# Investigating the relationship between age and smart phone usage patterns: evidences from Indian smart phone users

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**Abstract:** This study intended to develop new categories of smart phone usage patterns in to three types such as professional, social and personal centric usage and tested the same among different age groups, i.e., young, middle, old, etc. with reference to finding the intentions of usage patterns among the selected age groups. The survey had been conducted among 150 Indian smart phone users belong to different age groups and the results revealed: 1) all age groups intended to use smart phones for personal usage; 2) young age group users intended to use smart phones for professional usage; 3) whereas middle age group and old age group users intended to use smart phones for social and personal usage, respectively. The implications of the outcomes were discussed.

**Keywords:** smart phones; usage pattern; personal; social; professional; young; middle; old; age groups; structural equation modelling; growing smart phone market.

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## 1 Introduction

Revolution of new technologies such as Android, etc. enabled the rapid development of smart phone usage among mobile phone users replacing traditional phones. Moreover, ability to do multitasking through smart phones influenced more users to shift from traditional phones (Sakkthivel and Ramu, 2017). Several researches attempted to explore the smartphone usage behaviour (Osman et al., 2012; Nagarkoti, 2014). However, not much of researchers attempt to study the influence of age factor over smart phone usage. There were studies attempted to identify demographic and social influence over the usage of smart phones and found no influence age factor of smart phone usage (Basha et al., 2011; Juwaheer et al., 2013; Marumbwa, 2014). Sakkthivel and Ramu (2017) attempted to identity the influence of different variables over smart phone usage of women consumers and found usage variables influenced the usage of smart phones. Several studies focused on developing a separate construct such as usage related variables in order to test the same on intentions of women consumers to use smart phones (Osman

et al., 2012; Nagarkoti, 2014; Sakkthivel and Ramu, 2017). There was a study attempted to find the influence of gender over technology adoption model (TAM) towards smart phones and found the influence of male users of perceived ease of use (Sakkthivel and Ramu, 2018). The past research had focused in the lenses of human computer interaction functionality and specification and satisfaction. As the smart phone became indispensable instrument for human's daily life of any social strata, there was a pertinent need to investigate the purpose behind the use of smart phone. Smart phone users employed this instrument for various purposes such as information seeking, accessing e-mails, social interaction, e-commerce and so on. Smart phone applications were used for many purposes. This research intended to classify usage intentions into three major categories such as such as professional, personal and social, thus attempting to explore the intensity of the type of usage intentions among the selected age groups such as young, middle and old. The outcomes of the study would benefit practicing managers and academia to work out new strategies and new vistas on research in this regard. The unique contribution of the research to the literature is its categorisation by usage type and shifted the focus of the research from utility of the mobile application and value added services to age wise usage types.

## 2 Smart phone usage intentions

Despite being the innumerable research conducted on the smart phone usage intention, the literature is dominated on the perspective of human computer behaviour perspective. This stream of research focused on functions, specification and applications aspects of smart phone usage intentions alone. Further, the studies explored antecedent such as quality affects consequences such as satisfaction. Smart phone usage also increased media usage (Woo et al., 2014), the deficiency needs such as physiological, safety, belongingness mediates the growth needs such as self-esteem and self-actualisation leads to smart phone use and satisfaction. Value added services influencing the smart phones usage through the perceived values (Kim and Kang, 2012; Chi and Lai, 2015; Vargo and Lusch, 2008) and perceived use (Kim and Kang, 2012). The mobile value added service intentions are further mediated to influence usage intentions (Wang et al., 2014). The hedonic and utilitarian smart phone's personal centric usage being influenced through, value added services (Ng and Kwahk, 2010). The influence of service (Wang et al., 2014), innovative technology, function and quality enhances the smart phone usage intentions (Chi et al., 2009, 2011). The usage intention and perceived value can be triggered through promotion by communicating the available value added services of the phone to users (Ke, 2002). Vendeursen et al. (2015) assessed the impact smart phone usage on different aspects such as addiction, usage types, emotional intelligence, social stress, self-regulation, age and gender. The study revealed that usage of smart phones for social purposes led to increasing addiction. Gokcearslan et al. (2016) conducted a study in Turkey to find the influence of smartphone usage in deriving addiction, self-regulation, self-efficacy, and cyber-loafing among university students. The study found that duration of the smart phone usage had significant impact of addiction behaviour. Berenguer et al. (2017) involved in a study to identify the involvement of elderly population, i.e., seniors in using smartphone and adoption behaviour. The study acknowledged that the seniors were not keen to use smart phones. Sakkthivel and Ramu (2018) investigated the influence of gender on technology acceptance model towards using smart phones in

Sultanate of Oman. The results revealed that both male and female users shown negative response towards perceived usefulness of smartphones. The study further revealed that the male users shown positive response towards perceived ease of use, whereas the female users shown negative response. Kuss et al. (2018) assessed the influence on mobile phone use over predicting psychopathological issues among Gen X and Gen Y. The study revealed that the excess use of social media using smartphone affected Gen Y and excess use of smartphone to make calls affected Gen X. Barnes et al. (2019) examined the difference between smartphone addiction v/s social networking services, differences for demographics with reference to smartphone addiction v/s social networking services addiction and user perceptions. The study found that smartphones addiction dominated over social networking services addiction, failed to identify the differences in demographics such as age, gender or education with reference to social networking services addiction.

