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## Article

# Consumer attitudes and intentions to adopt smartphone apps: Case of business students

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## **Consumer Attitudes and Intentions to Adopt Smartphone Apps: Case of Business Students**

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### **Abstract**

Increasing development in information communication technology led to huge attention over the mobile phones having extra features, normally referred as smartphones. Recently, the operating system and more importantly what distinguishes smartphones from ordinary phones, applications (Apps) had been given huge important in literature. We investigated the determinants behind the intention of using smartphone apps by choosing the perceived usefulness, perceived ease of use, social need, and perceived enjoyment as explanatory variables. We collected data from sample of 263 business students of Bahauddin Zakariya University of Multan (Pakistan) through the personally administered questionnaire. Factor analysis (based on Varimax rotation and Kaiser's normalization) was used. Relationship of interest was tested using the multiple linear regression analysis, three variables were found statistically significant but sufficient evidence was not found for the relationship of perceived enjoyment and intention to adopt apps. This study contributes to a more thorough understanding of the determinants of smartphones apps among business students by emphasizing the dimensions of perceived usefulness, perceived ease of use, social need and perceived enjoyment. Students' usage of smartphones apps is highly influenced by aspects of perceived usefulness, perceived ease of use, and social need. Smartphone application developers, and programmers should improve the current ability and contents to increase user enjoyment. Positive viral marketing spread via social networking sites could help application' developer providers to strengthen the competitive advantage of their product.

**Keywords:** smartphones, apps, perceived usefulness, perceived enjoyment, social need, university graduates

## 1. Introduction

Mobile phones have improved the communication among people in the previous half decade. The number of mobile phone users are increasing day by day dramatically also expected to increase in the future. Smartphones don't just contain e-mail functionality rather they are powerful computers that can handle multiple functions. IBM was the introducer of first ever smartphone ("Simon") in the market in 1993, since its evolution it shifted from being "phone-centric" (mobile phones that can handle only limited software) to being "data-centric" (mobile phones that can perform multiple functions i.e. instant messaging, picture messaging, video, and audio playback, global positioning system (GPS), games, a video camera, picture, and video editing) (Persaud and Azhar, 2012). This shift was exemplified by the introduction of first-generation iPhone in 2007, and by release of Linux based Android operating system in 2008.

A business can get maximum benefits from its business by using smartphone. The smartphone has revolutionized the way business operated. Now individuals don't need to stick on desks with desktop computers all day, rather individuals can check e-mail, work on the road, stay in touch with breaking news, and even in touch with the office, no matter where one is. Applications on the smartphones are particularly most important feature, because it can facilitate a business in a number of ways. Google apps on Android are atop of its competitors (iOS, Windows Phone OS etc.) when we talk about the apps. This is because of its open source nature, and variety of programs available for the development of applications. There are millions of free apps as well as many on sale available via internet. If you have an iPhone or an Android, it is necessary to research all the apps over the internet that can help your business to run better and more efficiently.

According to Verkasalo et al. (2010) "Smartphones are the devices that can perform dual function i.e. mobile telephone and handheld computer". Thus, what separate smartphones from mobile phones are the features of a computer, such as the applications (apps), defined as "small programs that run on a mobile device and perform tasks ranging from banking to gaming and web browsing" (Taylor et al., 2011, p. 60), which make smartphones possible to use for more purposes than calling and sending text messages. Smartphones run an operating system that can run diverse apps. The most popular operating system (OS) in the market include Apple's iOS, Google's Android, Nokia's Symbian & Windows Phone OS and RIM's BlackBerry OS. (Oliver, 2008)

The popularity of smartphone apps is exploding (Taylor et al., 2011), and people today have a vast number of apps to choose from. For example, iPhone's App Store offers more than 850,000 apps (Apple, 2013) and Android's Google Play offers more than 450,000 apps (Google, 2013). Only in Apple's App Store, a total of 50 billion apps have been downloaded (Apple, 2013), of which almost 20 billion were downloaded in 2012 alone (Apple, 2013). More than 800 apps are downloaded per second in Apple's App Store, at a rate of over two billion apps per month (Apple, 2013), showing the popularity. Worldwide sales of new smartphones were about 175 million in 2009, 350 million in 2011, and will reach 700 million in 2015 (Portio Research, 2011).

