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Article

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MANAGEMENT | RESEARCH ARTICLE

The effect of innovation and consumer related factors on consumer resistance to innovation

Mazhar Abbas¹, Muhammad Shahid Nawaz^{2*}, Jamil Ahmad¹ and Muhammad Ashraf¹

Abstract: Implementations of technological innovations have been playing key roles for firms to grow and survive in the long run particularly in a dynamic and complex market and unstable economic conditions. The success of any innovation in the market which highly depends on consumers could be one of the potential factors behind the failure of the innovation. Research on innovation resistance is still in infancy and effort to describe the resistance as well as understanding the consumers' resistance to innovation still requires in-depth investigations including the context of resistance to innovation. As a response to this problem, this study examines the consumers' resistance to innovation through measuring the resistance to smartphones. This study is grounded by the resistance to innovation and appraisal theories. In the research framework, this study includes consumers' characteristics (motivation, self-efficacy, emotion (negative), and attitude toward existing product) and innovation characteristics (relative advantage, perceived risk, complexity, social influence, and price). A cross sectional, survey data were gathered from 307 university students of four public universities in Pakistan via self-administered survey questionnaires. They were statistically tested using PLS (SEM) path modeling. The results demonstrate the concept of consumers' resistance to innovation in the context of Pakistan.

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PUBLIC INTEREST STATEMENT

Innovation is a key driver for company's growth and survival, in the long run, particularly in a dynamic & complex market and ambiguous economic situations. Even though the fruitful consequences of inhibition in the diffusion of innovation interpret this achievement into the market failure, Where resistance has been interpreted as one of the main reasons for the inhibition or delay in diffusion of innovations. Innovation adoption by consumer relies upon several factors; from which most significant factors are as a consumer characteristic and the characteristics of innovation. Previous research on the characteristics of consumers and innovation shows good correlation between factors such as innovation & consumer characteristics, adoption or implementation of that innovation by consumers. Thus, this research bridging the gap to understanding the influencing factors and moderating effects that create resistant to innovation by the consumer, in the context of public universities of Pakistan.

Subjects: Social Sciences; Behavioral Sciences

Keywords: resistance to innovation; risk; social influence; price; emotion (negative); relative advantage

1. Introduction

Innovation resistance will continue to be a serious problem that is faced by all organizations around the world. The main reason is that consumers are reluctant toward adopting all smartphones like Nokia, Apple, and Blackberry except the Samsung. Whereas, Gartner (2011) reported that global market share held by Nokia Smartphone's from first quarter 2007 to second quarter 2011 market share had slipped down 3.10 percent. ABI Research reveals that Samsung has made more Smartphone sales in quarter three than all other competitors, namely; Nokia, Apple, and Blackberry. Furthermore, Nokia's sales have been declined both in smartphones and features mobiles in Pakistan (Kobie, 2014). To ensure the success of innovation in the market, consumers' resistance toward innovation, as a potential factor in marketing, will help the companies' indifferent ways for product design and development. Now withstanding many studies have been done by researchers to handle this issue by exploring various factors to understand the reasons why consumers are unwilling to adopt newness. Meanwhile, an Innovation resistance comparatively neglected concept in innovative product management. Consistent with this previous line, adoption and diffusion examine how an innovation spreads in the market from the time of innovation whereas innovation resistance focuses on why consumers are unwilling to adopt newness (Ram, 1989; Tansuhaj, Gentry, John, Manzer, & Cho, 1993). Generally, in many studies accomplished to see the reasons why consumers are unwilling to adopt newness. For example, a number of researchers used consumer characteristics and innovation characteristics as the main predictors to evaluate the consumers' behavior and their intentions to adopt the new product (Mohtar & Abbas, 2015a; Ram, 1989). On the other hand, some researchers used the Ram model to evaluate the influence of "innovation attributes" (characteristics) toward innovative products particularly in customer point of view (Brown, Cajee, Davies, & Stroebel, 2003; He, Duan, Fu, & Li, 2006; Holak & Lehmann, 1990; Liao, Liu, & Cheng, 2015; Tan & Teo, 2000). Other than that, a number of researchers investigated the impact of consumer characteristics toward intention to adopt new technology (e.g. Han, Mustonen, Seppanen, & Kallio, 2006; Harkke, 2006; Lu, Yu, Liu, & Yao, 2003) and some of them use the technological acceptance model by adding other variables (e.g. Constantiou, Damsgaard, & Knutsen, 2006; Fang, Chan, Brzezinski, & Xu, 2006; Koivumaki, Ristola, & Kesti, 2006). Hence based on the above-discussed review, the literature shows that a number of researches focused on customer acceptance of innovation, but very little attention has been paid to see the reasons behind the consumer resistance to innovation. So there is a need to further explore the reason why consumers are unwilling to adopt newness. Resistance to innovation theory and consumer innovativeness is applied in this research paper in order to discuss the factors influencing consumer resistance to innovation. Consumer innovativeness has widely studied variables in the adoption of innovative products (Bartels & Reinders, 2011; Goldsmith & Reinecke Flynn, 1992). Thus, this conceptual paper explores the interaction influencing of consumer innovativeness and its relationship between innovation, consumer characteristics, and consumer resistance to innovation.

2. Significance of the study

The existing literature recognizes that there is a relationship between consumer characteristics, innovation characteristics, and consumer resistance to innovation without confirming why and how this relationship exists. Hence, this study contributes to the existing literature by establishing how and why those relationships exist by introducing moderating variables.

First, this study has taken new variables which are price into the model. The result of the price reveals that price is one of the most significant variables of consumer resistance to innovation. This mentions that variable inclusion of price into the model as one of the main determinants of consumer resistance to innovation is a very reasonable factor in this study. Also, a price is a very important factor that significantly predicts the user resistance to innovation in the market. This explains

that the higher the price, the higher the consumer resistance to innovation is. This study also suggests the need to incorporate price in other particular categories of consumer resistance to innovation studies.

Secondly, this study analyzes the robustness of the theory of resistance to innovation in its capacity to forecast resistance to innovation and has the intention to adopt new products and innovation within different sampling frames.

Third, this study integrates the core consumer characteristics to understand the relationship between consumer characteristics and consumer resistance to innovation (i.e. self-efficacy and motivation) in one construct. All the antecedents' determinants are supported in this study except three factors (i.e. perceived risk, attitude toward existing product, and relative advantage). The major findings of this study provide significant factors that might employ in studying the consumer resistance to innovation and also understanding the important factors that might impact the consumer resistance to innovation. The all significant determinant in this study can be used in determining the resistance of other technologies.