In the lenses of user gratification theory (Peters et al., 2007), smart phone users perform number of activities such as information seeking, recreation, and social interaction to gratify their respective or combination of activities to satisfy their needs. Wang et al. (2014) has classified communication, entertainment, facilitation, and information search use of smart phones. Leung (2007) has designed in another dimension as sociability, instrumentality, reassurance, entertainment, acquisition and Wei and Lo (2006) has added psychological reassurance, fashion/status, mobility and immediate access as user gratification cause. Based on user gratification has majorly classified as task oriented and social usage (Dimmick et al., 1994; Keller, 1977; Fischer. 1992). In the light of social usage, the mobile media also supports cultural participation such as civil, political and social engagement are witnessed in the past (Campbell et al., 2010a, 2010b; Campbell and Kwak, 2011b; Chen, 2015; Hampton et al., 2011). Information seeking and recreational activities (Campbell et al., 2010a; Rojas and Puig-i-Abril, 2009) and relational activates were considered to be positively associated with social activities (Chen et al., 2012), however linking with civil engagement was not associated (Campbell and Kwak, 2010). Some scholars have noted the positive impact of mobile in professional or practical use (ex: Fischer, 1992; Loose et al., 2013).

The literature further advances with socio-graphic differences among the mobile use (Duggan and Rainie, 2013) such as age group variation (Smith, 2011; Purcell, 2011; Balakrishnan and Raj, 2012; Dresler-Hawke and Mansvelt, 2008). The cultural participation increases with level of education (DiMaggio and Ostrower, 1990; Park et al., 2013; Duggan and Rainie, 2013; Purcell, 2011; Hargittai and Hinnant, 2008) among privileged class (Hargittai and Hinnant, 2008), gender (Balakrishnan and Raj, 2012) and personality trait variation (Kim et al., 2015; Bianchi and Phillips, 2005).

Despite smart phone being researched with positive impact, research also confirmed the negative impacts such as smart phone addiction and compulsive use (Kwon et al., 2013; Park and Lee, 2011). Loneliness and shyness is connected with several type of smartphone addiction symptoms (Bianchi and Phillips, 2005; Brook and Newcomb, 1995; Dobkin et al., 1995; Engelberg and Sjoberg, 2004; Ensminger et al., 2002; Gaev, 1976; Weiss, 1973). The aforesaid reviews provided a much needed cue to identify and classify the smart phone usage in to three major types of usage as professional centric, social centric and personal centric usages. However, no reviews provided direction towards testing the usage patterns among different age groups. Therefore, the premises of

the research had been intended to test the new usage patterns among different age groups through setting following hypotheses.

## 3 Premises of the research and hypotheses development

Research on smartphone usage used to be pervasive in the areas of ubiquitous computing (e.g., Andone et al., 2016; Böhmer et al., 2011; Wagner et al., 2014; Falaki et al., 2010; Ferreira et al., 2015), human computer interaction and behavioural addiction (Elhai et al., 2017; Lopez-Fernandez et al., 2014; van Deursen et al., 2015; Lee et al., 2016). Smartphones, despite being the most popular device among the entire spectrum of population and demographics, few studies attempted to focus on marketing aspects. Thus, this research aimed at filling such vacuum by studying the usage behaviour of users towards using smart phones. Albeit, there had been a conscious awareness among the marketers and scholars about different usage types such as social, personal and professional usage, however, no research had attempted to prove empirically. Considering the recognised gap of providing empirical proof on the aforesaid usage types, the research theme had been created to test the selected usage types such as social, personal, and professional empirically among the different age groups in order to find usage discrepancies. This usage typology and discrepancies among the age groups would help smart phone manufacturers to design appropriate hardware and software applications including an operating system aiming to address such usage types. As discussed earlier, though smart phones used to be the most popular device among every spectrum of population, unlike cars and wrist watches, the manufacturers never been attempted to produce and launch a utility specific model. In wrist watches, there were sports models for youngsters and designer and classic models for middle and old age groups. Such marketing focus was not widely practiced by smartphone manufacturers. This study would attempt to bridge such gap witnessed through providing results which would help the manufacturers and marketers to understand the discrepancies between smart phone usage pattern and demographic aspects, specifically age factor. This study would support future smart phone marketers to devise an appropriate strategy in the process of product development.

From the literature, we inferred that there was a pertinent need to classify the usages vertically based on the purpose of use in to three major types as social, personal and professional usages. The latest smart phone features/applications could be used for social, personal and professional reason. The open social media like Facebook and Twitter were purely a social networking media. These social media applications generated social capital. Though these applications were used in personal environment but meant for social communication. The above usage patterns could be ascertained as social usage (Vendeursen et al., 2015; Kuss et al., 2018; Barnes et al., 2019).

Similarly, using applications such as e-mail, information seeking, online banking, online shopping, watching videos for professional works, etc. could be considered as professional usage pattern. Some of the social media applications can also be leveraged for the intra corporate communication tools such as private corporate social media, e-mail, chat and knowledge sharing application also emerged in to the corporate environment arena for professional use as knowledge management and communication tool. Therefore, aforesaid usage pattern could be identified as professional usage (Sakkthivel and Ramu, 2017).

Finally, the smart phone features could also be used for personal reason. The use of e-mail, *short messaging services* (SMS) to receive and send personal messages, watching videos for entertainment and learning, searching information seeking for personal knowledge could be considered as personal usage pattern. Hence, such usage pattern could be ascertained as personal usage (Sakkthivel and Ramu, 2017).

