenience		
Arif et al. (2016); Ting et al. (2011)	C1	Having a smartphone is like having both a mobile phone and a computer together
	C2	In my work, smartphone saves me time and effort
	C3	I would prefer carrying my smartphone rather than my laptop
	C4	A smartphone enables me to receive learning materials anywhere I go
	C5	Using a smartphone would allow me to accomplish task more quickly
Hedonism		
Ahmad et al. (2017); Childers et al. (2001)	HD1	Using the smartphone entertains me
	HD2	Using the smartphone excites me
	HD3	Using the smartphone is enjoyable
	HD4	Using the smartphone is interesting
	HD5	Using the smartphone is fun
	HD6	Using the smartphone makes me feel good
Habit		
Limayem et al. (2003)	HB1	The use of smartphone has become a habit for me
	HB2	I am addicted to using smartphone

Construct	Item Code	Statements
	HB3	The use of smartphone is a must for me
	HB4	I don't even think twice before using smartphone
	HB5	Using smartphone has become natural to me
Dependency		
Ting et al. (2011)	D1	I always use my smartphone to deal with my work
	D2	I am totally dependent on my smartphone
	D3	I cannot do anything with my job without the smartphone
	D4	I will feel insecure when my smartphone is not with me
	D5	In my daily life, usage of smartphone is high

Source: Compiled by the Researchers

5. Data Collection

The present research work employed the survey method for data collection, through researcher-controlled sampling, from students enrolled in three universities located in and around New Delhi, the capital city of India. These institutions are commonly referred to as 'Central Universities' as they are funded by the Central Government of India and cater primarily to students belonging to the middle-class background (Ahmad et al., 2016; Heslop, 2014). The middle-class population is supposed to represent the interests and aspirations of the general population (Ahmad et al., 2016). The research instrument (questionnaire) was administered personally by the researchers at various sites around the campus in the university (Strange et al. 2003; Dornyei & Taguchi 2010). The researchers' presence during the questionnaire administration facilitated clarification of any doubts, enhancing respondent engagement and resulting in a higher response rate (Strange et al. 2003; Dornyei & Taguchi 2010). A total of 484 responses were deemed usable out of the 485 questionnaires distributed. Table 3 presents a summary of the respondents' profiles.

Table 3: Respondents' Profile

CHARACTERISTIC	FREQUENCY
COURSE	
Graduation	262
Post-graduation	222
AGE	
Less than 21 years	248
More than 21 years	236
GENDER	
Male	254
Female	230

Source: Prepared by the Researchers

6. Refinement of Scale

Originally, a 31-item scale was proposed by the researchers which was gradually refined via repeated iteration technique. The items with low factor loadings (<0.4) were eliminated (Metin et al. 2012; Kline 2014; Rahman et al., 2017). The outcome of this process was a refined and updated 20-item scale. The item reduction process was executed on the basis of Principal Component Analysis (PCA) where items with high values (>0.5) were taken into consideration and the remaining were removed (Hair et al., 1998; Rahman et al., 2017). The items having cross-loadings were also removed (Anderson & Gerbing, 1988; Yoo & Donthu, 2001b). Most items showed satisfactory loadings (>0.6) on the proposed factors, leading to a refined 20 item scale.

7. Data Analysis and statistics

Initially, some preliminary tests are conducted on the respondents' data for basic screening of the data. We first conducted missing value analysis in the dataset. In missing value analysis, those responses which are partially filled are removed. After that, those responses which are repetitive in nature (i.e. respondents had filled in the same values for all the research constructs) are removed. After the implementation of this, we get 454 responses. Only these responses are considered significant for this study and the rest of the tests are implemented on this data set.

8. Check for the Normality of Data

The normality of data is analysed to check whether the data follows the normal probability distribution or not. This test measures two parameters i.e. skewness and kurtosis. Skewness is the measure of the asymmetry of a distribution of data. Data can

be either positively distributed (Right skewed) or negatively distributed (left-skewed). Kurtosis, similarly, measures the peakedness of a normal distribution curve. Leech et al. (2014) stated that a distribution is considered approximately normal when the skewness value is between ± 1 and the kurtosis value is less than 10. In this dataset, all variable values

factors (Mitra & Datta, 2014). The present study included a total of 20 research items to measure parameters like social need (SN), social influence (SI), convenience (C), hedonism (HD), habit (HB) and dependency (D). Before performing factor analysis, it is a prerequisite to conduct KMO and Bartlett test on the data set.