Fourth, the inclusion of moderator in this study to understand the moderating effect on the relationship between innovation and consumer characteristics with consumer resistance to innovation is very impactful. Theoretically, scientists recommend that consumer innate innovativeness has a very important influence on the selection of innovative product (Citrin, Sprott, Silverman and Stem, 2000; Im, Bayus, & Mason, 2003; Lassar, Manolis and Lassar, 2005; Rogers, 2003). However, the strength of the relationship among consumer innovativeness and the resistance of innovation are inconsistent with the previous research (Im, Mason, & Houston, 2007) and deficiency of consensus (Hauser, Tellis, & Griffin, 2006; Roehrich, 2004). This opens up an argument that consumer innovativeness requires further exploration into its influence on the adoption of innovative products. Most studies in the literature tested consumer innovativeness as a moderating variable through exploratory analysis, but this study tests consumer innovativeness as a moderating variable through CFA.

Fifth, the literature showcases that there are too few studies make use of resistance to innovation theory in determining the consumer resistance to innovation in Pakistan. Furthermore, using resistance to innovation theory in Pakistani culture has also contributed to the existing body of knowledge. In addition, by using the different sampling framework and innovative products, the results of this study support the robustness of the innovation resistance theory to predict the consumer resistance to innovation. Hence, this study contributes to the current body of knowledge on consumer resistance to innovation through providing the deep insight from a Pakistani perspective. All in all, all above variable contributed in resistance to innovation and appraisal theory.

3. Literature review and preposition development

3.1. Relationship between innovation characteristics and resistance to innovation

3.1.1. Relative advantage and resistance to innovation

In past, some studies have been conducted to explore that relative advantage is a very significant factor for the adoption and innovation resistance (e.g. Püschel, Afonso Mazzon, Mauro, & Hernandez, 2010; Riquelme & Rios, 2010; Rogers, 2003). Likewise, Moore and Benbasat (1991) established a measure of relative advantage that influences the rate of diffusion of innovation. Similarly, Al-Gahtani (2003) explored the impact of relative advantage on consumer adoption which was significantly positive and negative with innovation resistance. On the other hand, in recent years a number of studies have been undertaken which stated that when consumer perceives lower relative advantage over different innovative products, they are most likely to resist the innovation, which implies that consumer perceives lower relative advantage with innovation, which leads to higher consumer resistance to innovation and another study hypothesized that different advantages offered by technological innovation, consumer are most likely to adopt it (Al-Jabri & Sohail, 2012; Ho & Wu, 2011;

IST-Africa, 2015; Mndzebele, 2013; Mohtar & Abbas, 2015b; Robinson, 2013; Tidd, 2010). Hence, based on the recent studies it has been concluded that relative advantage is one of the best and most consistent predictors of innovation adoption.

Hypothesis 1: There is a negative relationship between relative advantage and consumer resistance to innovation.

3.1.2. *Perceived risk and resistance to innovation*

Previous mainstream literature shows and verifies the relationship and the effect of perceived risk on intention related to consumer behavior in various fields such as electronic commerce (e.g. Belkhamza & Syed Azizi, 2009; Crespo, del Bosque, & de los Salmones Sánchez, 2009; Kim, Ferrin and Rao, 2008; Park & Jun, 2003), e-filling system (Azmi & Bee, 2010), purchasing tickets on-line (Kim, Kim, & Leong, 2005), purchasing via mail order (Simpson & Lakner, 1993), and Internet banking (Aldás-Manzano, Lassala-Navarré, Ruiz-Mafé, & Sanz-Blas, 2009; Ozdemir & Trott, 2009). On the other side of the perceived risk associated with the financial, performance, and security, risks were found to be significant in the case of smartphones. Following the mainstream literature on the perceived risk and consumer behavior toward innovation (Aggarwal, Cha, & Wilemon, 1998; Brahim, 2015; Carter & Curry, 2013; Dunphy & Herbig, 1995; Yiu Chi, Grant, & Edgar, 2007) found a positive relationship in the context of a smartphone. From above literature, there is a contradiction between the relationship among perceived risk and innovation so this call for further research related to innovation. Hence, based on the recent studies it has been concluded that perceived risk is one of the best and most consistent predictors of innovation resistance.

Hypothesis 2: There is a positive relationship between perceived risk and consumer resistance to innovation.

3.1.3. *Complexity and resistance to innovation*

It is also claimed through several researchers that innovative products that are less complex and easily adopted by customers and vice versa (Holak & Lehmann, 1990; Liao et al., 2015). There is a negative relationship between complexity and relative advantage as if a product were considered complex, will be difficult for customers to use and, therefore, cannot be exploited for its usage and advantage (Holak & Lehmann, 1990). Likewise, different researchers have come across as complexity is negatively associated with the diffusion of innovation and positively related to resistance to innovation (Dunphy & Herbig, 1995; Mohtar & Abbas, 2015b; Tornatzky & Klein, 1982). A vast body of research suggests that there is a strong impact of a complexity of new technology on its adoption and its rejection (Cheung, Chang, & Lai, 2000; Gu, Lee, & Suh, 2009; Luarn & Lin, 2005; Mohtar & Abbas, 2015b; Venkatesh & Davis, 2000; Wang, Wang, Lin, & Tang, 2003). As mobile banking services have very user-friendly interfaces, users see them as easy to use, and hence to form positive attitudes toward them (Lin, 2011). Hence, based on the recent studies it has been concluded that complexity is one of the best and most consistent predictors of consumer resistance to innovation.

Hypothesis 3: There is a positive relationship between complexity and consumer resistance to innovation.

3.1.4. *Social influence and resistance to innovation*

The effect of social influence has been proven in a number of areas, including littering (Cialdini, Reno, & Kallgren, 1990), voting (Gerber, Green, & Larimer, 2008), who donate to charity (Reingen, 1982), which express the injury (Apfelbaum, Sommers, & Norton, 2008), the choice of employment (Higgins, 2001), investing in the stock market (Hong, Kubik, & Stein, 2004), and most relevant to the investigation of both the adoption and rejection of consumer products (Berger & Heath, 2007). To support the relationship by the previous study, Kim and Garrison (2009) conducted a study to examine the impact of social influence on smartphone's users. The results of this study show that social influence could affect the intention to use a Smartphone via influencing the perceived usefulness. In addition, López-Nicolás, Molina-Castillo, and Bouwman (2008) argued that social influence has a positive

influence on the attitude toward mobile innovations. Furthermore, Singh, Srivastava, and Srivastava (2010) stated that consumer's decision to adopt or reject mobile commerce was influenced by family members and friends. Adoption of products depends on the customer and their willingness. The study results revealed that social influence has significant positive influence on consumer resistance to innovation. Dasgupta, Paul, and Fuloria (2011) stated that perceived image was a significant element for consumers' willingness to adopt or reject the technology. Hence, based on the previous studies it has been concluded that social influence is one of the best predictors of consumer resistance to innovation.

Hypothesis 4: There is a positive relationship between social influence and consumer resistance to innovation.

