

The Adoption Intentions of Smartphones among Young Consumers: Diffusion of Innovation Theory Perspective

Suleman Anwar, Ayesha Ramzan Butt, Eliane Bragança de Matos and Muhammad Kashif

Abstract

The current study aims to investigate the elements of the Diffusion of Innovation theory to determine their impact on the smart phone adoption intentions among younger consumers in Pakistan. The study is a cross-sectional survey in nature, where the data was collected by means of a self-reported questionnaire, randomly distributed among the users of smart phones. The data were analysed by means of quantitative analysis by following an objectivist frame of reference to reach meaningful conclusions. The results reveal that traditional structure of the Diffusion of Innovation theory does not fit well with the data which led us to the development of an alternative model – a first attempt to reach theoretical refutation and adjustment to make the theory more accustomed to mobile technology adoption studies in future. The refutation of the diffusion of innovation theory with reference to smart phone adoption and the developing country context of Pakistan are the unique contributions of this study.

Keywords: adoption, DOI theory, Pakistan, SEM, smart phones

Authors

Suleman Anwar is Assistant Professor, GIFT University, Pakistan. Email: Suleman@gift.edu.pk.

Ayesha Ramzan Butt, GIFT University, Pakistan.

Eliane Bragança de Matos is Assistant Professor of Marketing, Faculdades Novos Horizontes. Email: elianebraganca@gmail.com.

Muhammad Kashif is Assistant Professor, GIFT University Pakistan. Email: kashif@gift.edu.pk.

1. Introduction

Mobile phones have become a necessity all across the globe. The recent statistics on mobile phone penetration reveal almost six out of seven billion of the world population own a mobile phone (Daily Mail, 2017). Furthermore, the Smartphone penetration has also tripled and is expected to cross the two billion user threshold in the year 2016 with over a half of the world population owning Smartphones by the end of 2018 (E-Marketer, 2014). People use mobile phone devices for several purposes. In a recent survey conducted among American mobile phone users, the top four motives for mobile phone usage were: to send or receive messages (80%); to access the internet (61%); to send or receive email (52%) and to download apps (50%) (Pew Internet Center, 2017). The motives of Smartphone usage are slightly different as compared with all mobile phones. In a recent study published by Harvard Business Review (HBR), the top five motives of Smartphone usage found were: me time (46%); socializing (19%); shopping (12%); accomplishing (11%) and preparation (7%) (Harvard Business Review, 2013). As a general point of view, this rapid penetration of hand held devices must have relieved the brand managers of technology products who can

now develop *aperture* while communicating brand messages to consumers – especially the mobile marketing as a tool to convey brand message. However, despite this proliferation of products among consumers from all across the globe, technology brands are facing challenges such as *imitation* by the market *challengers* and market *followers* (Giachetti & Lanzolla, 2015) which has made technology *brand differentiation* a difficult task to achieve, especially in the developing world where local brands are becoming stronger players in the face of competition posed by international technology brands (Li & Kozhikode, 2008).

In developing countries such as Pakistan, the mobile phone penetration rate is among the highest in the world and this has also made the country a lucrative market for international and global brands to enter and serve consumer needs. However, alongside the entry of global players, counterfeit brands are also growing very quickly given the fact that, in terms of acceptance of technology brands, Pakistanis are very price sensitive (Naveed, Akhtar & Cheema, 2012). This is a threat to the growth and survival of high priced–high quality technological innovations. This is not a Pakistani case only as there are a few more price-centred markets, such as Brazil, India and China, in particular, where people tend to buy counterfeit mobile brands instead of high quality innovations such as Smart phones (Kwong *et al.*, 2009). The market share of Smart phones has been declining over the last few years and while some attribute this to the death of the founder of one of the leading firms, others relate it to some unknown market forces which have caused a decline in the smart phones penetration. This is where the current study contributes to the body of knowledge at three levels. At the first level, the Diffusion of Innovation (DOI) Theory is challenged to make it much more valid to investigate the Smartphone users’ intentions to adopt innovative products.