Table 7: Indicator Analysis

Name	Missings	Mean	Standard Deviation	Kurtosis	Skewness
SN1	0	3.607	1.206	-0.801	0.078
SN2	0	3.6	1.464	-0.899	0.101
SN3	0	3.665	1.535	-0.902	0.089
SI1	0	3.419	1.331	-0.914	-0.07
SI2	0	3.585	1.514	-0.909	0.018
SI3	0	3.945	1.625	-0.945	-0.045
HD1	0	3.565	1.605	-0.806	-0.078
HD2	0	3.838	1.5	-0.789	-0.011
HD3	0	3.578	1.546	-0.819	0.003
HD4	0	3.608	1.545	-0.912	-0.034
HD5	0	3.847	1.564	-0.827	0.045
C1	0	3.645	1.612	-0.745	0.11
C2	0	3.578	1.638	-0.902	0.143
C3	0	3.576	1.453	-0.715	0.087
HB1	0	3.40	1.504	-0.725	0.043
HB2	0	3.50	1.565	-0.739	0.143
HB3	0	3.307	1.486	-0.601	0.179
D1	0	3.604	1.515	-0.613	0.168
D2	0	3.535	1.513	-0.654	0.119
D3	0	3.389	1.525	-0.586	0.153

fall within the acceptable ranges for both skewness and kurtosis. (Table 7).

9. Check for the Reliability of Data

Reliability of data is determined to check the internal consistency of data. It means how closely the items are related to each other in a group. Internal consistency is evaluated by the Cronbach alpha coefficient. A value greater than 0.7 is recommended (Panayides, 2013; Flynn et al., 1990; Malhotra & Grover, 1998; Mirghafoori et al., 2017). In the present study, Cronbach alpha values of all the research variables were found to be more than 0.7. So, the received data had sufficient reliability.

10. Factor Analysis

Factor analysis was conducted to identify the relationships that exist among the research variables and classified them into different

a. Kaiser-Mayer-Olkin (KMO) and Bartlett test

The KMO value ranges from 0 to 1, with a value greater than 0.6 indicating that the sample is adequate for factor analysis (Field, 2009). In this study, the KMO value is 0.91. Bartlett’s test evaluates the correlation matrix, and the Bartlett’s test of sphericity was found to be significant (0.000), as shown in Table 3. Therefore, both the Kaiser-Meyer-Olkin (KMO) test and Bartlett’s test indicate that the data is suitable for factor analysis.

Table 3: KMO and Bartlett test

Test		Values
KMO		0.91
Bartlett’s Test	DF	372
	Significance value	0.00

b. Characteristics of factor analysis

In the present study, Principal Component Analysis (PCA) with Varimax rotation was employed for the analysis. Only constructs with an eigenvalue greater than 1 and a cumulative variance extraction of at least 40% were retained (Kim & Muller, 2004).

c. Eigen values

Eigenvalues represent the sum of the squared factor loadings associated with each factor. Table 4 presents the Eigen values in the R-console output. In table 2, only six variables have an Eigen value > 1. This represents that total of six factors are formulated. Values are presented in the decreasing order of Eigen values. Max Eigen value is 7.02 and the minimum value of the extracted factor is 1.03. Those variables having an Eigen value <1 were left out.

***Table 4: Eigen values of all variables in R-console**

```
> print (z$values , digits=2)
[1] 7.02 2.69 2.05 1.85 1.63 1.03 0.91
0.80 0.74 0.69 0.67 0.60 0.56
[14] 0.52 0.44 0.40 0.38 0.36 0.34 0.32
```

Table 5 presents the Rotation sums squared loading, Proportion variance, and Cumulative variance of the variables. R- Console output values are presented below Table 5. From the table, it is observed that a total of 6 components are rotated and they are presented in decreasing order with a maximum value of 3.63 and minimum value of 1.46.

Table 5: SS loadings and variance values of rotated components in R-console

	RC1	RC4	RC2	RC6	RC3	RC5
SS loadings	3.63	2.44	1.89	1.67	1.66	1.46
Proportion Var	0.18	0.12	0.09	0.08	0.08	0.07
Cumulative Var	0.18	0.30	0.39	0.47	0.55	0.62

After getting the Eigen values and percentage variance, the next step is to draw the rotation matrix. In this study, varimax rotation is used and all the variables whose loading is greater than 0.4 is determined (Table 6). It was found that all the items have loadings greater than 0.6 and there is no cross-loading occurring in any variables.