In 2001 were 5.9 billion mobile-phone users which is expected to increase to 7.5 billion by the end of 2014. It is considered that half of the mobile world is in Asia. Egypt tops the compound annual growth rate (worldwide) by having greatest increase in number of mobile phones users, followed by Oman, Sudan, Bangladesh, Mozambique, Iran and

Pakistan. In terms of mobile phone growth Pakistan ranks 7<sup>th</sup> worldwide and 2<sup>th</sup> in Asia (Portio research 2013). 67% of the Pakistan's total population own a mobile phone and 23% of them own a smartphone. (Portio research 2011) Though overall ratio of the smartphones is comparatively low in Pakistan, but since auction for 3G license are on the table of current official authorities, we can predict that smartphones ratio will increase dramatically in the market. There are 30 million internet users in Pakistan, half of them browse internet via mobile phones (Ansr.io). Government of Pakistan is planning to auction the long delayed 3G license by March 2014. All the telecommunication companies have already shown interest in bidding for 3G licenses. The International Monetary Fund (IMF) has already approved \$6.7 billion loan package last year in September for the above mentioned license.

Extensive research has been conducted on smartphones and smartphone apps, in combination with value (e.g. Chiem et al., 2010; Persuad and Azhar, 2012; Wells, Kleshinski and Lau, 2012; Salo et al., 2013), however current literature shows some limitations:

- Small evidence is available regarding value-in-use
- Few studies discussed the potential determinants of adoption of smartphone apps
- All the studies were conducted in developed countries

This study intends to investigate how the service components provided by Smartphone Apps would induce customers' intention to use of Apps. More specifically, the interrelationships between customers' appraisal of Apps in extrinsic prospect (e.g. perceived usefulness, perceived ease of use and social needs) and emotional prospect (e.g. perceived enjoyment), attitude and behavior intentions (e.g. initial adoption, recommendation) are examined, in order to understand consumers' intention for future adoption in better manner.

## **2. Literature Review**

A psychology research showed the importance of smartphones in such a way that if psychology had no methodological inertia than how we would be able to collect the behavioral data, the authors stated that we would use smartphone for this purpose because they are pervasive, sense rich, computationally powerful and remotely accessible. Smartphones has the potential to collect very precise and objective data from the millions of people about their behaviors and experiences without asking them to come in the controlled labs. (Dufau et al., 2011; Kwok, 2009; Rachuri & Mascolo, 2011; Raento, Oulasvirta, & Eagle, 2009).

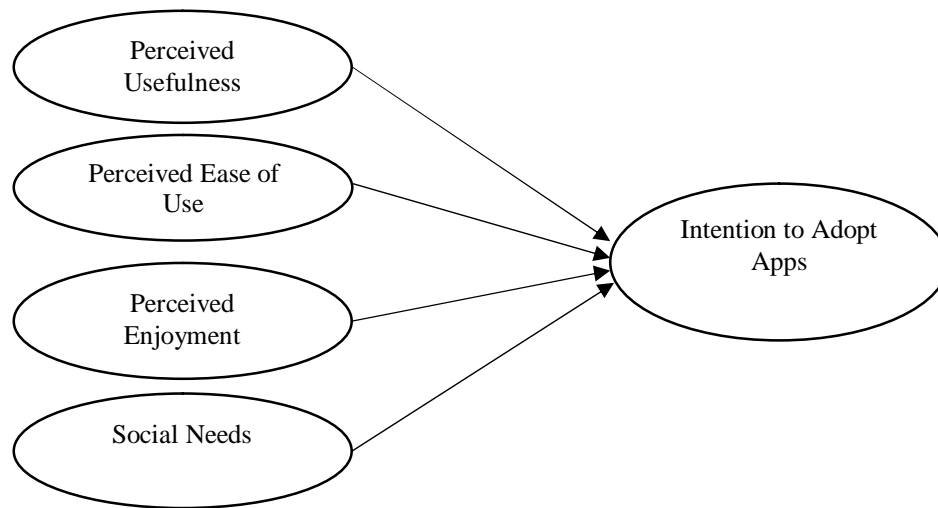
Smartphone Apps is a relative new business communication media, but the explosive growth of this handheld device is frequently discussed in recent studies (Lee & Raghu, 2011). Compared with traditional physical store transactions, mobile channels offer customers plenty of unique value, such as no temporal and spatial limitation, and availability of information. These Smartphone features bring us different levels of convenience, and this device has emerged as an important communication tool in our lives. Regarding the rapid expansion of smartphone apps service, m-commerce is expected to be the next wave of Internet transaction after e-commerce (Liang & Wei, 2004).