The new generation smart phones are embedded with many features were used for all purposes but the literature insofar has not witnessed evidence for relative magnitude of usage dispersion among professional, personal and social reasons. The smart phones were used for all purposes, however there was no research yet to identify intensity of the usages variation among the professional, social and professional use. The usage intensity variation could be attributed due to the extent of applicability of the application to all the type of usage pattern. Though, smart phone were loaded with all types' applications, leveraging usage the all applications practically not possible for all types user. The usage depended upon numbers of factors such as the user's interest, personality characters and technology adoption. The extrovert or shy and lonely users might be more addicted to social media usage such as Facebook and Twitter to meet their gratification. The business man and professional might not have time to engage in social media usage as compared to other socio-graphics. Despite all usage type most of mobile applications were common to all purpose were not exclusive a type of usage, most common applications such as e-mail, WhatsApp, information search and online purchase were mostly a personal reason. Based on the aforesaid arguments, we set the following hypothesis:

H1 Personal centric usages are relatively higher than social and professional.

From the arguments in favour of socio-graphic usage difference (Duggan and Rainie, 2013) and age group usage variation (Dresler-Hawke and Mansvelt,, 2008; Smith, 2011; Purcell, 2011; Balakrishnan and Raj, 2012; Vendeursen et al., 2015; Kuss et al., 2018; Nahas et al., 2018), set of hypotheses intend to be developed with reference to enquiring the difference in usage patterns among the selected age groups for the study such as young, middle and old.

The middle age group was active in all type of usages. However, as they grew up, their social networks were comparatively higher than youngsters. The middle age people gathered more social contacts from family, friends, neighbours and colleagues as they grew up. The increase in social network subsequently increased the social usage of the smart phone in relative to professional and personal usage. Though the older age group had relatively higher social contacts, their interest might be more on personal usage than professional and social usage. Based on the above arguments, we set the following hypothesis:

H2 The middle age group users oriented towards more social centric usage than professional and personal centric usage.

The older age group users, who have grown up, use mobile phone for professional and personal purpose relatively higher than social usage. The older users might still prefer traditional social networking such as face to face than smartphone for their social activity. The older age group users were assumed to be professionally less active than that of middle and young age group. The following hypothesis set based on the above mentioned arguments:

H3 The older age group users oriented towards more personal use than professional and social usage.

The youngsters in the age group of 21–30 were yet to develop an adequate mass of social network. Compared to older and middle age, younger age groups would be in the process of developing their career and job prospects and work pressure as they have just started their career and are entering in to the professional world. Though they might engage in personal and social usage of their smart phone significantly, their professional usage was expected to be higher than that of middle and older age group. The above arguments leading to developing the following hypothesis:

H4 Young age group users are oriented towards professional centric than personal and social centric.

## 4 Methodology

The study adopted descriptive research design and it explored and intended to find the relationship between smart phone usage and age. The study used quota sampling technique to collect the requisite data from the selected smart phone users (male and female) residing in Bangalore, India (one of the major metros housing most of the leading local and global information technology companies and houses most technical savvy population). The selected respondents represented different demographic profiles such as age, marital status, literacy, occupation, employment status, income, and so on. It was imperative to state the Indian smart phone market prove to be one of the fastest growing market in the world registering 11% growth in the first quarter of year 2018 (ET Bureau, 2018). The respondents were appropriately briefed about the purpose of the study, and asked to participate in the interview. The study used trained investigators to approach to conduct personal interview with the respondents (male and female) in their place of work and common places such as malls, retail stores, etc. The primary data had been collected from 172 samples, and finally 150 (N = 150) respondents were selected for the analysis and the rest of the responses were not considered due to inaccuracy. The questionnaire consisted of nine items scale measuring three items each captured social, personal and professional centric aspects of the smart phone usage. The respondents were asked to respond to their extent of agreement in 1 to 7 scale where 1 is completely disagree and 7 is completely agree The sample of the questionnaire was developed in the following style, ex:

1 I would like to have and use smart phones to connect with my friends through Facebook, Twitter, etc. (social network).

2 I would like to have and use smart phones to it is important to my work/business (work/business).

3 I would like to have and use smart phones to buy products/services over internet for my personal use (personal) (Sakkthivel and Ramu, 2017).

The scale had been validated through conducting exploratory factor analysis using principle component analysis factoring method with varimax rotation. The items were loaded above the threshold limit of .70 and also converged appropriately on its respective factor components demonstrated convergent validity of the scale. Further, the Smart PLS

version () also validated and ensured the reliability measures while testing the hypothesis. It was observed that composite reliability (Nunnally and Bernstein, 1994) of the all the constructs were much above the threshold limit of .70 supported the reliability of the surveyed data and scale. The average variance extracted (AVE) (Fornell and Larcker, 1981) for each of the constructs was well above the specified threshold level of above 0.50 confirmed reliability of the measures. The square of the AVE was much above the inter construct correlations in the diagonals supported that constructs were discriminating each other (Fornell and Larcker, 1981). The results of the reliability and discriminate validity were depicted (Table 1).

**Table 1** Reliability and discriminate validity

| *Construct* | *CR* | *AVE* | *Personal* | *Professional* | *Social* |
|---|---|---|---|---|---|
| Personal | *0.8976* | *0.7452* | *0.8633* | | |
| Professional | *0.8077* | *0.5835* | 0.4068 | *0.7638* | |
| Social | *0.8674* | *0.6857* | 0.6193 | 0.4245 | *0.8281* |

From the satisfactory results of reliability and validity tests, we further proceeded to test the hypothesis employing structural equation modelling using Smart PLS.