3.1.5. Price and resistance to innovation

Price has been noted an important component affecting the diffusion of new products or services, but the price for a new product or service is especially difficult, study results identified that there is positive relationship between price and consumer resistance to innovation (Chen, 2012; Foxall, 1988; McTaggart, 2012; Mohtar & Abbas, 2015c). It is also claimed that higher the price, the higher the consumer resistance to innovation and price have a positive relationship between consumer resistances to innovation (Ram & Sheth, 1989). In the next few years study by Szmigin and Foxall (1998), it was indicated that price had a strong influence on consumer resistance to innovation as compared with adoption. Consistent with this study Van den Bulte and Stremersch (2004) found a strong, positive correlation between price and consumer resistance to innovation. Consumer price perceptions have a significant influence on purchase intention of Smartphones among the young adults in Malaysia. Smartphone companies can increase prices for high-end Smartphone for the young adults tend to view that high prices lead to higher quality products, conversely (Kleijnen, Lee, & Wetzels, 2009). All in all, taking into consideration of the previous studies Chen (2012) revealed that price was a predictor of resistance to innovation.

Hypothesis 5: There is a positive relationship between price and consumer resistance to innovation.

3.2. Relationship between consumer characteristics and resistance to innovation

3.2.1. Motivation and resistance to innovation

Motivation is a source of consumer resistance to innovation and consumer motivation behavior that is satisfied which depends on the habit is resistance to novelty (Sheth, 1981). When the consumer is quite satisfied with the routine and innovation to threaten to the consumer routine as well as usage pattern then he resists to the innovation, thus the more the discontinuous the innovation, the more resistance to innovation. Thus, it is proved that the lower the motivation, the higher the consumer resistance to innovation (Lee, Cheung, & Chen, 2007). Bunce and West (1995) recognized both intrinsic motivation and standard autonomy as positive indicators of consumers' behaviors toward innovation. Additionally, the results of this study proved that there was a negative relationship between motivation and consumer resistance to innovation (Anderson & King, 1993; Isen & Baron, 1991). Motivation drives shoppers' requirements and expectations to hold innovation. Taking after many researchers' arguments and observational conclusions (Davis, Bagozzi, & Warshaw, 1992; Lee et al., 2007), motivation has a negative impact on customer resistance to innovation. Motivation derives consumer intentions and needs to adopt technological innovative products. Following researchers (Davis et al., 1992; Lee et al., 2007) studies results revealed that motivation is negatively related to consumer resistance to innovation.

Hypothesis 1: There is a negative relationship between motivation and consumer resistance to innovation.

3.2.2. *Self-efficacy and resistance to innovation*

The relationship between consumer resistance to innovation and Self-efficacy is a construct which represents the trust of a single person in their own capabilities. Self-efficacy is characterized as the faith in one's skills to perform a specific behavior and effectively execute certain activities to achieve objectives (Bandura, 1977; Chen, Greene, & Crick, 1998; Gist & Mitchell, 1992). Research has indicated that people gradually collect their self-efficacy through earlier cognitive, social, and physical achievements and through taking in (Bandura, 1982), self-efficacy subsequently develops with hard-won accomplishments rather than uniqueness and attributes, which are generally balanced qualities. Thus, the individual capability of self-efficacy significantly influences the level of perceived anxiety. Some experts have come to an efficacy of having a negative impact on the resistance of the buyer and the positive impact on the adoption of imaginary products (Ellen, Bearden, & Sharma, 1991; Park & Chen, 2007; Tan & Teo, 2000). On the basis of previous literature, it has been proven that the suitability of the buyer to self-efficacy expected a negative impact on resistance to innovation. With regard to this, in recent years many studies shown lower the consumer self-efficacy leads to the higher consumer resistance to innovation, which implies that when consumer have self-efficacy related to that product which creates lower self-efficacy about innovative product, the higher the consumer resistance to innovation (Mohtar & Abbas, 2015c; Park & Chen, 2007).

Hypothesis 2: There is a negative relationship between self-efficacy and consumer resistance to innovation.

3.2.3. *Emotion (Negative) and resistance to innovation*

A large number of studies have validated the negative relationship between emotion (negative) and consumer resistance to innovation (Davis et al., 1992; Martin, 2007; Wood & Moreau, 2006 as cited in Patsiotis, Hughes, & Webber, 2013), which implies that, the higher the emotion (negative) the higher the consumer resistance to innovation (Martin, 2007; Wood & Moreau, 2006). In the same year, a study by Mauro, Hernandez and Afonso Mazzon (2007) found that consumers are resisting innovation due to the negative emotion. Likewise, a study by Bagozzi and Lee (1999) indicated that negative emotion has a strong influence on consumer resistance to innovation as compared to adoption. With regard to this, in recent years many studies shown that when consumer perceives negative emotion, they are most likely to resist the new technology, which implies that when consumer have bad experience related to that product which creates negative feelings about innovative product, the higher the consumer resistance to innovation (Barsky & Nash, 2002; Choraria & Sardana, 2013; Cronin, Brady, & Hult, 2000; Wakefield, 2015).

Hypothesis 3: There is a positive relationship between emotion (negative) and consumer resistance to innovation.

3.2.4. *Attitude toward existing product and resistance to innovation*

It is claimed by several researchers that attitude toward the existing product is positively associated with consumer resistance to innovation, which implies that the higher the attitude of consumer toward existing product the higher the consumer resistance to innovation (Gatignon & Robertson, 1985). After few years, Gatignon and Robertson (1991) and Rogers and Shoemaker (1971) found that there was a positive relationship between attitude toward existing product and consumer resistance to innovation because certain social-psychographic aspects, for example, innovative feeling, opinion leadership, and risk-taking behavior, have equally been indicated to be identified with new product adoption and consumer who have their feelings with old products they reject to the new ones. With regard to this, in recent years many studies shown that when consumer perceives favorable attitude toward existing product, they are most likely to resist the innovation, which implies that more consumer feels satisfied with their existing product, the higher the resistance to innovation (Chen, 2012; Dzugbenuku, 2013; Mont & Heiskanen, 2015; Wang, Dou, & Zhou, 2008; Yu, Li, & Chantatub, 2015).

Hypothesis 4: There is a positive relationship between attitude towards exiting product and consumer resistance to innovation.

3.3. Moderating variables

3.3.1. Moderating effect of consumer innovativeness on the relationship between consumer characteristics, innovation characteristics and consumer resistance to innovation

Over the year, majority of the studies have used consumer innovativeness as a predictor with consumer characteristics, innovation characteristics, and consumer resistance to innovation (Bartels & Reinders, 2010, 2011; Jeong, Yoo, & Heo, 2009; Vandecasteele & Geuens, 2010). On the other hand, studies that introduced consumer innovativeness as intervening variable on the relationship between consumer characteristics, innovation characteristics and consumer resistance to innovation are not many, some of them is the study by Bartels & Reinders (2010, 2011), Vandecasteele and Geuens (2010), Jeong et al. (2009) and Tomaseti, Sicilia, and Ruiz (2004). Likewise, they argued that consumer who encounter high levels of innovativeness were not the best performer as well as lower motivation, self-efficacy, high emotion (negative), favorable attitude toward existing products, lower relative advantage, higher complexity, higher perceived risk, high social influence, and high price with their innovative products which ultimately increase the level of consumer resistance to innovation. The use of innovativeness as an intervening variable having an indirect effect, instead of direct effect was also supported by (Jaccard, Turrisi, & Choi, 1990; Ouellet, 2006; Vandecasteele & Geuens, 2010). Thus, the strength of the relationship between consumer characteristics and consumer resistance to innovation is moderate; but this relationship is in line with resistance to innovation theory and a majority of previous literature which revealed that behavior and attitude of consumer were influenced by consumer innovativeness. Which implies that the consumer with high consumer innovativeness could have very innovative than the consumer with low innovativeness. Hence, based on the discussed literature, the suggestion is that the level of consumer innovativeness can weaken, strengthen, or have no effect on the negative relationship between self-efficacy, motivation, relative advantage, and consumer resistance to innovation. Similarly, the level of consumer innovativeness can weaken, strengthen, or have no effect on the positive relationship between emotion (negative), attitude toward existing product, perceived risk, complexity, social influence, price and consumer resistance to innovation.