According to Accenture (2012), people today assume there should be an app for everything. In other words, everything should be “appified”. As Wagner (2011, p. 28) states: “while the global smartphone market is growing rapidly, little is known about how consumers make use of smartphones”. There is a need for marketers to understand the consumer behavior for smartphone apps and identify how and why they are used, in order to know how to best reach out to consumers through apps, as marketing channels, or as goods or services in themselves. Though, many smartphone apps seem to be developed without considerations to why and how people would want to use them. Hence, without knowing the consumer perceived value in using the apps. Chen and Mort (2007) claim that when a technology, such as an app, is voluntary to use, perceived value has a positive effect on technology readiness. This means that for a person to use an app, it should have usefulness, ease of use, enjoyment and social needs.

A common view has been to look at value as inherent in the product or service at the time of exchange. However, several scholars (e.g. Normann and Ramírez, 1993; Vargo and Lusch, 2004; Edvardsson, Gustafsson and Roos, 2005; Vargo, Maglio and Akaka, 2008; Grönroos, 2008) argue that value is created during usage, so called value-in-use. Value-in-use is based on consumption, in contrast to value-in-exchange that is based on trade (Vargo, Lusch and Morgan, 2006). Grönroos (2008) and Vargo, Maglio and Akaka (2008) argue that without value-in use, there is no value-in-exchange. Applying this to smartphone apps, value-in-exchange emerges when the app is downloaded, whereas value-in-use emerges when the app is used. If the user of the app doesn’t adopt an app, there will be no value in having downloaded the app, thus, no value-in-exchange.

### **3. Conceptual Framework**

In the prior literatures about technology adoption, various models have been applied in identifying the main determinants of individual technology adoption, including diffusion of Innovation Model, Task Technology Fitting Model (Goodhue & Thompson, 1995). In general, Technology Acceptance Model (TAM) is the parsimonious framework, which is widely embraced and proved to be effective in explaining different technologies adoption behaviors. Davis develops (1989) TAM in studying the technologies adoption for utilitarian purposes (e.g. perceived usefulness and perceived ease of use) in the early stage, which is capable to explain the strongest mediator in most of the user behavior cases. Basic framework of TAM states the inter-relationship between the perceived utilitarian consequences, behavioral intention and actual usage (Davis, 1989). However, prior studies indicate perceived usefulness and ease of use are not only the factors that influence users’ intention of technology adoption (Lee et.al, 2003). The holistic sensation influencing users’ total involvement in the technology adoption should not be neglected, in which intrinsic benefit is studied as an encouragement to adoption intention in related studies (Koufaris, 2006; Kim, Chan & Gupta, 2007).



**Figure 1: Conceptual Model**

Figure shows the framework constructed based on the concepts explained by extant literature, so termed as conceptual framework, not the theoretical framework. Nature of study supports the latent variable model as variables included cannot be observed directly. To check the relevance of factors in context, this study creates a new framework by modifying the perceived consequences of TAM and integrating the model with other influential factors – social need and perceived enjoyment. All factors are illustrated in details in the following sections.