## 5 Analyses and discussion

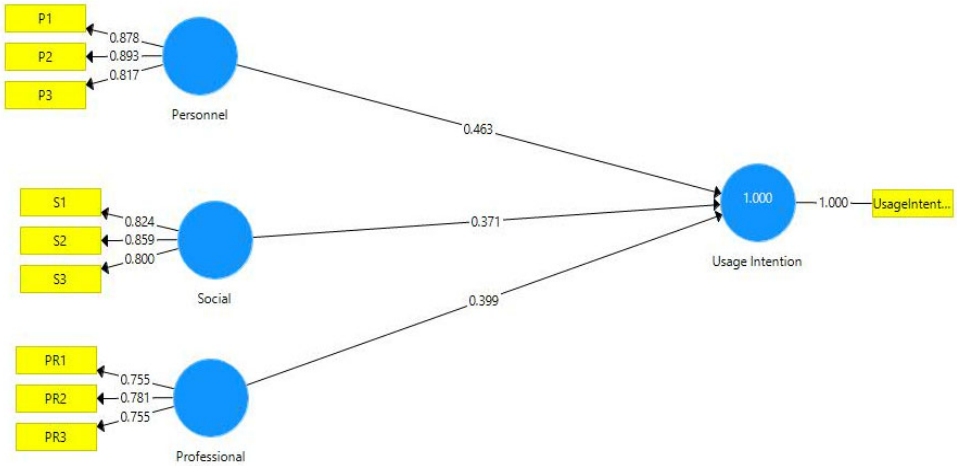
To test the set hypotheses, we conducted a structural equation modelling-based path analysis using Smart PLS (V). The bootstrap analysis (2,000 times) of the base line model results indicated that all the constructs were significantly related with usage intentions. We used bootstrap analysis to strengthen to rigor of the analysis due to inclusion of relatively smaller size of sample for the study. However, the magnitude of relation with each type of usage intentions varied significantly. The base line model suggested that the personal centric usage of the Smart phone was very high ($\beta = 0.46$, $p < 0.000$) while comparing to social centric usage ($\beta = 0.37$, $p < 0.000$) and professional centric usage stands ($\beta = 0.39$, $p < 0.000$). Though all types' usages were highly significant, the results indicated that social and professional centric usage fared equally, however, personal centric usage stands much stronger, thus proving set Hypothesis H1. The outcomes revealed the strength of personal centric usage was prevalent among all age groups, thus proved that the smart phone users intended to use smart phone for personal centric usage (Figure 1).

In order to explicate the difference in usage across various age groups as per the set Hypotheses H2 to H4, a multi group analysis has been conducted using Smart PLS (V). The results revealed that there was a gradual progress in strength in personal centric usage as the age gradually increased ($\beta = 0.37$) to ($\beta = 0.48$), thus reaffirming the set Hypothesis H1. The results portrayed the difference in usage pattern found among different age groups.

Baseline model revealed the personal centric usage found to elicit higher response than that of other usages such as professional and social. It was found that middle age respondents use more of smart phones with social centric usage intentions than that of young and older age groups respondents ($\beta = 0.48$, $p > 0.000$), thus the Hypothesis H2 was supported. Whilst checking on the professional centric usage, it was identified that

young age respondents use more of smart phones for the said purpose than that of middle age and older age group respondents (β = 0.46, p > 0.000), thus Hypothesis H4 was supported. Whilst assessing the usage of personal centric usage intentions, it was evident that older age group respondents to use more of smart phones for personal usage than that of young and middle age group respondents (β = 0.48, p > 0.000), thus the Hypothesis H3 was supported. Whilst comparing over all base line models with different age groups taken for the study such as young, middle and old age groups, it was evident from the analysis that there was a significant discrepancy exist with reference to the intentions of usage among such age groups. It was imperative to ascertain that usage pattern varied among users from different age groups. The outcomes proved all the set hypotheses, i.e., H1, H2, H3 and H4 (Table 2).

**Figure 1** Modelling on linkage between age and smart phones usage pattern (see online version for colours)




The results revealed that all groups intend to use smart phones for personal usage intentions among other usage intentions, however, it was credible to state that notable difference in intentions to use smartphones among the selected age groups, i.e., young, middle and old. It was vital to notice that personal centric usage was found to be popular among all age groups, however, such usage intentions differ among different age groups. Young users preferred to use smart phones for professional usage, middle age preferred to use smart phones for social usage, and older age group preferred to use smart phones for personal usage. It was interesting to notice that older age group respondents preferred to use smart phones for personal use, whereas middle age preferred to use for social use, and young age group respondents preferred to use smart phones for professional use. It was safe to infer that the degree of usage preferences varied between various age groups. The outcomes of the study were found to be novel and unique in terms of finding relationship between smartphone usage patterns and relating with different age groups. Moreover, the study revealed the different usage patterns such as professional, social and personal and mapping the same with different age groups. Such outcomes would immensely benefit and provide useful insights smart phone manufacturers and application developers with reference to designing and developing smart phones and applications responding to such requirements of the said age groups in terms of adding additional

features targeting the respective age groups. The outcomes would enable the practicing managers to develop smart phones targeting to respective age groups loaded with options satisfy such requirements.