Hypothesis 1: There is a negative relationship between consumer innovativeness and consumer resistance to innovation.

3.3.2. Related studies of consumer resistance to innovation

Why there is a need to study consumer resistance to innovation because the innovation resistance is most significant problem. The innovation resistance comparatively neglected concept in innovative product management. The majority of the previous studies concentrated on innovation adoption and diffusion; as a result, innovation resistance used to be traditionally measured indirectly by looking at the individual innovativeness (Tansuhaj et al., 1993). Consistent with this view, adoption, and diffusion examines how an innovation spreads in the market from the time of innovation whereas innovation resistance focuses on why consumers have unwillingness to adopt newness (Ram, 1989; Tansuhaj et al., 1993). On the other hand, some researchers used the Ram model to evaluate the influence of “innovation attributes” (characteristics) toward innovative products particularly in customer point of view (Brown et al., 2003; He et al., 2006; Holak & Lehmann, 1990; Liao et al., 2015; Tan & Teo, 2000).

The suggested Roger model (1987) is used to evaluate the impact of innovation characteristics on the adoption of innovation, where a number of characteristics like a relative advantage, complexity, and compatibility and trial ability found in the perspective of consumer resistance to innovation. He et al. (2006) used Rogers innovation attributes to investigate the variables that influence the consumer decision to adopt, for instance, relative advantage is positively associated and complexity is negatively associated toward consumer acceptance about online electronic payments. Im et al. (2003) used “consumer characteristics” and their impact on the acceptance of innovation. Fang et al. (2006) conducted a research to investigate the consumer choices and the selection toward an online payment system. These choices of the consumers are a consequence of “innovation

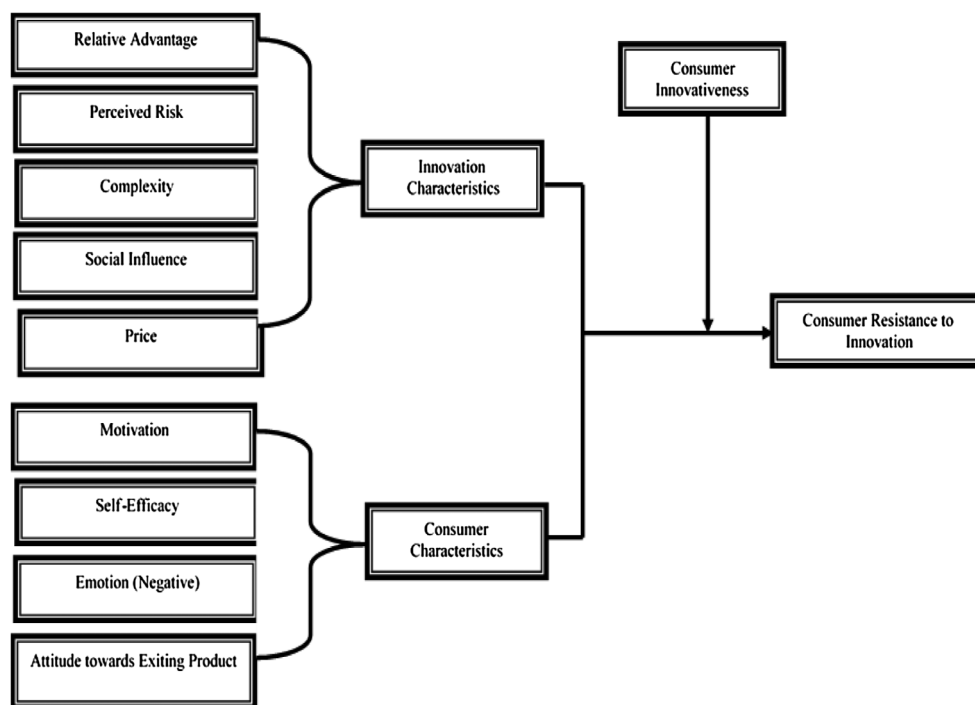
characteristics,” “consumer characteristics,” and TAM. On the other hand, a number of researcher investigate the impact of consumer characteristics toward intention to adopt new technology(e.g. Han et al., 2006; Harkke, 2006; Lu et al., 2003) and some of them using the technological acceptance model by adding other variables (e.g. Constantiou et al., 2006; Fang et al., 2006; Koivumaki et al., 2006). Furthermore, Ketkar, Shankar, and Banwet (2012); Yiu Chi et al. (2007); Amin (2008) used technology acceptance model in the perspective of mobile commerce, online banking to investigate the influence of consumer characteristics on purchase behavior of consumers toward latest technologies. Püschel et al. (2010) used technological acceptance model (TAM), TPB, and IDT to investigate “consumer’s characteristics” and their following influences on acceptance of the mobile banking adoption. The findings of the study revealed that relative advantage and self-efficacy significantly influences mobile banking adoption. Based on the TAM model, Sripalawat, Thongmak, and Ngramyarn (2011) were found that self-efficacy and perceived usefulness were most influential factors in mobile banking adoption.

As above discussed, the literature shows that a number of researches were focused on customer acceptance of innovation, but very little attention paid to see the reasons behind the consumer resistance to innovation (Gatignon & Robertson, 1985; Ram, 1987). In addition, both adoption and diffusion theories do not support the procedure of consumer resistance to innovation.

Social Influence, negative emotions, consumer innovativeness, and price are selected as consumer and innovation characteristics to investigate the influence on consumer resistance to innovation. As researcher has selected these factors from different models, same other variables are selected on the basis of different reasons because most of the studies have utilized perceived usefulness, perceived ease of use, compatibility, complexity, trial ability, adoptability as the antecedent of consumer resistance to innovation. Perceived ease of use and perceived usefulness, complexity, trial ability, and adoptability are commonly used in determining the consumer resistance to innovation in previous studies (Morris & Venkatesh, 2000; Park & Chen, 2007; Roberts & Pick, 2004).