### 3.1 Perceived Usefulness

Perceived usefulness (PU) is one of the strongest utilitarian determinants in the study of technology adoption, defined as degree to which consumers believe to enhance job performance by using particular system or technology (Davis, 1989). Applying Davis's definition (1989) in the context of apps adoption, PU refers to how Smartphone users and consumers use apps based store. Technology that cannot help customers to perform task efficiently is less likely to be employed or intend to undertake continued usage (Robey, 1979; Bhattacharjee, 2001). Most relevant studies have stated consistent positive relationship between PU and behavioral intention in various technologies context (Taylor & Todd, 1995; Fenech, 1998; Moon & Kim, 2001; Venkatesh & Davis, 2003; Yang, 2005). In the context of Apps-oriented business development, various Smartphone characteristics are considered as highly influential in determining users' perceived usefulness.

- **H<sub>1</sub>:** Perceived usefulness (PU) is positively related to Intention to adopt Apps (IAA).

### 3.2 Perceived Ease of Use

Perceived ease of use (PEOU) is identified as another critical extrinsic determinant that may influence users' intention of technology adoption (Davis, 1989). PEOU refers to "individuals' believe that using a particular product/service would be free from effort" (Davis, 1989). Applying the same concept in the context of Apps technology, PEOU is interpreted as the extent to which users perceive the ease of interaction with Apps enables them to receive proper and useful information they need. Chong and Marthandan suggest (2008) no matter how the technology is perceived to be useful, the practicality of

technology– ease of use may still affect users' intention of initial adoption or continuity. Previous finding has inconsistently argued the association between ease of use and adoption behaviors, subject to types of technology and products (Dishaw & Strong, 1999; Gefen & Straub, 2004; Kulviwat, Bruner & Kumar, 2007). Several researchers conclude PEOU as an important anticipator in predicting users' acceptance in the context of mobile service (Cheong & Park, 2005; Snowden & Spafford, 2006). However, Gefen and Straub (2004) argue that there is no direct relationship between PEOU and behavioral intention, whereas easy use of technology might be influential to users' perceived usefulness and affecting users' adoption intention indirectly. This result is further supported in the applications of mobile service (Wu & Wang, 2005; Hong, Thong & Tam, 2006; Mouakket, 2009). Regarding the inconsistent influence of PEOU suggested in prior studies, either direct or indirect effect of PEOU might be contributable to increase users' perceived value or adoption intention of smartphone apps. Hence, both direct and indirect effects of PEOU are examined in the study.

- **H<sub>2</sub>:** Perceived ease of use (PEU) is positively related to Intention to adopt Apps (IAA).

### 3.3 Perceived Enjoyment

In addition to the perceived usefulness and perceived ease of use, emotional attachment is considered as another crucial factor to explain and predict users' acceptance to new technology adoption (Dobholkar, 1996; Moon and Kim, 2001; Pagani, 2004). Various attributes has been used to explain technology penetration, including fun, playfulness and enjoyment (Pagani, 2004; Yang and Jolly, 2008). By definition, perceived enjoyment (PE) is the intrinsic holistic sensation gaining from the total involvement of the task, can be viewed as a non-apparent reason that influences user to perform an activity (Igbaria, Schiffmanb & Wieckowski, 1994; Kim, Chan & Gupta, 2007). Pervious researches suggest that users may experience different kinds of instant enjoyment from using specific type of technology, such as website usage and e-commerce and it is favorable in affecting consumers' attitude towards technology usage positively (Novak, 2003; Kulviwat, Bruner & Kumar, 2005). In the context of handheld internet device usage, Kulviwat, Breuner and Kumar suggest (2005) perceived enjoyment as the strongest predictors on consumers' attitude when comparing with the utilitarian factors – usefulness and ease of use. This opinion is further supported in different types of mobile applications, including e-mailing, multimedia message system (MMS) and gaming (Verkasalo, 2008). This result is further affirmed in the context of mobile services while enjoyment and fun are perceived as strong antecedents in affecting users perceived intrinsic value only (Park and Yang, 2006; Yang and Jolly, 2006; Curran & Meuter, 2007). Derived from the market context in the study of Hejden (2005), more new mobile services emerging today are in purpose of entertainment instead of business-oriented. Thus, other than utilitarian factors, the intrinsic motivation of Smartphone Apps is also examined in the study.