DOI is a psychosocial theory which integrates the social as well as the psychological elements fostering acceptance of innovations. The theory is widely employed by researchers to explain the rate of innovation among the users of a product or service (innovation). The theory has its roots in the study of sociology by Gabriel Tarde, a 19th century sociologist who has been regarded as the father of modern diffusion of innovation paradigms (Kinnunen, 1996). Philosophically, he related the diffusion of innovation process to the *Law of Imitation* and referred it to a continuous process of acceptance among individuals based on their social and personal dispositions. The idea evolved with the passage of time as researchers studied it under various circumstances, e.g. in the context of agriculture, education, medical and consumer sciences. In the latter half of the 20th century, a professor in sociology of rural dynamics synthesized more than 500 studies published over the years to offer a framework to study the innovation in organizational as well as in social settings (Rogers, 1971). The theory evolved over a period of time and researchers employed it to investigate innovation adoptions in social as well as organizational settings (Rogers, 1995) and having its roots embedded in sociology as well as the study of physics whence the *Law of Imitations* emerged. Since then, the DOI theory has been employed to study social as well as organizational contexts.

The context of Pakistan is another valuable aspect of this study, which has not previously been studied by employing a well-established psychosocial theory such as DOI to investigate innovation adoption. The socio-cultural environment can be one reason for the declining market share of smartphones – Pakistan as a country is very different when compared to the West as indicated by the work of Hofstede (2010). People generally are low risk takers which can be related negatively to innovation adoption but this has not yet

been thoroughly explored through empirical studies. Finally, the smartphone brands have been considered as an innovation for the conduct of this study, mainly to offer some strategies to influence price sensitive consumers and in a counterfeit-driven market such as Pakistan.

2. Literature Review

2.1. Relative Advantage and Innovation Adoption

In collectivist societies, brand trust is an important element affecting the adoption of innovation. The consumer perceptions of doubt regarding the lack of performance of a brand in relation to its competitors (relative advantage) can easily lead to brand rejection which highlights an important role for relative advantage in innovation adoption (Hamid Hawass, 2013). Since there are always multiple brands and substitutes to influence various market segments, consumers employ a relativity principle and select only those brands which are considered advantageous over others (Nowlis & Simonson, 1996). The relative advantage can take several forms – e.g., functional and social. In terms of functional advantage, the consumers seek to evaluate brands based on the assumption that these products fulfill the *performance criteria* as communicated by the brand team (Ballantyne, Warren & Nobbs, 2006). On the other hand, the consumers would like brands to fulfil their self-esteem and social needs better than the other available alternatives as a reason to accept the innovation (Sirgy, 1982). Elements such as price, availability, features and social status form the relative advantage as something pivotal influencing the innovation adoption. Based on this assumption, the following hypothesis is stated;

H1: The relative advantage relates to the adoption intention of smartphones.

2.2. Compatibility and Innovation Adoption

This refers to the ability of an innovative brand to meet the consumer's lifestyle, habits and past experiences. A brand needs to be compatible with the lifestyle of its users and this has some social and personal implications (Labroo & Lee, 2006). For instance, the brands which are not socially compatible with consumers are criticised heavily for inculcating a hedonic, Western spirit among an Eastern community. The brand choice is highly dependent on the extent of congruity between the brand and its users. This is of supreme importance in collectivist cultures (including Pakistan) where people seek an in-group identity because the brands which do not reflect societal values in their positioning are criticised and rejected (Dong & Tian, 2009). In this regard, the brands are not criticised alone but, rather, their users are also criticised. On the other hand, incompatible brands are also purchased to seek attention for an individual and status among the members of the community (Cayla & Eckhardt, 2008). Despite the duality of the nature of incompatibility and innovation adoption, the extant literature available on innovation adoption advocates a positive relationship between the compatibility of an innovation with the innovation adoption (Bohling, 2012). Based on the existing work, the following hypothesis is proposed:

H2: Compatibility relates to the adoption intention of smartphones.

2.3. Complexity and Innovation Adoption

Complexity refers to the extent to which an innovative product is difficult to understand and use by its users (Rogers, 1995). Complexity in innovation can take several forms – the intellectual difficulty which is related to use and understanding of an innovation and the difference between knowledge-intensive, high-quality or low-quality innovations (Drucker, 2002); as well as the relative newness and the past use of the technology (Rogers, 1995). Technology which is difficult to use can also offer an exciting experience of learning among its users and this is largely dependent upon the market segment a brand is aspiring to serve (Wood & Moreau, 2006). Furthermore, initially, at an early stage of the usage of an innovative brand, the consumers tend to be more exciting and learning-oriented – a spirit which fades away as time progresses. Above all, the users' perceptions of the extent of complexity will influence their decision to adopt an innovation. There is an understanding that complexity (having new features) can also help in developing a point-of-differentiation among other competing brands to safeguard a brand from the realm of competition (Styles & Goddard, 2004). Consequently, there has been a relationship between the complexity of an innovation and its adoption which led us to formation of the following hypothesis:

H3: Complexity relates to the adoption intention of smartphones.