**Table 2** Path analysis (see online version for colours)

| | *Path* | *Path coefficient* | *Mean (M)* | *STDEV* | *T statistics* | *P values* |
|---|---|---|---|---|---|---|
| Base line model | Personal -> usage intention | *0.4628* | 0.4623 | 0.0202 | 22.9387 | 0.0000 |
| | Professional -> usage intention | 0.3986 | 0.3987 | 0.0219 | 18.2017 | 0.0000 |
| | Social -> usage intention | 0.3713 | 0.3705 | 0.0197 | 18.8098 | 0.0000 |
| 21–30 | Personal -> usage intention | 0.3558 | 0.3539 | 0.0247 | 14.4169 | 0.0000 |
| | Professional -> usage intention | *0.4670* | 0.4674 | 0.0333 | 14.0036 | 0.0000 |
| | Social -> usage intention | 0.3715 | 0.3723 | 0.0268 | 13.8868 | 0.0000 |
| 31–40 | Personal -> usage intention | 0.4282 | 0.4538 | 0.1130 | 3.7907 | 0.0002 |
| | Professional -> usage intention | 0.3797 | 0.3252 | 0.1135 | 3.3471 | 0.0008 |
| | Social -> usage intention | *0.4869* | 0.4643 | 0.0659 | 7.3895 | 0.0000 |
| 41–50 | Personal -> usage intention | *0.4857* | 0.4879 | 0.0772 | 6.2924 | 0.0000 |
| | Professional -> usage intention | 0.4631 | 0.4351 | 0.0911 | 5.0834 | 0.0000 |
| | Social -> usage intention | 0.3846 | 0.3589 | 0.0875 | 4.3949 | 0.0000 |

## 6 Conclusions and implications of the study

This study intended to classify the various usage types such as personal, professional and social centric which could be considered a novel dimension in smart phone usage and market research. In line with scholars, Dresler-Hawke and Mansvelt (2008), Smith (2011), Purcell (2011), Balakrishnan and Raj (2012); Vendeursen et al. (2015) and Kuss et al. (2018). The study disproved the findings from the earlier studies with respect old age group users did not show interest to use smart phones (Berenguer et al., 2017). The study also established the usage discrepancy among various age groups found to be a novel observation. Further, the study revealed the usage pattern among the different age groups and defined different usage patterns. Such outcomes never found before and would immensely contribute to new vistas of research in this area and significant contribution to existing literature. The study revealed the different usage pattern of smart phone such as professional, social, and personal and the relationship between such usage among different age groups such as young, middle and old age. It was evident from the outcomes that young age group users intended to use smart phone for professional purpose, middle age group users intended to use smart phone for social purposes, and finally, old age group users intended to use smart phone for personal purposes. The results would provide a much needed direction to smartphone manufacturers to work on developing a smartphone aiming to cater to the requirements of consumers belong to different age groups referring to different usage patterns found through the study such as professional, social and personal. Moreover, the outcomes would help the smart phone manufacturers to move beyond the limit of innovation they have already attained through further narrowing their focus towards producing smartphones specific to age groups

loaded with tools enabling the different usage pattern such as professional, personal and social. Such smartphones would create a new segment in the crowded smartphone market and would enable smartphone makers to find niche segment of consumers to cater with. Such outcomes were unique and immensely contributing to strategies of manufacturers and marketers who could make use of this finding in developing and targeting focused markets that would satisfy specific and common usage needs of various age group of smart phone buyers. This observation not necessarily applicable only to smart phone but can also be explored to other type of electronic products such as desktop and laptop buyers and their usage intentions among various age groups. The study could act as a pre-cursor to ascertain usage pattern such as personal, professional, social, etc. of different electronic gadgets. The study determined and proved the validity of the constructs such as personal, social, professional usage pattern among smart phone users, and could be considered as equivalent of TAM to test acceptance any new technologies. The outcomes of the study would open up new vistas of research in this area enabling academia to actively involve in further research.

## 7 Limitations of the study

The study intended to find the different usage pattern among the smart phone users residing in Bangalore, India. Albeit, the study conducted in one city of a country, however, the selection location housed the smart phone users who were technically savvy and adapted to new technologies. The study focused on mapping the different usage pattern of the smart phones into three types such as professional, social and personal. However, the study did not divulge into the reasons behind using smart phones for such uses. The study was conducted among relatively smaller group of smart phone users, however, such group had provided the requisite data to identify and define new usage pattern.

## 8 Scope of further research

Further researchers could work on testing the above constructs over different electronic gadgets or equivalent. It is pertinent to mention here the major contribution of the study into existing literature about categorising usage pattern such as personal, social, and professional and validated the same through different age groups. It would pave way to opening vistas in future research in this area. The further researchers could also work on identifying usage pattern pertinent to different demographic profiles, thus could provide insights to manufacturers, marketers and academia. Further researchers could also work on identifying discrepancy on usage intensity towards different gadgets including smartphones.

## References

Andone, I., Błaszkiewicz, K., Eibes, M., Trendafilov, B., Montag, C. and Markowetz, A. (2016) 'How age and gender affect smartphone usage', *in Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct*, ACM, September, pp.9–12.

Balakrishnan, V. and Raj, R.G. (2012) 'Exploring the relationship between urbanized Malaysian youth and their mobile phones: a quantitative approach', *Telematics and Informatics*, Vol. 29, No. 3, pp.263–272.

Barnes, S., Pressey, A.D. and Scornavacca, E. (2019) 'Mobile ubiquity: understanding the relationship between cognitive absorption, smartphone addiction, and social network services', *Computers in Human Behavior*, January, Vol. 90, No. 1, pp.246–258.