- **H<sub>3</sub>:** Perceived enjoyment (PE) is positively related to Intention to adopt Apps (IAA).

### 3.4 Social Need

Smartphones apps has dramatically changed the way people live, shop, purchase, play and connect with world (Goldman. 2010). Smartphones has different operating system as

mentioned earlier, and can handle diverse range of apps which allow individuals to interact with others more effectively by using the apps without any geographical restrictions. (Carayannis et al. 2012). Social needs include love, affection and belongingness (Schiffman et al., 2009). Smart phones offer larger and higher resolution screens and provide consumers with a tremendous array of features, including mobile web browsing, thousands of applications, e-mail, instant messaging, picture messaging, video and audio playback, GPS, games, a video camera, picture and video editing and much more (Goldman, 2010). In Peterson and Low's (2011) study, almost three-quarters of the students stated that they used the apps which gave them with unlimited internet access on their mobile phone or limited internet service sufficient for their needs.

- **H<sub>4</sub>:** Social need (SN) is positively related to Intention to adopt Apps (IAA).

### *3.5 Adoption Intention*

Intention is the indicator of an individual's readiness to perform a given behavior (Ajzen & Fishbein, 1975). The theory of planned behavior (TPB) (Ajzen & Fishbein, 1975) indicates the relationship between attitude, intention and behavior, in which intention is considered as the immediate factor in explaining consumers' behavior. Ajzen (1991) advocates that only the level of specific beliefs, but not the generic operation across applications that we can learn about critical factors inducing one person to engage in the behavior of interest. Based on this approach, this study identify the protruding belief of Smartphone apps users.

Several information systems are studied relied on the TPB, and intention is verified as the precedent of human behaviors (Bhattacharjee, 2001). Intention is determined by the individual's attitude toward the technology and whether they are willing to take a specific action if it is perceived to lead positive outcomes (Compeau & Higgins, 1995). In the past literatures, customers' intention can be decoded into various contexts, including continuance intention, which are all affected by the initial usage experience. Since apps usage is still the early stage of development, understanding consumers' attitude towards the initial adoption is crucial. Thus, the ultimate purpose of this study is to investigate the inter-related importance between the perceived consequences in affecting the intention of (a) initial adoption, (b) continuous usage of smartphone Apps.

## **4. Research Methods**

### *4.1 Data*

It is noted by Jacob and Isaac (2008) that university students are among the highest contributors to the increasing number of smart phone users. The factor that most influences the increase in smart phone usage is the functionality of apps (perceived usefulness) that helps users in their daily life especially business people and university students. So, a structured questionnaire (provided in appendix-1) containing 25 items was used to collect the data from 263 university's business students from Bahauddin Zakariya University in "Multan" district (Pakistan). Questionnaire distribution and data collection process was administered by researchers personally. All the questions were first elaborated to the students and then they were asked to response as per the 5-point Likert scale from strongly disagree to strongly agree. Among 263 respondents 191 (72%) were male and remaining 72 (28%) were female. As all the respondents were university (business) students, 161 (61%) were of BS honors program and 102 (39%) were master (2-year) program students. In Pakistan android OS is most famous operating system



among smartphones, so data also supported this phenomena as 142 (54%) of 263 students were using android in their smartphones. 37 (14%) were users of Apple iOS. Equal percent of respondents were using Symbian and Windows phone OS, i.e. 38 (14%). Only 12 (4%) people were using Blackberry OS.