In the first category, it clubs three items i.e. SN1, SN2, SN3 in one construct (Social needs). In the second category three items i.e. SI1, SI2, SI3 are clubbed in one construct (Social Influence). In the third category five items i.e. HD1, HD2, HD3, HD4 and HD5 are clubbed in one construct (Hedonism). Similarly, three items i.e. C1, C2, and C3 are clubbed in one construct (Convenience). Three items HB1, HB2 and HB3 are clubbed in one construct (Habit). Three items D1, D2, and D3 are clubbed in one construct (Dependency).

Table 6: Rotated component Matrix

	RC1	RC4	RC2	RC6	RC3	RC5
SN1	0.531					
SN2	0.800					
SN3	0.826					
SI1		0.672				
SI2		0.821				
SI3		0.753				
HD1			0.778			
HD2			0.540			
HD3			0.570			
HD4			0.702			
HD5			0.603			
C1				0.618		
C2				0.711		
C3				0.772		
HB1					0.742	
HB2					0.809	
HB3					0.853	
D1						0.658
D2						0.685
D3						0.838

d. Average Variance Extracted (AVE)

This parameter is used to measure the convergent validity. The value of AVE greater

than 0.5 represents a significant level of convergent validity (Fornell & Larcker 1981). The AVE values for all elements are found from R console and presented in table 7.

e. Composite reliability (CR)

Composite reliability is the measure of internal reliability. A value greater than 0.7 is considered significant. The CR values for all

elements are found from the R console (Table 7). In addition to this, Cronbach's alpha is also calculated to measure internal reliability. A value of more than 0.7 is considered acceptable.

Table 7: AVE and CR value

<code>>summary_aa\$reliability</code>				
	alpha	rhoC	AVE	rhoA
SN	0.866	0.769	0.535	0.824
SI	0.720	0.794	0.564	0.744
HD	0.708	0.759	0.594	0.744
HB	0.722	0.844	0.644	0.729
C	0.787	0.744	0.594	0.702
D	0.760	0.773	0.534	0.784

f. Discriminant Validity Test

Discriminant validity test is conducted to determine that the parameters are not be highly correlated with each other and also to check that the parameters within a construct are different from each other. A discriminant validity test was performed on the constructs developed in our study (SN, SI, HD, HB, C and D). It is found that the value of Cronbach's alpha coefficient is greater than the mean of the correlation of latent constructs and no coefficient has a correlation greater than 0.9 as shown in below table 5. This confirms the discriminant validity test.

Table 8: Discriminant Validity test

<code>>summary_aa\$validity\$fl_criteria</code>						
	SN	SI	HD	HB	C	D
SN	0.731
SI	0.665	0.701
HD	0.629	0.536	0.627	.	.	.
HB	0.760	0.603	0.677	0.703	.	.
C	0.540	0.631	0.533	0.474	0.713	.
D	0.706	0.505	0.653	0.716	0.542	0.731

All the factors have values greater than 0.7 for Cronbach's alpha coefficient. These values are 0.866 for SN, 0.720 for SI, 0.708 for HD, 0.722 for HB, 0.787 for C, 0.760 for D.

1. Development of Multifactor Congeneric Model

We received the values of all tests (CR, AVE, Discriminant validity test) within the significant range. It means the data set is eligible for the development of a Multifactor Congeneric Model. Initially, the measurement model is tested in the R-console. Afterward, a structural model is developed which comprises path functions for different variables. Figure 2 presents the Multifactor Congeneric Model. It was found that all practices within a parameter have good regression values.