Basha, S.S., Lakshmanna, B.C. and Fayaz, K. (2011) 'Empirical study on buying behaviour of mobile phone in India', *Asia Pacific Journal of Research in Business Management*, Vol. 2, No. 6, pp.298–316.

Berenguer, A., Goncalves, J., Hosio, S., Ferreira, D., Anagnostopoulos, T. and Kostakos, V. (2017) 'Are smartphones ubiquitous?: An in-depth survey of smartphone adoption by seniors', *IEEE Consumer Electronics Magazine*, Vol. 6, No. 1, pp.104–110.

Bianchi, A. and Phillips, J.G. (2005) 'Psychological predictors of problem mobile phone use', *CyberPsychology & Behavior*, Vol. 8, pp.39–51.

Böhmer, M., Hecht, B., Schöning, J., Krüger, A. and Bauer, G. (2011) 'Falling asleep with Angry Birds, Facebook and Kindle: a large scale study on mobile application usage', *in Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services*, ACM, August, pp.47–56.

Brook, J.S. and Newcomb, M.D. (1995) 'Childhood aggression and unconventionality: impact on later academic achievement, drug use, and workforce involvement', *Journal of Genetic Psychology: Research and Theory on Human Development*, Vol. 156, pp.393–410, DOI: 10.1080/00221325.1995.9914832.

Campbell, S.W. and Kwak, N. (2010) 'Mobile communication and civic life: linking patterns of use to civic and political engagement', *Journal of Communication*, Vol. 60, No. 3, pp.536–555, DOI: 10.1111/j.1460-2466.2010.01496.x.

Campbell, S.W. and Kwak, N. (2011a) 'Mobile communication and civil society: linking patterns and places of use to engagement with others in public', *Human Communication Research*, Vol. 37, No. 2, pp.207–222, DOI: 10.1111/j.1468-2958.2010.01399.x.

Campbell, S.W. and Kwak, N. (2011b) 'Political involvement in 'mobilized' society: the interactive relationships among mobile communication, network characteristics, and political participation', *Journal of Communication*, Vol. 61, No. 6, pp.1005–1024, DOI: 10.1111/j.1460-2466.2011.01601.x.

Chen, K.Y-N., Lo, V-H., Wei, R., Xu, X. and Zhang, G. (2012) 'A comparative study of the relationship between mobile phone use and social capital among Asian college students', Paper presented at the *62nd Annual Conference of the International Communication*.

Chen, W. (2015) 'A moveable feast: Do mobile media technologies mobilize or normalize cultural participation?', *Human Communication Research*, Vol. 41, No. 1, pp.82–101.

Chi, H. and Lai, Y. (2015) 'The influence of 4G mobile value added services on usage intention: the mediating effect of perceived value of smartphone and phablet', *International Journal of Marketing Studies*, Vol. 7, No. 6, p.50.

Chi, H.K., Yeh, H.R. and Yang, Y.T. (2009) 'The impact of brand awareness on consumer purchase intention: the mediating effect of perceived quality and brand loyalty', *Journal of International Management Studies*, Vol. 4, No. 1, pp.135–144 [online] http://www.jimsjournal.org/pi.html.

Chi, H.K., Yeh, H.R. and Yang, Y.T. (2011) 'Applying theory of reasoned action and technology acceptance model to investigate purchase behavior on smartphone', *Journal of International Management Studies*, Vol. 6, No. 3, pp.139–149.

DiMaggio, P. and Ostrower, F. (1990) 'Participation in the arts by black and white Americans', *Social Forces*, Vol. 68, No. 3, pp.753–778.

Dimmick, J., Sikand, J. and Patterson, S. (1994) 'The gratifications of the household telephone: sociability, instrumentality and reassurance', *Commun. Res.*, Vol. 21, No. 5, pp.643–665.

Dobkin, P., Tremblay, R., Masse, L. and Vitaro, F. (1995) 'Individual and peer characteristics in predicting boys' early onset of substance abuse: a seven-year longitudinal study', *Child Development*, Vol. 66, pp.1198–1214, DOI: 10.1111/j.1467-8624.1995.tb00931.x.

Dresler-Hawke, E. and Mansvelt, J. (2008) 'Mobile phone: enhancing social communication in young adult's lives', Presentation at the *Australian and New Zealand Marketing Academy Conference*, Sydney, Australia.

Duggan, M. and Rainie, L. (2013) *Cell Phone Activities*, pp.7–4, Pew Research Center's Internet & American Life Project, Washington, DC.

Elhai, J.D., Levine, J.C., Dvorak, R.D. and Hall, B.J. (2017) 'Non-social features of smartphone use are most related to depression, anxiety and problematic smartphone use', *Computers in Human Behavior*, Vol. 69, No. 4, pp.75–82.

Engelberg, E. and Sjoberg, L. (2004) 'Internet use, social skills, and adjustment', *Cyberpsychology & Behavior*, Vol. 7, No. 1, pp.41–47.

Ensminger, M.E., Juon, H.S. and Fothergill, K.E. (2002) 'Childhood and adolescent antecedents of substance use in adulthood', *Addiction*, Vol. 97, pp.833–844, DOI: 10.1046/j.1360-0443.2002.00138.x.

ET Bureau (2018) *India Smart Phone Growth Likely in Double Digits in 2018: IDC*, 24 May, Economic Times [online] https://economictimes.indiatimes.com/tech/hardware/india-smartphone-growth-likely-in-double-digits-in-2018-idc/articleshow/64157987.cms (accessed 20 July).