Despite all arguments that have been discussed in previous literature, some variables like innovation characteristics (e.g. social influence and price) and consumer characteristics (e.g. motivation, self-efficacy, emotions, and attitude towards existing product) which are not fully explored yet in the perspective of consumer resistance to innovation. Furthermore, the proposed antecedent factors of emotions such as negative emotions social influence, perceived risk, relative advantage, motivations, self-efficacy, and attitude toward existing product as well as consumer innovativeness as a moderator have been employed by current study to investigate the consumer resistance to innovations. Moreover, the study of social influence, price, emotion (negative), and consumer innovativeness in the context of resistance to innovation is less studied and need to explore more in the domain of consumer resistance to innovation. The summarized findings of previous studies which revealed that the major focus on studies of the direct relationship between the predictors and consumer resistance to innovation and ignored with an indirect relationship like moderating variables in the study (Hosseini, Delaviz, Derakhshide, & Delaviz, 2016).

There are very limited studies found in the previous literature those exploring the determinants relationship with consumer resistance to innovation. Similarly, there are few studies found empirically investigating the consumer innovative behavior – one of the major factors toward consumer resistance toward technologies (Park & Chen, 2007). Lennon et al. (2007), while exploring the factors those contribute to consumer positive decision to adopt innovations, emphasized that it was equally significant to understand the reasons behind resistance to latest technologies or ideas (Midgley & Dowling, 1993; Rogers, 1995). It was found that three innovative projects, out of four, fail due to consumers’ resistance (Cooper & Zmud, 1990); whereas, studies are limited on resistance to innovation and specific context only. However, there is are limited number of studies providing understanding and explanatory power of consumer resistance to innovation. Understanding of consumer resistance to innovation, there is lack of research focus of consumer resistance to innovation.



4. Methodology

In this study, the researcher used quantitative approach. Quantitative data used in this study are survey based which includes a self-administered questionnaire to sample groups of respondents. The population for this study is targeted to the University students in Punjab Pakistan. Selected sample from the wide range of population consists of university graduates who are mobile phone users and using smartphones within Punjab, Pakistan. A selection of university students is used as a unit analysis in this study. As per Ding, Velicer, and Harlow (1995), various studies considered 100–150 subjects to the base adequate specimen size when utilizing structural mathematical statement displaying. Kelloway (1998) and Hair, Hult, Ringle, and Sarstedt (2013) proposed an example size of no less than 200 perceptions to be a fitting least. Boomsma (1983) proposed a specimen size of roughly 400 perceptions for models of moderate complexity. The sample size of this current research is fulfilling the criteria of minimum recommendation proposed by various researchers (Ding et al., 1995; Hair et al., 2013; Kelloway, 1998; Sekaran & Bougie, 2010). The minimum sample size of this study is necessary 220.

The data have been collected using self-administered questionnaire (as Booklet) from the university students of government universities of Pakistan. The respondent has been selected using strategies random sampling technique. The sampling technique utilized for the present study is a stratified random sampling. The stratified random sampling outline is focused around present study program which are bachelor's degree, master, and PhD students have been used to select the sample. This expected education level has significantly impacted the use among Smartphone users (DeBaillon & Rockwell, 2005; Poon, 2008). To ensure consistency among all variables, researcher measured all items using 1 to 6 points scale where 1 = disagree very much, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, and 6 = agree very much. The structured questionnaires will use to collect data regarding each study variable. Moreover, this scale is much easier to construct and much more reliable than other scales such as four-point Likert scale and five-point Likert scale (Chomeya, 2010). However, some researchers argued that seven-point scale is simply preferable because it minimizes respondents' confusion (Fornell & Cha, 1994). Practically, six-point Likert scale offers respondents simply more options from where they can smoothly make their choices. Statistical software like SPSS and Smart-PLS 2.0 M3 used to carry out statistical analysis to meet the desired objectives of this study.

5. Research findings

5.1. Model evaluations

5.1.1. Measurement model

In the model evaluation, the measurement model was undertaken to ensure the model validity and reliability. This is in line with arguments of Esposito Vinzi and Russolillo (2010) who introduced the rule of thumb for outer loading. According to their rule of thumb outer loading should be 0.5 and above, as far as for the average variance extracted it should be above than 0.5. Based on the following argument all the items in outer loading which are below than 0.5 should be deleted one by one with the lowest value, because it improves the quality of data. Table 1 shows the results.

To observe discriminant validity, this study commenced discriminant validity to guarantee the external consistency of the model, based on the comparison between the latent variables as shown in Table 2 where the AVE of the variables are: attitude toward existing product (ATEP) = 0.857; consumer innovativeness (CI) = 0.713; complexity (COM) = 0.785; consumer resistance (CR) = 0.784; emotions (EMO) = 0.795; motivation (MOT) = 0.783; price (P) = 0.745; perceived risk (PR) = 0.741; relative advantage (RA) = 0.765; self-efficacy (SE) = 0.785; and social influence (SI) = 0.773.)

5.1.2. Structural model

This segment treats with the structural model after the evaluation of measurement model as pointed out by Hair, Black, Babin, Anderson and Tatham (2006) structure model deals about the dependence of the relationship in the hypothesized model of the study. In PLS, structure model gives inner modeling analysis of the direct relationship among the constructs of the study and their *t*-values as for as path coefficients. As argued by Agarwal and Karahanna (2000), the path coefficients are the same as the standardized beta coefficient and regression analysis. Beta values of the coefficient of the regression and *t*-values are examined to decide on the significance. Following the rule of thumb by Hair, Hult, Ringle and Sarstedt (2014), *t*-value greater than 1.64 is considered to be as significant, which is further used for making decisions on the proposed hypothesis (Figure 1).

Table 3 illustrates that all supported and accepted hypotheses have a *p*-value that is not greater than 0.05 and the hypotheses which are rejected have *p*-value greater than 0.05. Figure 2 displays the *t*-values after bootstrapping.

5.2. Assessment of effect size (f^2)

Effect size signifies the relative effect of a specific exogenous latent variable on an endogenous latent variable(s) by indicating the change in the R^2 (Chin, 1998). It is determined as the increase in R^2 of the latent variable to which the path is associated, relative to the latent variable's proportion of unexplained variance (Chin, 1998). Therefore, the effect size could be depicted using the following formula (Cohen, 1988).

$$\text{Effect size: } f^2 = \frac{R^2_{\text{Included}} - R^2_{\text{Excluded}}}{1 - R^2_{\text{Included}}}$$

Cohen (1988) explains f^2 values of 0.02, 0.15, and 0.35 as having weak, moderate, and strong effects, respectively. Table 4 demonstrates the particular effect sizes of the latent variables of the structural model.