2.4. Trialability and Innovation Adoption

Trialability is the extent to which a consumer is likely to experience an innovative product (Rogers, 1995). The brand trial depends on several elements – social, personal, as well as psychological (Lam *et al.*, 2013). The consumers generally

are likely to try a brand which has a social appeal – that is, it is socially acceptable as well as acknowledged among members of society (Batra *et al.*, 2014). It is also evident that product trial decisions are dependent upon the personal and psychological elements – the lifestyle of consumers (strivers, achievers and so on), their demographics, as well as their concept of life (welfare or hedonistic motives) (Arts, Frambach & Bijmolt, 2011). Most importantly, trialability can also reduce the perceived risk(s) associated with the innovation adoption. However, this relationship is scantily developed in technology adoption studies. Trialability has also been regarded as an important element to minimize the risks associated with innovation adoption. For example, if someone has already used and gone through the trial of an innovative product, the risk taking ability in that individual may have developed such that it opens the door to try further innovations in future (Hirunyawipada & Paswan, 2006). Consequently, the following hypothesis has been proposed:

H4: Trialability relates to the adoption intention of smartphones.

2.5. Social Influence and Innovation Adoption

Social influence can take two broader forms – normative and informational. The normative form refers to conforming to a set of expectations from others, while the informational deals with the information provided by other knowledgeable people who can influence the information symmetry (Deutsch & Gerard, 1955). In societies where people live in groups and seek an in-group identity, the social elements strongly affect the choice of products and services. There exists a very high chance of brand adoption in cases where people can get social approval and recognition by consumption of the respective products and services (Dong & Tian, 2009). Culture has

always been an important element affecting consumer choice. In the first half of the 20th century, when the consumer behaviour school of marketing thought was emerging, researchers delineated the important role of reference group members in product choice and consumption. Contemporary researchers have also highlighted the importance of reference group members who might approve a brand, the likelihood of its acceptance and adoption increases (Choi & Geistfeld, 2004). Social needs, as postulated by the classic work of Maslow (1943), are very important for human survival and can be applied to almost all the product categories where an element of risk such as social disapproval and rejection exists. It is believed it can be true for technological innovations such as smartphones. Consequently, the following hypothesis is proposed:

H5: Social influence relates to the adoption intention of smartphones.

2.6. Perceived Risk and Innovation Adoption

Perceived risk is the extent of risks associated with the purchase and consumption of products. The risks associated with purchase and consumption of products are classified into several dimensions – social, functional, time loss, physical and psychological (Mitchell, 1999). People tend to accept those products where the perceived risk is low and otherwise. Marketers make utmost efforts to minimize the level of risk as perceived by the consumers to induce purchase and trial of products (Hirunyawipada & Paswan, 2006). Advertisements and other brand related information is directed towards consumers in order to minimise the associated risk. In addition to that, the personality of a consumer also plays a pivotal role – *innovators* and *achievers* (psychographic market segment categories) are generally more risk taking in

nature and are more likely to buy innovative brands as compared with *makers* and *strivers*, mainly due to income and work-life differences (Assael, 2005). The consumers of technology brands need sufficient information and it is regarded a challenge among marketers to convince them to accept an innovation with innovative features – that is, something that never existed before. Consequently, the following hypothesis is proposed:

H6: Perceived risk relates to the adoption intention of smartphones.

3. Research Methods

For the purpose of data collection, quantitative measures were selected, using an already established questionnaire based on the seminal work of Rogers (1995). The questionnaire was adopted from the study of Ismail (2012). The questionnaire was adopted without any changes as it was employed in Malaysia (another largely Muslim, collectivist dominant country) in the recent past and this is a context similar to that of Pakistan. The questionnaire comprised of 27 items – spread across six dimensions of DOI theory as proposed by Rogers (1995). A Likert scale ranging from 1 = strongly disagree to 5 = strongly agree was developed. Table 2 provides a descriptive analysis of data that offers insights into the measurements of the six dimensions. The questionnaire was administered in English and was personally distributed by one of the authors of this research to smartphones users in private sector universities located in the suburbs of Lahore, which is a metropolitan city located in the largest province of Pakistan. It is difficult to find smartphone users in public places in Pakistan because the country is highly populous so that its markets and streets become quite congested and this made data collection almost impossible at public places. This is why

the data was collected from universities located in the suburbs of Lahore. The universities were selected by convenience and so too, therefore, were the respondents. However, care was taken in respondent choice that only those people were requested to render their opinion who had used smartphones in the preceding six months. This was to make sure that respondents had enough experience in using the brand.