#### *4.2 Validity and Reliability Analysis*

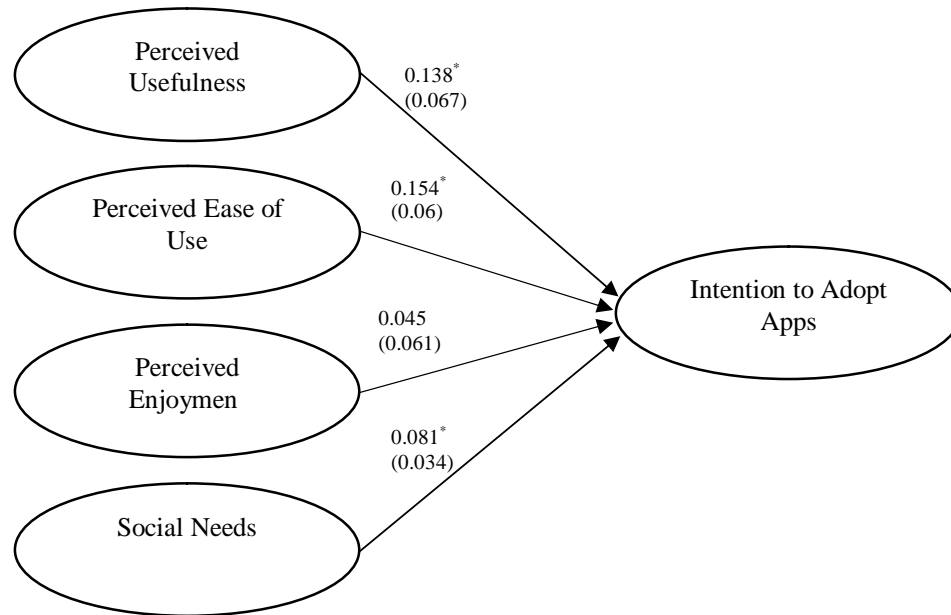
Before using the questionnaire data for regression analysis, items are processed under the reliability and validity analysis. Reliability of the constructs is measured through Cronbach's alpha, a widely used coefficient of internal consistency, proposed by Cronbach (1951). Theoretical value of alpha lies between 0 and 1, and higher values are preferable. Validity of items is ensured by factor analysis; these computed factors are called principal components. Items were entered for this analysis using SPSS, and at first step two key measures were calculated: Kaiser-Myer-Olkin (KMO) and Bartlett statistics. KMO measure of sampling adequacy is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. Large values for the measure indicate that a factor analysis of the variables is a good idea. Bartlett's test of sphericity tests whether the correlation matrix is an identity matrix, which would indicate that the factor model is inappropriate. So if testing doesn't provide sufficient evidence for null hypothesis then it is inferred that correlation matrix is not identity matrix.

Results of aforementioned analyses for dependent and independent variables are presented in table 1 and 2 respectively. For dependent variable KMO statistics (0.688) and Bartlett test are satisfactory. One construct for intention to adopt was extracted from factor analysis which contained four items, as found in previous literature. Values of Cronbach's alpha for this construct is appropriate (0.606). For independent variable (determinants of IAA) Initial diagnostic tests (KMO and Bartlett) were suitable however factor analysis of 21 items resulted in four components (perceived usefulness, perceived ease of use, social needs, and perceived enjoyment) and all returned useful items.

#### *4.3 Regression Analysis*

To find the relationship between the IAA and its determinants, linear regression analysis is conducted. A linear regression equation is estimated by regressing IAA over selected four determinants of IAA. Empirical results, for multiple regression, are given in table 4. To estimate the equation only purpose was to investigate the individual relationship of potential factors behind the intention to adopt an app, not to propose a model for determination and prediction. At first, ANOVA test was run to test the combined relation of studied factors. ANOVA assumes the null hypothesis that all the slope coefficients for regressors are equal to zero, concluding no relation with regress and. F-stat of 6.564 with probability value of less than 0.000 provides sufficient statistical evidence to assume that there is at least one non-zero slope coefficient in the regression equation. Three of four variables found to be significantly related to IAA, with an allowed type-1 error of 5%. All three variables are positively and significantly related to desired intention. Speaking in terms of individual relation, perceived usefulness is positively related to intention to adopt apps as indicated by the slope coefficient of 0.138 and standard error of 0.067. Perceived ease of use, however, has strongest relationship (slope coefficient of 0.154) and more precise estimator (standard error is 0.060). Social need has relatively weak relationship with the explanatory variable although positive and generalizable (coefficient

of 0.081 and p-value of 0.016). It is important to note that study doesn't provide enough evidence regarding the relationship of perceived enjoyment and intention behind adopting the apps. Overall model's fitness and summary measures do not indicate high predictive power as R-squared and adjusted R-squared are very low.