Falaki, H., Mahajan, R., Kandula, S., Lymberopoulos, D., Govindan, R. and Estrin, D. (2010) 'Diversity in smartphone usage', *in Proceedings of the 8th International Conference on Mobile Systems, Applications, and Services*, ACM, pp.179–194.

Ferreira, D., Kostakos, V. and Dey, A.K. (2015) 'AWARE: mobile context instrumentation framework', *Frontiers in ICT*, Vol. 2, No. 6, pp.1–9.

Fischer, C.S. (1992) *America Calling: A Social History of the Telephone to 1940*, University of California Press, Berkeley, CA.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, Vol. 18, No. 1, pp.39–50.

Gaev, D. (1976) *The Psychology of Loneliness*, Adams Press, Chicago, IL.

Gokcearslan, S., Mumcu, F.K., Haslaman, T. and Cevik, Y.D. (2016) 'Modeling smartphone addiction: role of smartphone usage, self-regulation, general self-efficacy, and cyber loafing in university students', *Computers in Human Behavior*, October, Vol. 63, No. 10, pp.639–649.

Hampton, K.N., Sessions, L.F. and Her, E.J. (2011) Core networks, social isolation, and new media', *Information, Communication & Society*, Vol. 4, No. 1, pp.130–155.

Hargittai, E. and Hinnant, A. (2008) 'Digital inequality: differences in young adults' use of the internet', *Communication Research*, Vol. 35, No. 4, pp.602–621.

Juwaheer, T.D., Vencatachellum, I., Puderuth, S. Ramasawmy, D. and Ponnsami, Y. (2014) 'Factors e influencing the selection of mobile phones among young consumers in Mauritius', *International Journal of Innovation and Knowledge Management in Middle East and North Africa*, Vol. 3, No. 1, pp.65–92.

Ke, C.H. (2002) *The Effects of Sales Promotion on Buyer's Purchasing Intensions – The Moderating Effect for Product Category*, unpublished Master thesis, Tunghai University, Taichung, Taiwan.

Keller, S. (1977) 'The telephone in new (and old) communities', in Pool, I.S. (Ed.): *The Social Impact of the Telephone*, pp.281–297, MIT Press, Cambridge, MA.

Kim, J.B. and Kang, S. (2012) 'A study on the factors affecting the intention to use smartphone banking: the differences between the transactions of account check and account transfer', *International Journal of Multimedia and Ubiquitous Engineering*, Vol. 7, No. 3, pp.87–96.

Kim, Y., Briley, D.A. and Ocepek, M.G. (2015) 'Differential innovation of smartphone and application use by sociodemographics and personality', *Computers in Human Behavior*, Vol. 44, pp.141–147.

Kuss, D.J., Kanjo, E., Crook-Rumsey, M., Kibowski, F., Wang, G.Y. and Sumich, A. (2018) 'Problematic mobile phone use and addiction across generations: the roles of psychopathological symptoms and smartphone use', *Journal of Technology in Behavioral Science*, Vol. 3, No. 3, pp.141–149.

Kwon, M., Lee, J-Y., Won, W-Y., Park, J-W., Min, J-A., Hahn, C., Gu, X., Choi, J-H. and Kim, D-J. (2013) 'Development and validation of a smartphone addiction scale (SAS)', *PloS One*, Vol. 8, No. 2, p.e56936.

Lee, S.J., Lee, C. and Lee, C. (2016) 'Smartphone addiction and application usage in Korean adolescents: effects of mediation strategies', *Social Behavior and Personality: An International Journal*, Vol. 44, No. 9, pp.1525–1534.

Leung, L. (2007) 'Unwillingness-to-communicate and college students' motives in SMS mobile messaging', *Telematics Inform.*, Vol. 24, No. 2, pp.115–129.

Loose, M., Weeger, A. and Gewald, H. (2013) 'BYOD – the next big thing in recruiting? Examining the determinants of BYOD service adoption behavior from the perspective of future employees', *AMCIS*, Chicago, Illinois.

Lopez-Fernandez, O., Honrubia-Serrano, L., Freixa-Blanxart, M. and Gibson, W. (2014) 'Prevalence of problematic mobile phone use in British adolescents', *Cyberpsychology, Behavior, and Social Networking*, Vol. 17, No. 2, pp.91–98.

Marumbwa, J. (2014) 'Exploring the moderating effects of socio-demographic variables on consumer acceptance and use of mobile money transfer services (MMTs) in Southern Zimbabwe', *American Journal of Industrial and Business Management*, Vol. 4, No. 2, p.71.

Nagarkoti, B. (2014) *Factors Influencing Consumer Behavior of Smartphone Users*, International Business (BBA) degree thesis, Arcada.

Nahas, M., Hlais, S., Saberian, C. and Antoun, J. (2018) 'Problematic smartphone use among Lebanese adults aged 18–65 using MPPUS-10', *Computers in Human Behavior*, October, Vol. 87, pp.348–353.

Ng, E.H. and Kwahk, K.Y. (2010) 'Examining the determinants of Mobile Internet service continuance: a customer relationship development perspective', *International Journal of Mobile Communications*, Vol. 8, No. 2, pp.210–229.

Nunnally, J.C. and Bernstein, I.H. (1994) *Psychometric Theory*, McGraw-Hill, New York.

Osman, M.A., Talib, A.Z., Sanusi, Z.A., Shiang-Yen, T. and Alwi, A.S. (2012) 'A study of the trend of smartphone and its usage behavior in Malaysia', *International Journal of New Computer Architectures and their Applications*, Vol. 2, No. 1, pp.275–287.