It was planned that the sample would be 200 people and so the questionnaire was distributed personally by the researcher involved in data collection. However, with a response rate of 77.2%, 193 people willingly completed and returned the questionnaires, which were retained for data analysis purposes. The response rate and sample size are comparable with recently conducted studies investigating adoption intentions (Ismail, 2012). The sample demographics of age, gender and number of years using smart phones as a brand are detailed in Table 1 below.

Item	Frequency (n)	%age
Age		
Below 21	94	49.0
22-27	91	47.4
28-35	3	1.6
Above 36	4	2.1
Total	192	100.0
Gender		
Male	105	54.7
Female	87	45.3
Total	192	100.0
No. of Years Using Smartphone		
1 year	84	43.8
2 year	69	35.9
3 year	39	20.3
Total	192	100.0

Table 1: *Demographic Characteristics; source: Original Research*

The descriptive analysis shows that 49.0% of the sample is less than 21 years old and 47.4% aged between 22 and 27 years old; 54.7% are women and 43.8% have used smartphones for 1 year and 35.9% for 2 years.

4. Results

4.1. Data Analysis through Structural Equation Modelling (SEM)

The data cleaning (missing values as well as the outliers) is a core task at hand among researchers before analysis – both structural as well as development of a measurement model. The multivariate outliers were identified by means of the Mahalanobis distance (D2) with a probability less than 0.1%, as suggested by psychology researchers (Schinka, Velicer & Weiner, 2003). Based on the analysis, it is found that there is a minimum acceptable distance which exists between the two points – making data an ideal candidate for further analysis. The analysis of indicators of the Kolmogorov-Smirnov normality test was also performed to establish a goodness of fit index at a later stage of analysis. The results of this test pointed towards lack of normality of the indicators used for this purpose. The findings are enough to establish a violation of multivariate normality, since the normal distribution of all variables in a block is a requirement for the existence of multivariate normality of all linear combinations of these variables (*ibid.*, 2003).

The uni-dimensionality was based on the principal component analysis (PCA) with a Varimax rotation, after which all factors with eigenvalues > 1.00 were retained (Hair *et al.*, 2006). According to this criterion, all constructs were considered uni-dimensional since the extracted variances were between 57.22% and 63.80% (within the limits suggested by the authors). For internal consistency, Cronbach's alpha coefficient was used – the value ranged between 0.542 and 0.714. Convergent validity was also confirmed as all factor loadings of the indicators were significant in the factor analysis at the level of 5%. The construct Perceived Risk was the one which did not meet the criteria listed in the bibliography, with extracted variance of 42.29% and factor loadings of 0.444.

To assess the discriminant validity, we used the method developed by Fornell and Larcker (1981). The construct correlations should not exceed the value of 0.85 and construct squared correlations must not be greater than the average variance extracted. The results are shown in Table 2.

Construct 1	Construct 2	Correlations	Construct squared correlations	AVE Construct 1	AVE Construct 2
ADP	COMPLEX	0.377	0.142	0.771	0.762
ADP	RA	0.231	0.053	0.771	0.664
ADP	SOC	0.708	0.501	0.771	0.861
ADP	TRI	0.663	0.440	0.771	0.720
COMP	ADP	0.290	0.084	0.902	0.771
COMP	COMPLEX	0.429	0.184	0.902	0.720
COMP	PERSK	0.326	0.106	0.902	0.762
COMP	RA	0.274	0.075	0.902	0.641
COMP	SOC	0.266	0.071	0.902	0.664
COMP	TRI	0.455	0.207	0.902	0.861
COMPLEX	RA	0.548	0.300	0.664	0.762

X					
PERSK	ADP	0.943	0.889	0.641	0.762
PERSK	COMPLE X	0.794	0.630	0.641	0.664
PERSK	RA	0.396	0.157	0.641	0.861
PERSK	SOC	0.926	0.857	0.641	0.720
PERSK	TRI	0.961	0.924	0.641	0.771
SOC	COMPLE X	0.616	0.379	0.720	0.762
SOC	RA	0.468	0.219	0.720	0.664
SOC	TRI	0.932	0.869	0.720	0.861
TRI	COMPLE X	0,693	0,480	0,861	0,664
TRI	RA	0,777	0,604	0,861	0,762

Table 2: Average Variance Extracted (AVE) and Construct Squared Correlations; **source:** Original Research

Table 2 shows that some correlations are very high – higher than the 0.85 recommended by some researchers (*ibid.*, 1981). As a result, the construct squared correlations showed results above the AVE of the construct. Hence, considering these results, the theoretical structural model was produced.