**Figure 2: Estimated Model**

\* Shows significant at 5% level

R-squared: 0.092, Adj. R-squared: 0.078, St. Error of regression: 0.617, F-stat: 6.564, P-value of F-stat: 0.0000

## 5. Discussion and Conclusion

### 5.1 Originality

The domain of research, smartphones, is a new technology that is largely adopted and deserves investigation for future mobile market strategies. Although this research of smartphone dependency is limited to universities, this study contributes to the field by adding new investigation in this new target segment of smartphone users. This study contributes to a more thorough understanding of the determinants of smartphones apps among business students by emphasizing the dimensions of perceived usefulness, perceived ease of use, social need and perceived enjoyment. There is a contradiction in prior studies concerning the explanations for the causes of ICT artifact adoption while preserving both the generalizability of TAM model and the accuracy and salience to practice. This research contributes a new vision and methodology to explain what and how innovative design features influence user's attitudes towards smartphone usage from the affordance perspective.

### 5.2 Practical Implications

Students' usage of smartphones apps is highly influenced by aspects of perceived usefulness, perceived ease of use, and social need. Smartphone application developers, and programmers should improve the current ability and contents to increase user enjoyment. Positive viral marketing spread via social networking sites could help application' developer providers to strengthen the competitive advantage of their product. The result of this research implies that managers or designers should take advantage of the current advanced technology to develop diverse and intuitive design features on smartphone for attracting user's attention and affection. The proposed framework can be used by mobile internet service providers and smartphone manufacturers to design the products and marketing strategies.

### 5.3 Theoretical Implications

There is opportunity for future research to expand the sample size and investigate in different geographical areas in order to enhance the understanding regarding usage of smartphone apps. The R-squared for this study was very low, (as discussed earlier the objective of researchers was not to formulate a model, rather to investigate the marginal effects of selected explanatory variables), implying there are additional factors that affect demand for smartphones to be explored further, other than perceived usefulness, perceived ease of use, social need and perceived enjoyment. So, another option will be to include other explanatory variables to enhance the model validity. Further research could enhance the proposed model by inputting mediating variables, such as lifestyle, culture, as well as demographics such as gender or age, etc. Furthermore, it would be relevant to investigate differences in product demand among smartphone users and basic mobile phone users. However, this study advanced understanding by the smartphone providers, manufacturers, application developers, and programmers to obtain empirical and actionable insights about the determinants of demand for smartphones and how to improve smartphone user experience and plan directions in the smartphone market.

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**Appendix-1: Questionnaire**