As mentioned in Table 4, the effect sizes for attitude toward existing product, complexity, emotion (negative), motivation, price, perceived risk, relative advantage, self-efficacy, social influence, and

Table 1. Construct reliability, Cronbach's alpha, composite reliability and AVE of all the latent variables

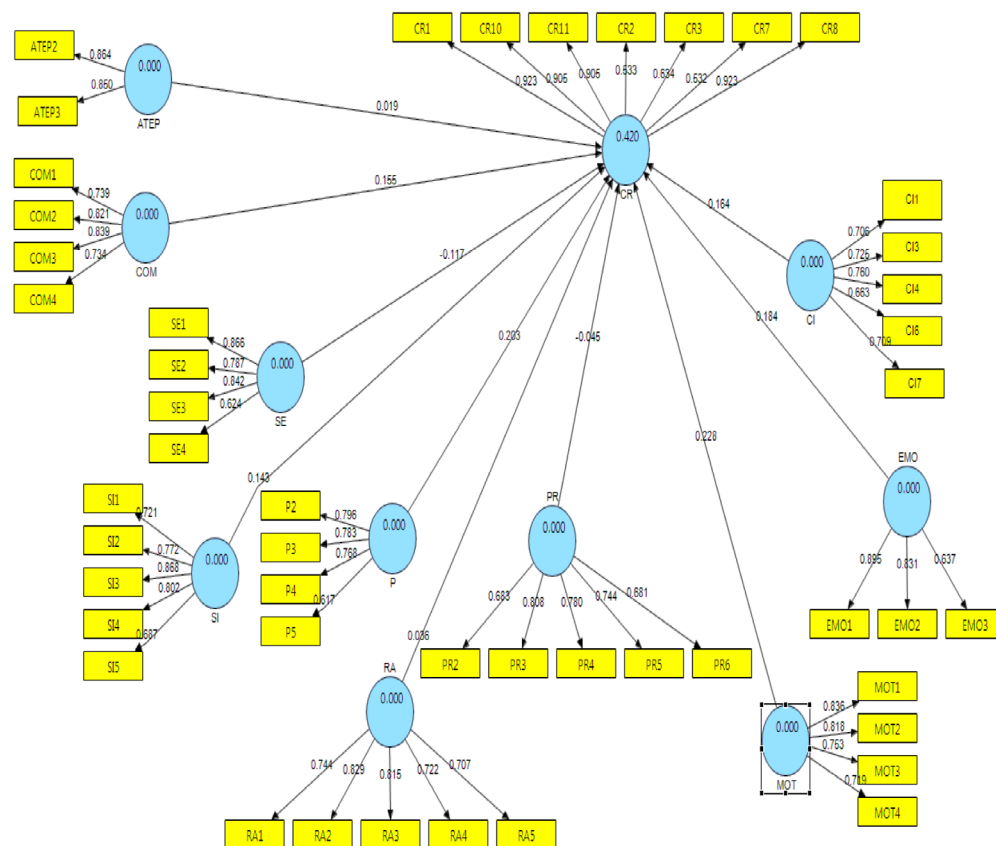
Construct	Item	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted
Attitude	ATEP2	0.864	0.638	0.847	0.734
	ATEP3	0.850			
Consumer innovativeness MV	CI1	0.706	0.758	0.838	0.509
	CI3	0.725			
	CI4	0.760			
	CI6	0.663			
	CI7	0.709			
Complexity	COM1	0.739	0.794	0.865	0.616
	COM2	0.821			
	COM3	0.839			
	COM4	0.734			
Consumer resistance DV	CR1	0.923	0.883	0.914	0.616
	CR10	0.905			
	CR11	0.905			
	CR2	0.532			
	CR3	0.635			
	CR7	0.534			
	CR8	0.923			
Emotion	EMO1	0.895	0.718	0.835	0.632
	EMO2	0.831			
	EMO3	0.637			
Motivation	MOT1	0.836	0.791	0.863	0.613
	MOT2	0.818			
	MOT3	0.753			
	MOT4	0.719			
Price	P2	0.796	0.737	0.831	0.555
	P3	0.783			
	P4	0.768			
	P5	0.617			
Perceived RISK	PR2	0.683	0.795	0.858	0.549
	PR3	0.808			
	PR4	0.780			
	PR5	0.744			
	PR6	0.681			
Relative advantage	RA1	0.744	0.822	0.875	0.585
	RA2	0.829			
	RA3	0.815			
	RA4	0.722			
	RA5	0.707			
Self-efficacy	SE1	0.866	0.797	0.864	0.617
	SE2	0.787			
	SE3	0.842			
	SE4	0.624			
Social influence	SI1	0.721	0.831	0.880	0.597
	SI2	0.772			
	SI3	0.868			
	SI4	0.802			
	SI5	0.687			

Table 2. Discriminant validity matrix

	ATEP	CI	COM	CR	EMO	MOT	P	PR	RA	SE	SI
ATEP	0.857										
CI	0.171	0.713									
COM	0.437	0.1643	0.785								
CR	0.280	0.4750	0.368	0.784							
EMO	0.357	0.0763	0.368	0.297	0.795						
MOT	0.197	0.6705	0.198	0.449	-0.013	0.783					
P	0.262	0.4972	0.269	0.467	0.133	0.420	0.745				
PR	0.183	0.2316	0.216	0.228	0.049	0.196	0.528	0.741			
RA	0.181	0.5903	0.192	0.406	0.103	0.687	0.434	0.218	0.765		
SE	0.197	0.6162	0.086	0.326	0.064	0.689	0.418	0.167	0.639	0.785	
SI	0.174	0.5266	0.154	0.429	0.126	0.407	0.501	0.335	0.420	0.390	0.773

Note: All the values shown in diagonal and bolded represent the square route of average whilst those of the diagonal represent latent variable correlations.

Figure 1. Measurement model.



consumer innovativeness on consumer resistance to innovation 0.0017, 0.0310, 0.04312, 0.0293, 0.0362, 0.0034, 0.0017, 0.0121, 0.0224, and 0.0190, respectively. Therefore, following Cohen's (1988) guideline, the effects sizes of these 10 exogenous latent variables on consumer resistance could be viewed as small, small, large, and none, respectively.

Table 3. Results of hypothesis testing (direct effects)

No	Hypothesized path	Path coef.	Std. err.	t-value	p-value	Decision
1	ATEP -> CR	0.019	0.058	0.329	0.371	Not supported
2	COM -> CR	0.162	0.060	2.575	0.005	Supported
3	EMO -> CR	0.185	0.053	3.355	0.000	Supported
4	MOT -> CR	0.283	0.072	3.078	0.001	Supported
5	P -> CR	0.221	0.064	3.302	0.001	Supported
6	PR -> CR	-0.036	0.058	0.796	0.213	Not supported
7	RA -> CR	0.044	0.069	0.533	0.297	Not supported
8	SE -> CR	-0.080	0.066	1.704	0.045	Supported
9	SI -> CR	0.180	0.066	2.156	0.016	Supported
10	CI -> CR	0.172	0.078	2.105	0.018	Supported

Figure 2. Structural model.