The relationships between dependent and independent variables were not all significant, as shown in Table 3. The constructs COMPLEX, COMP, TRI and RA showed no statistical significance of factorial scores, which guided us towards further robust analysis.

Dependent Construct	Independent Construct	Standardized Regression Weight	Regression Weights	S.E.	C.R.	P	Decision
ADP	SOC	0.559	0.509	0.117	4.34	***	Supported
ADP	COMPLEX	-0.044	-0.044	0.098	-0.451	0.652	Not supported
ADP	PR	0.59	0.891	0.217	4.106	***	Supported
ADP	COMP	0.194	0.175	0.092	1.894	0.058	Not supported

ADP	TRI	0.216	0.212	0.1	2.123	0.034	Not supported
ADP	RA	0.669	-0.016	0.084	-0.193	0.847	Not supported

Table 3: *Model Constructs Validity*; **source:** *Original Research*

Since one of the aims of this study was to test and refute the DOI theory to develop a highly suitable model for future investigations pertaining to innovation adoption of technology (with respect to in particular), an alternative model was envisioned which is unique to this study, which is now discussed.

4.2. Alternative Model of Innovation Adoption

The alternative model considered the relationship between constructs previously identified and tested various combinations between the independent and dependent variables. The best suitable fit found among the all other combinations is presented in Figure 1 below.

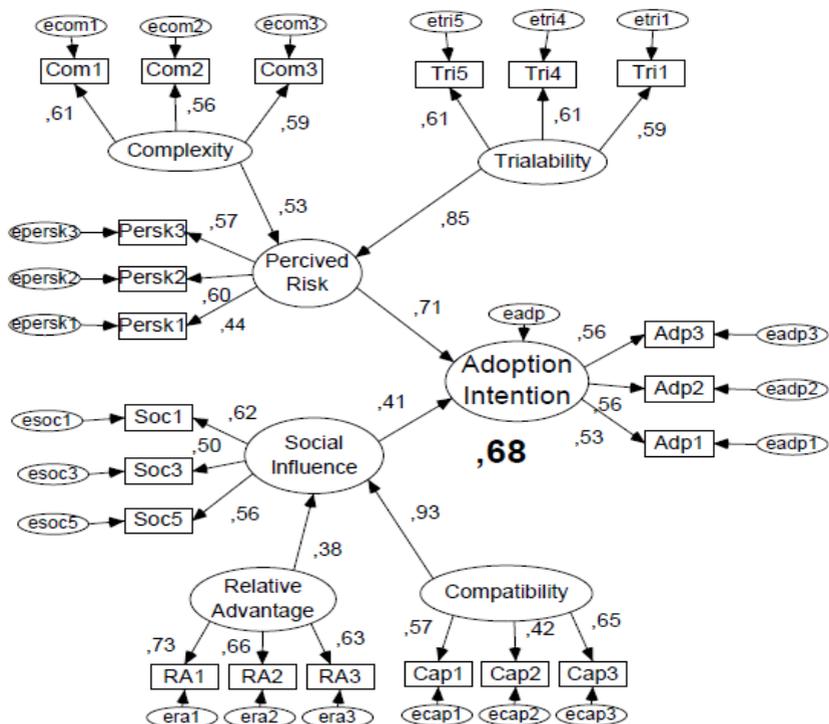


Figure 1: *Alternative Model: Technology Innovation Adoption; source: Original Research*

Based on the measurement model, it became necessary to establish the degree of adjustment, i.e. the degree to which the models predict the correlation matrix (absolute measurements), as directed by researchers (Gerbing & Anderson, 1988; Hair et al., 2006). In order to achieve this, the following adjustment measures were taken – Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI) and Quality Adjusted Index. Besides these, we also considered the Normed Fit Index (NFI) and the

Comparative Fit Index (CFI). These are presented in Table 4 below.