Construct	Statement	Reference
<b>PU</b>	PU1-I prefer apps providing wide range of information.	Davis, (1989) Suki, N. M. (2013).
	PU2-I prefer apps providing real-time and updated information.	
	PU3-I prefer apps, which in future, recommend me further apps as per my needs.	
	PU4-The apps store is more convenient than other devices or physical shops.	
	PU5-Apps enable me to finish my tasks efficiently.	
	PU6-I always use my smart phone apps to deal with my job.	
	PU7-In my daily life, usage of smart phone apps is high.	
<b>PEOU</b>	PEU1-My interaction with apps is clear and understandable.	Davis (1989) Gefen et al. 2003 Suki, N. M. (2013).
	PEU2-Learning to use apps is easy to me.	
	PEU3-Having a smart phone is like having both a mobile phone and a computer together.	
	PEU4-In my work, smart phone apps saves my time and effort.	
	PEU5-I would prefer carrying my smart phone rather than my laptop.	
	PEU6-Smartphone apps enables me to receive learning materials anywhere I go.	
	PEU7-Smartphone apps allow me to accomplish task more quickly.	
<b>PE</b>	PE1-It is enjoyable to use apps during idle time.	Eunju,& Eun - 2009
	PE2-It is enjoyable to have social interaction with my significant others. (E.g. Instant sharing with friends via social media platform in Apps)	
	PE3-The novel functions of apps excite me to adopt them.	
	PE4-In general, I believed using apps Is entertaining.	
<b>SN</b>	SN1-Smart phone apps allows me to stay connected with those I care about	Suki, N. M. (2013).
	SN2-I use smart phone to stay connected with friends and family through social networking web sites (Twitter, Facebook, MySpace, etc.)	
	SN3-I use my smart phone to catch up with friends and relatives	
<b>IAA</b>	IAA1-I intend to visit to the apps I like regularly.	Kim, H. W., Chan, H. C. & Gupta, S. Y. (2007)
	IAA2-I like to receive related message from developers in Apps. (e.g. notification of new arrival)	
	IAA3-I intend to learn using apps.	
	IAA4-I intend to use more apps in the future.	



**Appendix-2: Factor Analysis for determinants of IAA**

Factors	Items	Perceived Ease of Use	Perceived Usefulness	Social Needs	Perceived Enjoyment
$\alpha=.771$	In my work, smart phone apps saves my time and effort.	0.72			
	I would prefer carrying my smart phone rather than my laptop.	0.693			
	Smartphone apps allow me to accomplish task more quickly.	0.679			
	Smartphone apps enables me to receive learning materials anywhere I go.	0.66			
	Having a smart phone is like having both a mobile phone and a computer together.	0.62			
	My interaction with apps is clear and understandable.	0.588			
	Learning to use apps is easy to me.	0.539			
$\alpha=.721$	Apps enable me to finish my tasks efficiently.		0.698		
	I always use my smart phone apps to deal with my job.		0.679		
	I prefer apps, which in future, recommend me further apps as per my needs.		0.65		
	The apps store is more convenient than other devices or physical shops.		0.625		
	In my daily life, usage of smart phone apps is high.		0.577		
	I prefer apps providing real-time and updated information.		0.543		
	I prefer apps providing wide range of information.		0.494		
$\alpha=.774$	I use smart phone to stay connected with friends and family through social networking web sites (Twitter, Facebook, MySpace, etc.)			0.847	
	Smart phone apps allows me to stay connected with those I care about			0.772	
	I use my smart phone to catch up with friends and relatives			0.588	
$\alpha=.658$	It is enjoyable to have social interaction with my significant others. (E.g. Instant sharing with friends via social media platform in Apps)				0.769
	In general, I believed using apps Is entertaining.				0.722
	The novel functions of apps excite				0.713

	me to adopt them.				
	It is enjoyable to use apps during idle time.				0.487

Total Variance Explained is 49.494% and KMO is 0.745

#### Appendix-3: Factor Analysis of IAA

Factors	Items	Intention to adopt Apps
$\alpha=.606$	IAA1-I intend to visit to the apps I like regularly.	0.774
	IAA2-I like to receive related message from developers in Apps. (e.g. notification of new arrival)	0.762
	IAA3-I intend to learn using apps.	0.703
	IAA4-I intend to use more apps in the future.	0.481

Total Variance Explained is 47.634% and KMO is 0.688

#### Appendix-4: Regression Results

<i>Summary Statistics</i>				
R Square	0.092			
Adjusted R Square	0.078			
Standard Error of regression	0.617			
<i>F-stat</i>	6.564			
<i>P-value for F-stat</i>	0.000			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	2.171	0.394	5.518	0.000
PUSE	0.138	0.067	2.07	0.039
PEASE	0.154	0.06	2.552	0.011
PENJOY	0.045	0.061	0.741	0.459
SNEED	0.081	0.034	2.425	0.016