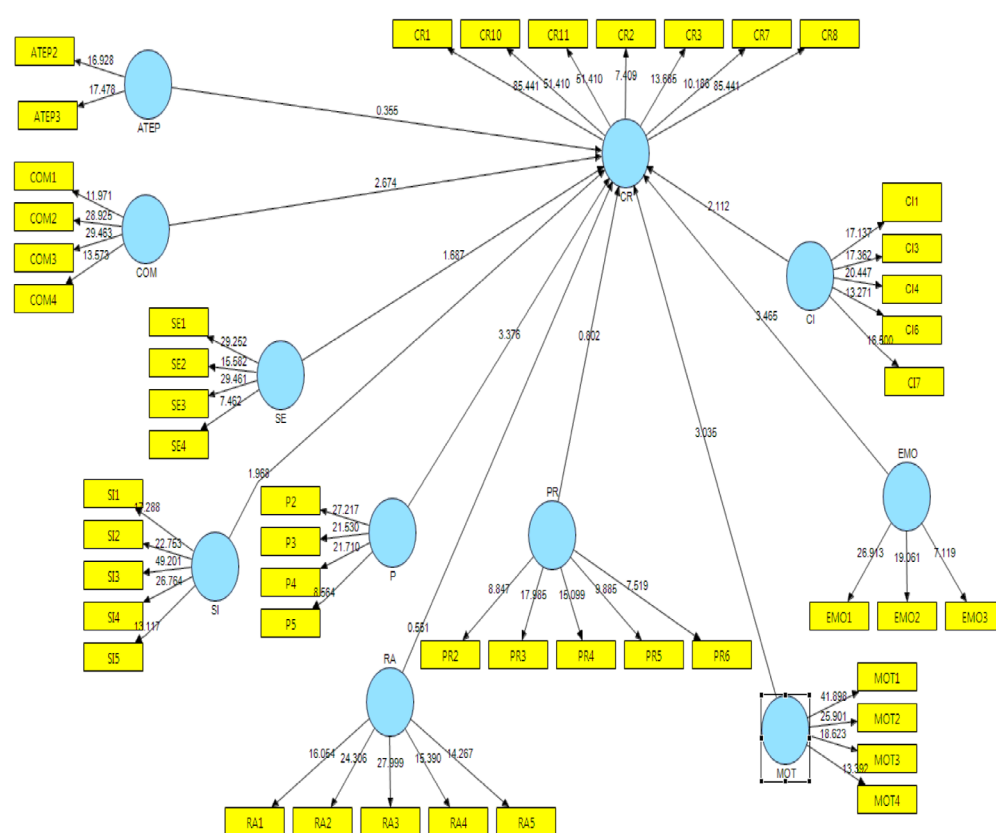


Table 4. Effect size of latent variables

R^2	Included	Excluded	f^2	Effect size
ATEP -> CR	0.42	0.419	0.0017	None
COM -> CR	0.42	0.402	0.0310	Small
EMO -> CR	0.42	0.395	0.0431	Small
MOT -> CR	0.42	0.403	0.0293	Small
P -> CR	0.42	0.399	0.0362	Small
PR -> CR	0.42	0.418	0.0034	None
RA -> CR	0.42	0.419	0.0017	None
SE -> CR	0.42	0.413	0.0121	None
SI -> CR	0.42	0.407	0.0224	Small
CI -> CR	0.42	0.409	0.0190	None

5.3. Determining the predictive relevance of the model

Table 5 shows the construct cross-validated redundancy. Table 5 shows that in column four (4), Q2 shows the predictive relevance of 0.24 for the CR (Consumer Resistance) which shows that this model has predictive relevance. In line with recommendation of Hair, Hult, Ringle and Sarstedt (2014), if Q2 value is greater than zero (0) the model have predictive relevance for reflective endogenous latent variable.

5.4. The moderating effects

With regard to this study, introducing the level of consumer innovativeness perceived by the survey respondents in SmartPLS 2.0 M3 needs to establish a direct relationship between moderating variable (consumer innovativeness) and the outcome variable (consumer resistance to innovation). Due to this reason, both the moderating effect as well as the direct effect will be used in order to improve the research. To calculate the moderating effect, the researchers run PLS algorithm to obtain the beta coefficients values which are given below in Table 6. Regarding the hypothesis testing the researchers run bootstrapping method to check whatever consumer innovativeness have moderates relationship between (attitude toward existing product, complexity, emotion, motivation, price,

Table 5. Construct cross validated redundancy

Total	SSO	SSE	1-SSE/SSO
CR	2,149	1,622.51	0.24

Table 6. Moderator hypothesis testing

No	Hypothesized path	Path coef.	Std. err.	t-value	Decision
1	ATEP * CI -> CR	-0.0525	0.0881	0.4127	Not supported
2	COM * CI -> CR	0.0178	0.1735	0.8219	Not supported
3	EMO * CI -> CR	0.1098*	0.1172	1.3486	Supported
4	MOT * CI -> CR	0.1343*	0.1143	1.4128	Supported
5	P * CI -> CR	0.1165*	0.1085	1.2834	Supported
6	PR * CI -> CR	-0.0898	0.0877	0.7542	Not supported
7	RA * CI -> CR	-0.0338	0.4632	0.2288	Not supported
8	SE * CI -> CR	-0.1399**	0.1018	1.6206	Supported
9	SI * CI -> CR	-0.108	0.0888	1.2288	Not supported

perceived risk, relative advantage, self-efficacy and social influence) and consumer resistance to innovation. As shown in Table 6, out of nine (9) moderating interaction hypothesis four hypothesis are significant at $p < 0.1$ and remaining five are insignificant at $p < 0.1$ (Figures 3 and 4).

At the same time, the R^2 value of the consumer resistance to innovation construct is increased from 0.420 to 0.458 by introducing consumer innovativeness as a moderating variables between the relationship of (attitude toward existing product, complexity, emotion, motivation, price, perceived risk, relative advantage, self-efficacy and social influence) and consumer resistance to innovation.

Figure 3. Interaction terms.