Fit Measures	Criteria	Results
p Value	> 0.05	0.000
Chi-square/df 1	1 - 5	2.815
Goodness-of-fit (GFI)	> 0.9	0.808
Adjusted GFI (AGFI)	> 0.8	0.760
Comparative fit index (CFI)	> 0.9	0.841
Normed fit index (NFI)	> 0.9	0.854
Root mean square error of approximation (RMSEA)	> 0.03 - 0.08	0.087
R ²		0.68

Table 4: *Fit Indices for CFA; source: Original Research*

The model adjustment data presented in Table 4 illustrates the small differences between desirable criteria for adjustment and the actual results. The difference may be explained by tendency convergence means and the high correlation between some constructs. The output model indicates that the constructs used and the relationships built between them explain 68% of the adoption innovation, which points to a high power model explanation.

Dependent Construct	Independent Construct	Standardized Regression Weight	Regression Weights	S.E.	C.R.	P	Decision
ADP	PR	0,714	0,919	0,218	4,204	**	Supported
ADP	SOC	0,409	0,368	0,102	3,627	**	Supported
SOC	RA	0,376	0,384	0,101	3,785	**	Supported
SOC	COMP	0,927	0,926	0,153	6,052	**	Supported
PR	TRI	0,845	0,632	0,135	4,696	**	Supported
PR	COMPLEX	0,534	0,396	0,102	3,878	**	Supported

Table 5: Regression Weights Alternative Model; **source:** *Original Research*

The constructs relationship analysis of alternative model (presented in Table 5) shows that adoption innovation for respondents is positive and strongly influenced by perception risk (PR = 0.714) and moderately affected by social influence (SOC = 0.409). Moreover, social influence is dependent on the relative advantage (RA = 0.376) and mainly by compatibility (COMP = 0.927). The construct perceived risk (PR) is strongly influenced by Trialability (TRI = 0.845) and moderately influenced by complexity (COMPLEX = 0.534). These relationships are significant statistically ($p < 0.001$).

5. Discussion

The determination of the influence of psychosocial variables (as defined by Rogers (1995) in his famous DOI theory on smartphone adoption intentions of Pakistani consumers and the presentation of a replica model of DOI theory to investigate mobile technology adoption research in future are the unique products of this study. The findings of the traditional model based on the DOI theory depict the significant role of social influence ($r^2 = 0.559$) and perceived risk ($r^2 = 0.59$) on the adoption intentions of smartphone users. Pakistan being a collectivist society, where people mostly seek an in-group identity by becoming an important member of the group as well as gaining social approval and recognition of the reference group to which they belong (Hofstede, 2010), such results were expected. The roles of friends and familial influences are very common phenomena in collectivist societies. Another element which influenced the adoption in intention in a traditional DOI model is the perceived risk. Since people are low risk takers, they may not accept the innovation immediately and may like to reduce the

amount of risk involved when adopting an innovation. The findings of our study are in line with the findings of study previously published in a Chinese context (which is another collectivist society), where the role of peers, friends and family was highlighted to adopt an innovation (Dong & Tian, 2009). Furthermore, the perceived risk is something which plays a significant role even in individualistic societies, as highlighted by previous studies (Ballantyne *et al.*, 2006). The perceived risk dimension has important implications for product managers (regardless of their origin from a collectivist or individualistic society) to guide them through research in formulating strategies to strategic innovation adoption.

The alternative model presented a different approach to fostering innovation adoption and is logical with regards to the social settings of this study. The two dimensions of traditional DOI theory (perceived risk and social influence) are framed differently in a new relationship. For instance, the perceived risk is influenced (reduced) by trialability ($TRI = 0.845$) and complexity ($COMPLEX = 0.534$) which is understandable in that a consumer who is already the user of a smartphone will know how to use it and this can actually reduce the functional risk. In addition to that, if a consumer has already used an innovative product and has gained social approval for it, the perception of risk can again be minimized. Hence, we can say that trialability can reduce the risk perceptions which strongly influence adoption intentions. This relationship is justified in the context of previously published studies, where the role of trial has been highlighted to minimize the consumer perceptions of risk associated with product choice (Lam *et al.*, 2013). The highly complex products carry high risk perceptions which can hinder innovation adoption. However, sometimes, the consumers are willing to take risks by going an extra mile while adopting an

innovation provided that the experience of doing so offers them an excitement. This is where the consumer emotions are important stimuli in inducing the adoption of innovations (Wood & Moreau, 2006). Here, the degree of complexity of innovation can be related to perceived risk; i.e. high complexity and high risk. However, customers who are excited about the experience of using innovations can accept such risks.