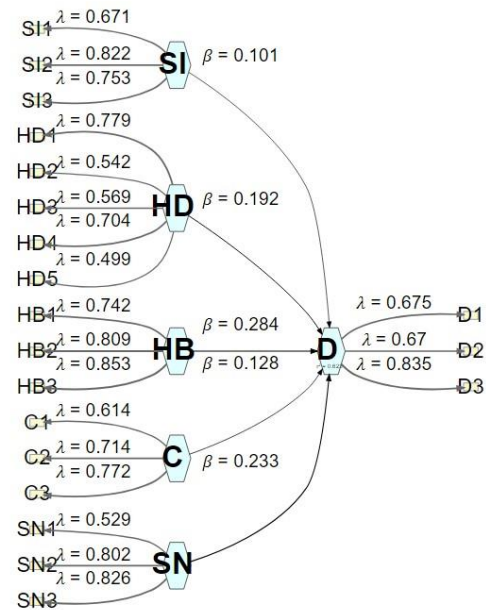


Figure 2: Multifactor Congeneric Model

g. Assessment of Structural Model

A structural model was developed using Confirmatory Factor Analysis (CFA) in R, as depicted in Figure 2. This model was designed to test the hypotheses H1, H2, H3, H4, and H5. The model's fit was assessed using various goodness-of-fit indices, which were calculated as follows: GFI = 0.829, AGFI = 0.832, RMR = 0.049, NFI = 0.864, CFI = 0.872, and RMSEA = 0.062. These indices suggest an acceptable fit, representing a valid structural relationship between Social Influence (SI), Hedonism (HD), Habit (HB), Social Needs (SN), Convenience (C), and Dependency (D) (Ory and Mokhtarian, 2009). The standardized coefficients (β) are shown in Table 8. It was found that all hypotheses are strongly supported, indicating that the parameters contribute naturally to the model. Social Needs, Habit, and Hedonism were found to have the most significant contributions, listed

in descending order, while Social Influence and Convenience had the least impact.

Table 8: Structural Model Analysis

Hypothesis	Estimates (Standardized) (β)	Results
H1: SI \rightarrow D	0.101	Supported
H2: HD \rightarrow D	0.192	Supported
H3: HB \rightarrow D	0.284	Supported
H4: C \rightarrow D	0.128	Supported
H5: SN \rightarrow D	0.233	Supported

h. DISCUSSION

The study explores various aspects of smartphone dependency in the light of relevant dimensions identified from available literature. The researchers proposed a smartphone dependency scale taking into consideration classical factors like social needs, social influence and convenience as well as emerging factors like habit and hedonism. As already explained, the initial 31 item scale comprised five independent variables- Social Needs, Social Influence, Convenience, Habit and Hedonism and one dependent variable- Smartphone Dependency. The outcome of factor analysis showed that Smartphone Dependency is indeed affected by the proposed factors. This may probably be the first study in the Indian context that identifies emerging factors- Hedonism and Habit- as relevant in the context of smartphone dependency, alongside classical factors such as Social Needs, Social Influence and Convenience. The Confirmatory Factor Analysis (CFA) led to a more parsimonious scale comprising 21 items. Another significant observation is that both the classical and emerging factors exhibited significant loadings.

Hedonism, the pleasure aspect of smartphone usage, has long been considered to be a contributing factor to mobile phone usage (Wilska, 2003; Mort & Drennan, 2007). Bruner and Kumar (2005) in their study demonstrated that Hedonism significantly influenced use of handheld internet devices. The role of Hedonism has also been established in studies related to smartphone usage (Chun et al., 2012; Hyun et al., 2014; Chen et al., 2015). The

present study also demonstrated that users find smartphone to be exciting, fun, interesting and enjoyable. They also make the users feel good. The findings corroborate those of previous researchers who too reported that use of smartphone was interesting and enjoyable (Chen et al., 2015), had a fun element (Lee et al., 2014; Kwon et al., 2013a), was exciting (Kwon et al., 2013a), and also made them feel good (Chun et al., 2012).

The present study also revealed that Habit also contributes to the formation of smartphone dependency. Habit as a critical factor of smartphone dependency has been discussed in various researches (Oulasvirta et al., 2012; Ezoë et al., 2016; Aljomaa et al., 2016; Contractor et al., 2017; Nayak, 2018). In line with the observations of Chen et al. (2015), the respondents in the present study too overwhelmingly agreed that using a smartphone is a habitual activity and comes naturally to them. They also indicated that smartphone is a must for them and they are addicted to it (Shambare et al., 2012; Van Deursen et al., 2015). Roberts et al. (2014) had proposed that excessive cell-phone usage among youth may result in smartphone use becoming more than just a habit. With increasing penetration of smartphones across the globe, the habitual usage has increased manifold and it has become a prominent factor contributing to smartphone dependency (Bian & Leung, 2014).

Smartphone dependency, in the present study, was also found to be influenced by social needs. It has been found to be relevant to smartphone addiction or dependency in several other research works in the domain (Suki, 2013a; Lin et al., 2015; Harun et al., 2015; Wang, 2016; Kim & Shin, 2016; Arif et al., 2016; Aykanat et al., 2016). The respondents believe that smartphone helps them stay connected to their friends and relatives. Similar to the observations by Goldman (2010), the respondents believe that smartphones help them transfer or share data, thus fulfilling their social needs.