Park, B-W. and Lee, K. (2011) 'The effect of users' characteristics and experiential factors on the compulsive usage of the smartphone', in *Ubiquitous Computing and Multimedia Applications*, pp.438–446, Springer, Berlin, Heidelberg.

Park, N., Kim, Y-C., Shon, H.Y. and Shim, H. (2013) 'Factors influencing smartphone use and dependency in South Korea', *Computers in Human Behavior*, Vol. 29, No. 4, pp.1763–1770, DOI: 10.1016/j.chb.2013.02.008.

Peters, C., Amato, C.H. and Hollenbeck, C.R. (2007) 'An exploratory investigation of consumers' perceptions of wireless advertising', *J. Advert.*, Vol. 36, No. 4, pp.129–145.

Purcell, K. (2011) *Half of Adult Cell Phone Owners Have Apps on Their Phones*, Pew Research Center's Internet & American Life Project, Washington, DC.

Rojas, H. and Puig-i-Abril, E. (2009) 'Mobilizers mobilized: Information, expression, mobilization and participation in the digital age', *Journal of Computer-Mediated Communication*, Vol. 14, No. 4, pp.902–927.

Sakkthivel, A.M. and Ramu N. (2017) 'Investigating the variables influence women users intentions to use smart phones: evidences from emerging economies', *Int. J. Mobile Learning and Organisation*, Vol. 11, No. 2, pp.155–175.

Sakkthivel, A.M. and Ramu, N. (2018) 'Investigating the gender influence on technology adoption model towards smartphones – evidences from emerging economies', *International of Business Excellence*, Vol. 16, No. 1, pp.35–46.

Smith, A. (2011) *Americans and Text Messaging*, Pew Internet & American Life Project, Washington, DC [online] http://pewinternet.org/Reports/2011/Cell-Phone-Texting-2011.aspx (accessed 19 February 2019).

Vargo, S.L. and Lusch, R.F. (2008) 'Service-dominant logic: continuing the evolution', *Journal of the Academy of Marketing Science*, Vol. 36, No. 1, pp.1–10 [online] http://dx.doi.org/10.1007/s11747-007-0069-6.

Vendeursen, A.J.A.M., Bolle, L.C., Hegner, S.M. and Kommers, P.A.M. (2015) 'Modeling habitual and addictive smartphone behavior: the role of smart phone usage types, emotional intelligence, social stress, self-regulation, age and gender', *Computers in Human Behavior*, April, Vol. 45, No. 4, pp.411–420.

Wagner, D.T., Rice, A. and Beresford, A.R. (2014) 'Device analyzer: large-scale mobile data collection', *ACM SIGMETRICS Performance Evaluation Review*, Vol. 41, No. 4, pp.53–56.

Wang, D., Xiang, Z. and Fesenmaier, D.R. (2014) 'Adapting to the mobile world: a model of smartphone use', *Annals of Tourism Research*, Vol. 48, pp.11–26.

Wei, R. and Lo, V. (2006) 'Staying connected while on the move: cell phone use and social connectedness', *New Media and Society*, Vol. 8, pp.53–72, DOI: 10.1177/1461444806059870.

Weiss, R.S. (1973) *Loneliness: The Experience of Emotional and Social Isolation*, MIT Press, Cambridge, MA.

Woo, J., Choi, J.Y., Shin, J. and Lee, J. (2014) 'The effect of new media on consumer media usage: an empirical study in South Korea', *Technological Forecasting and Social Change*, Vol. 89, pp.3–11.

## Annexure

### *Collection tool*

1 Age group: below 20__ 21–30___ 31–40___ 41–50___ above 50___

2 Gender: male__/female__

3 Marital status: single___/married____

4 Employment: employed___/unemployed____

5 Occupation: student__ govt.___ private___ business___ homemaker___ retired___ others (pls. specify) _____

6 Monthly income (INR): less than 25 K___ 25 K–50 K___ 51 K–75 K__ 76 K–100 K___ above 100 K___

7 Education: school final____ bachelor___ masters____ PhD___

8 Mode of stay: with family___ stay alone____

9 State your brand of smartphone: Apple/Samsung/HTC/Sony/others (pls. specify) _____

10 Please state your agreement on the following factors that influence you to use smart phones

(Scale starts with 1 is completely disagree …… 7 is completely agree)

| *S. no.* | *Statements* | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|---|
| 1 | I would like to have and use smart phones to watch movies/listening music/playing games/browsing internet (entertainment) | | | | | | | |
| 2 | I would like to have and use smart phones to capture photos/videos for my collection (hobby) | | | | | | | |
| 3 | I would like to have and use smart phones to buy products/services over internet for my personal use (online purchase) | | | | | | | |
| 4 | I would like to have and use smart phones to communicate and chatting with my friends (connection) | | | | | | | |
| 5 | I would like to have and use smart phones to connect with my friends through Facebook, Twitter, Instagram, etc. (social network) | | | | | | | |
| 6 | I would like to have and use smart phones to collect information through interacting with my friends over internet (information) | | | | | | | |
| 7 | I would like to have and use smart phones to it is important to my work/business (work/business) | | | | | | | |
| 8 | I would like to have and use smart phones to do online business through Instagram or WhatsApp (own business) | | | | | | | |
| 9 | I would like to have and use smart phones to do online banking for my business/work (online banking) | | | | | | | |