Another dimension which influenced the adoption intention among smartphone users is social influence, controlled by relative advantage (RA = 0.376) and compatibility (COMP = 0.927). These relationships are also justified in the context of a collectivist society such as Pakistan. For instance, the demographic characteristics and other social determinants of an individual's personality can cause brand distrust among consumers which can hinder mobile phone purchase, according to the findings of a study conducted in Egypt (Hamid Hawass, 2013). A brand which is not approved by the reference group members (on quality parameters, i.e. relativity) becomes doubtful in the eyes of a prospect and does not result in product adoption. Another element is the compatibility of an innovation with the values and lifestyle systems of a society. It is a generally held belief that brands which are socially congruent have a higher probability to be accepted by the members of a community. Between the two brands, a socially-congruent brand has a fair chance of being selected by the consumer (Labroo & Lee, 2006) and, generally, belongs to the social influence where members of the community seem to appreciate such brands and criticize the incongruent brands (Bohling, 2012).

6. Limitations and Future Research

The cross-sectional nature of the data is a limitation, where researchers, by employing this technique, cannot observe and present the behavioural change in the mindset of the object – the very essence of the social science research. Keeping these methodological limits in mind, we foresee an opportunity for future researchers to employ a mixed-method study to paint a detailed picture of the local culture where the study is conducted. This can be approached by understanding the cultural nuances of innovation adoption and the elements embedded in a local culture, explored through collecting some primary data by interviewing people and then a model can be developed which can be further tested to derive a new theoretical paradigm. Given the rapid changes in the socio-cultural environment surrounding bottom-of-the pyramid markets, it would be wise to employ longitudinal studies to predict innovation adoption among the users of products and services.

7. Conclusion

The new relationships proposed indicate more complex innovation adoption behaviour than previously established by Rogers (1995) due to social and market changes caused in part by the rapid diffusion of innovations and the market expansion of innovative smartphone brands studied in this research and confirmed by the specific data on the penetration and growth of the smartphone market in Pakistan. The specific cultural factors of innovative product markets tend to influence positively and markedly adoption innovation behaviour, as demarcated by studies of social psychology, which were based on the models of innovation adoption.

8. References

Arts, J.W., Frambach, R.T. & Bijmolt, T.H. (2011). Generalizations on consumer innovation adoption: a meta-analysis on drivers of intention and behaviour, *International Journal of Research in Marketing*, 28(2), 134-144.

Assael, H. (2005). A demographic and psychographic profile of heavy internet users and users by type of internet usage, *Journal of Advertising Research*, 45(01), 93-123.

Ballantyne, R., Warren, A. & Nobbs, K. (2006). The evolution of brand choice, *The Journal of Brand Management*, 13(4), 339-352.

Batra, R., Ramaswamy, V., Alden, D.L., Steenkamp, J.-B.E. and Ramachander, S. (2014). Effects of brand local and non-local origin on consumer attitudes in developing countries, *Journal of Consumer Psychology*, 9, 83-95.

Bohling, Timothy R. (2012), *Predicting purchase timing, brand choice and purchase amount of firm adoption of radically innovative information technology: a business to business empirical analysis*, Dissertation, Georgia State University, available at: http://scholarworks.gsu.edu/bus_admin_diss/12.

Cayla, J. and Eckhardt, G.M. (2008). Asian brands and the shaping of a transnational imagined community, *Journal of Consumer Research*, 35(2), 216-230.

Choi, J. and Geistfeld, L.V. (2004). A cross-cultural investigation of consumer e-shopping adoption, *Journal of Economic Psychology*, 25(6), 821-838.

Daily Mail (2017), Seven Billion Mobile Phones and 4-5 Billion Toilets, Says UN, available at:

<http://www.dailymail.co.uk/news/article-2297508/Six-world-s-seven-billion-people-mobile-phones--4-5billion-toilet-says-UN-report.html>.

Deutsch, M. and Gerard, H.B. (1955). A study of normative and informational social influences upon individual judgment, *The Journal of Abnormal and Social Psychology*, 51(3), 629.

Dong, L. and Tian, K. (2009). The use of Western brands in asserting Chinese national identity, *Journal of Consumer Research*, 36(3), 504-523.

Drucker, P.F. (2002). The discipline of innovation, *Harvard Business Review*, 80(8), 95-100.