This brings us to yet another antecedent of smartphone dependency i.e. Convenience, which is the ease or comfort that smartphone usage brings with itself. The ability of a smartphone to perform almost all the tasks of a computer, its ability to provide prompt

internet access and its compact size and portability makes it a convenient device to use (Genova, 2010). The respondents stressed that the smartphone helps save time and effort and it makes them accomplish their work more quickly. They also consider smartphone to be a replacement for their laptop. Similar results have been reflected in previous researches as well (Suki, 2013a; Arif & Aslam, 2014; Harun et al., 2015; Arif et al., 2016).

Another factor found to be contributing toward smartphone dependency was social influence which is the way an individual's beliefs, feelings and behaviour are affected by other people. In the case of smartphone, Social Influence impacts the usage intention apart from usage behaviour (Arif & Aslam, 2014). Interestingly, respondents in the present study believe that smartphone helps them overcome feelings of low self-esteem. They also acknowledged that their choice of smartphone is influenced by their friends whereas it also helped them fit better in their social groups. Several researchers have reported that Social Influence plays a crucial part in consumer's acceptance of innovative technology like smartphones (Kulviwat et al., 2009; Ting et al., 2011; Wang, 2016).

i. FINDINGS AND IMPLICATIONS

The suggested smartphone dependency scale is a combination of *classical factors*—Social Needs, Convenience and Social Influence, and *emerging factors*—Habit and Hedonism. Most importantly, the respondents acknowledged that habit and hedonism do contribute to their smartphone usage tendency. The results also depict that the smartphone users do consider the classical factors relevant to their smartphone usage behavior. This opens up a plethora of opportunities for marketers.

The manufacturers and marketers have to make the smartphone more entertaining and enhance the user's experience of a smartphone. The study clearly brings out that hedonism or pleasure is a critical part of smartphone dependency, which provides abundant options for the marketers to position their offering. Habit has also been found to influence Smartphone Dependency; thus, positive reinforcement of the brands is a must to create habitual usage, thereby increasing chances of dependency vis-à-vis a particular brand. Marketers should focus more on the

social need aspect of smartphone use as it emerged to be having maximum effect on dependency. Social need should be viewed by marketers as an opportunity to equip their smartphones with latest social media platforms, multimedia features and sharing options. The marketers should design their smartphones with high-capacity memory and fast data connectivity for online applications allowing prompt connectivity between users and their social groups.

Marketers, dovetailing their promotional strategy, may utilise social needs for better positioning of the smartphones and highlight the importance of staying connected through smartphones. The marketers may also utilize the role of social influences in creating dependency. Marketers may project smartphones to be a necessity within a social community and may position their brand as a status symbol within a social realm. This may be achieved by initiating promotional campaigns via endorsement from effective reference groups. This will enable the social influencers to create a positive impact and provide a superior reinforcement. Similarly, a significant association between convenience and users' dependence on smartphone provides an opportunity to marketers to position their product as an easy-to-use device. In other words, marketers may convince smartphone users that their brand offers a product that is convenient to use. Thus, smartphone manufacturers should focus on enhancing convenience features, such as offering larger memory capacity, more interactive interfaces, faster data transfer speeds, improved connectivity to input/output devices, and better capabilities for reading, writing, and editing documents. There is a need for marketers to provide a holistic experience for the smartphone users vis-à-vis the extracted factors—social needs, convenience, social influence, hedonism and habit—so that the consumer's dependency on smartphones is utilised in a positive manner.

j. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The study suffered from certain limitations too. Although sampling technique employed was non-probability in nature, yet due care has been taken to increase the representativeness of the student sample. The sample size in this study was on the lesser side

which may hamper the generalizability of the findings. However, future researchers may adopt innovative approaches in this regard. Response-bias may be present as it is impossible to eliminate it completely.

It is recommended that population sample be further broad-based to enhance the generalisability of the findings and deliver better outcomes. Further, study may be conducted across students from different education levels, instead of university students, to provide a more representative picture of smartphone dependency. A comparative study may be undertaken amongst different cultural groupings to understand how smartphones are perceived across user groups. The suggested 21 item scale may further be refined to better predict dependency on smartphones across different settings. Researchers may utilise the findings of the present study to further explore smartphone dependency in India. Smartphone usage is still in its early stages and more latent motives for using smartphone may emerge, especially in a demographically and culturally diverse country like India. This may open new avenues for researchers to look into and explore the phenomenon.

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