E-Marketer (2014), 2 billion consumers worldwide to get smart(ohones) by 2016, available at: <http://www.emarketer.com/Article/2-Billion-Consumers-Worldwide-Smartphones-by-2016/1011694>.

Fornell, C. & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, 18, 39-50.

Gerbing, D.W. & Anderson, J.C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment, *Journal of Marketing Research*, 25(2), 186-192.

Giachetti, C. & Lanzolla, G. (2015). Product technology imitation over the product diffusion cycle: which companies and product innovations do competitors imitate more quickly? *Long Range Planning*. 49(2), 250-64.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. & Tatham, R.L. (2006). *Multivariate data analysis* (6th ed.), Upper Saddle River, NJ: Pearson Prentice Hall.

Hamid Hawass, H. (2013). Brand trust: implications from consumer doubts in the Egyptian mobile phone market, *Journal of Islamic Marketing*, 4(1), 80-100.

Harvard Business Review (2013), How people really use mobile, available at: <https://hbr.org/2013/01/how-people-really-use-mobile>.

Hirunyawipada, T. and Paswan, A.K. (2006). Consumer innovativeness and perceived risk: implications for high technology product adoption, *Journal of Consumer Marketing*, 23(4), 182-198.

Hofstede, G. (2010). *National cultural dimensions*, available at: http://www.academia.edu/download/37276065/Geert_Hofstede.docx.

Ismail, A.R. (2012). Understanding the factors that affect the adoption of innovative high-technology brands: the case of Apple iPhone in Malaysia, *Journal of Global Marketing*, 25(4), 226-239.

Kinnunen, J. (1996). Gabriel Tarde as a founding father of innovation diffusion research, *Acta sociologica*, 39(4), 431-442.

Kwong, K.K., Yu, W.Y., Leung, J.W. & Wang, K. (2009). Attitude toward counterfeits and ethnic groups: comparing Chinese and Western consumers' purchasing counterfeits, *Journal of Euromarketing*, 18(3), 157-168.

Labroo, A.A. & Lee, A.Y. (2006). Between two brands: a goal fluency account of brand evaluation, *Journal of Marketing Research*, 43(3), 374-385.

Lam, S.K., Ahearne, M., Mullins, R., Hayati, B. & Schillewaert, N. (2013). Exploring the dynamics of antecedents to consumer-brand identification with a new brand, *Journal of the Academy of Marketing Science*, 41(2), 234-252.

Li, J. and Kozhikode, R.K. (2008). Knowledge management and innovation strategy: the challenge for latecomers in emerging economies, *Asia Pacific Journal of Management*, 25(3), 429-450.

Maslow, A.H. (1943). A theory of human motivation, *Psychological review*, 50(4), 370.

Mitchell, V.-W. (1999). Consumer perceived risk: conceptualisations and models, *European Journal of Marketing*, 33(1/2), 163-195.

Naveed, T., Akhtar, I. and Cheema, K.U.R. (2012). The impact of innovation on customer satisfaction and brand loyalty: a study of the students of Faisalabad, *MPRA Paper No. 53197*, available at: https://mpra.ub.uni-muenchen.de/53197/1/MPRA_paper_53197.pdf.

Nowlis, S.M. and Simonson, I. (1996). The effect of new product features on brand choice, *Journal of Marketing Research*, 36-46.

Pew Internet Center (2017), Mobile fact sheet, available at: <http://www.pewinternet.org/fact-sheet/mobile/>.

Rogers, E.M. (1971). *Diffusion of innovations* (3rd Ed.), New York, NY: The Free Press.

Rogers, E.M. (1995). Diffusion of innovations: modifications of a model for telecommunications. *Die Diffusion von Innovationen in der Telekommunikation*, 17, 25-38.

Schinka, J.A., Velicer, W.F. and Weiner, I.B. (2003). *Handbook of psychology*, Vol. 2, Research methods in psychology, Hoboken, NJ: Wiley.

Sirgy, M.J. (1982). Self-concept in consumer behavior: a critical review, *Journal of Consumer Research*, 9(3), 287-300.

Styles, C. and Goddard, J. (2004). Spinning the wheel of strategic innovation, *Business Strategy Review*, 15(2), 63-72.

Wood, S.L. and Moreau, C.P. (2006). From fear to loathing? How emotion influences the evaluation and early use of innovations, *Journal of Marketing*, 70(3), 44-57.