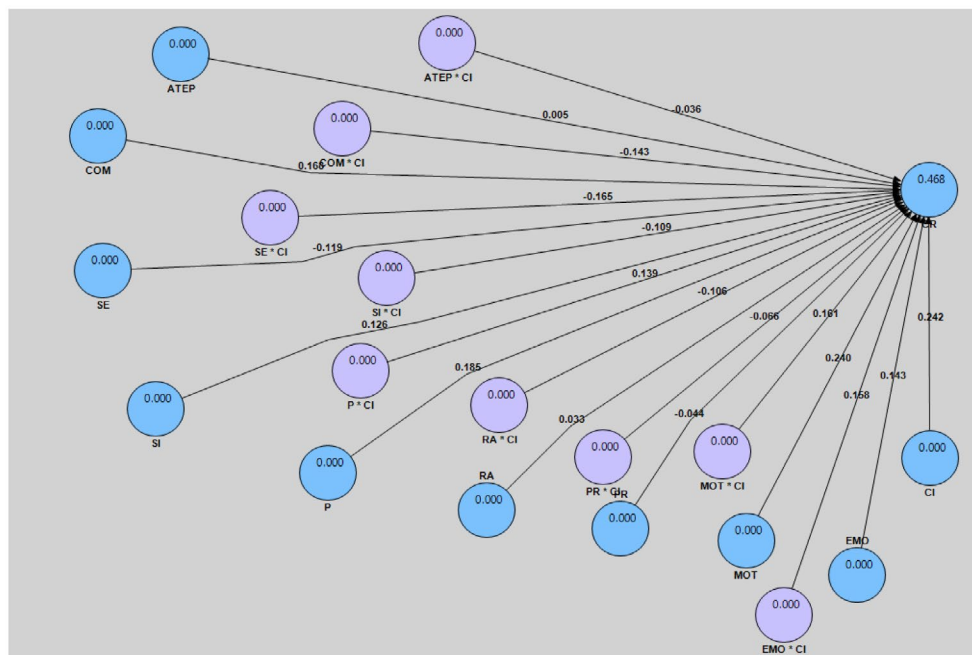
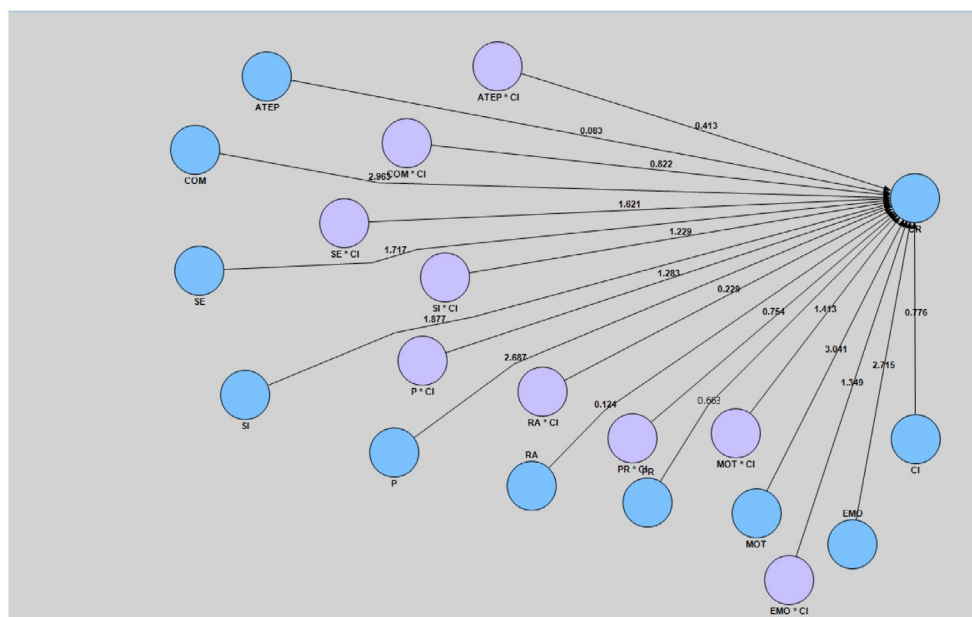


Figure 4. Bootstrapping model.



6. Discussion

6.1. Conclusion

The objective of this study is to investigate the factors influencing consumer resistance to innovation (Smartphone) in the context of Pakistan. Based on the gathered data, seven out of ten hypotheses are significantly supported, where emotion (negative), attitude, existing product, motivation, and self-efficacy are of consumer characteristics. Meanwhile, price, social influence, complexity, and relative advantage are of innovation characteristics. Emotion, motivation, price, complexity, social influence, and self-efficacy are the best predictor of consumer resistance to innovation.

On top of that, consumer innovativeness as a moderating variable is also tested to investigate its direct relationship. It is proven as a good predictor of consumer resistance to innovation. Similarly, perceived risk, relative advantage, and attitude toward the existing product are not found as a predictor of consumer resistance to innovation. The proposed theoretical framework of consumer resistance to smartphone represents an acceptable where 50% (R^2 value) of variation in consumer resistance is caused by the hypothesized factors.

Finally, there is an evidence of moderating effect of consumer innovativeness on the relationship between attitude toward an existing product, complexity, emotion (negative), motivation, price, perceived risk, relative advantage, self-efficacy, social influence, and consumer resistance to innovation. This study is able to provide supports for four moderation interactions; emotion, motivation, price, and self-efficacy that have some moderating effects on the relationship between consumer innovativeness and consumer resistance to innovation. Meanwhile, attitude toward existing product, complexity, perceived risk, relative advantage, and social influence is insignificant with the relationship of consumer innovativeness and consumer resistance to innovation (Table 7).

Table 7. Summary of the findings

No	Hypothesized path	Path coef.	Std. err.	t-value	Decision
1	ATEP -> CR	0.019	0.058	0.329	Not supported
2	COM -> CR	0.162	0.060	2.575	Supported
3	EMO -> CR	0.185	0.053	3.355	Supported
4	MOT -> CR	0.283	0.072	3.078	Supported
5	P -> CR	0.221	0.064	3.302	Supported
6	PR -> CR	-0.036	0.058	0.796	Not supported
7	RA -> CR	0.044	0.069	0.533	Non supported
8	SE -> CR	-0.080	0.066	1.704	Supported
9	SI -> CR	0.180	0.066	2.156	Supported
10	CI -> CR	0.172	0.078	2.105	Supported
11	ATEP * CI -> CR	-0.0525	0.0881	0.4127	Not supported
12	COM * CI -> CR	0.0178	0.1735	0.8219	Not supported
13	EMO * CI -> CR	0.1098*	0.1172	1.3486	Supported
14	MOT * CI -> CR	0.1343*	0.1143	1.4128	Supported
15	P * CI -> CR	0.1165*	0.1085	1.2834	Supported
16	PR * CI -> CR	-0.0898	0.0877	0.7542	Not supported
17	RA * CI -> CR	-0.0338	0.4632	0.2288	Not supported
18	SE * CI -> CR	-0.1399**	0.1018	1.6206	Supported
19	SI * CI -> CR	-0.108	0.0888	1.2288	Not supported

6.2. Implications of the study

6.2.1. Managerial implications

Based on the results of this study, one of the factors influencing the consumer resistance to innovation, in mobile phone industry such as Smartphone, is that it is one of the best communication channels. This is because it provides users with Smartphone functionalities of both personal digital assistant and cell phone. In the mobile phone industry, experts expect that smartphone can be dominant in mobile phone industry in Pakistan.

On the other hand, Smartphones are facing different realities in the market, like consumer resistance to innovation. Due to this reality, this study establishes a few implications on the basis of study findings, those can be useful in helping the Smartphone companies in Pakistan to increase the Smartphone demand among consumers in the market and gives deep insight into the Smartphone industries about the factors, significantly influencing consumer resistance to innovation in Pakistan. Because in the Pakistani market, a targeted consumer in this study like university graduate has a number of cell phones or Smartphone options in choosing their preferable Smartphone brands. Thus, it is very important for Smartphone companies to make future improvements and use different strategies to focus on the predicted factors and overcome the consumer resistance to a Smartphone in the market.

Based on the findings of this study, emotion (negative) has the strongest significant influence between other independent variables in impacting the consumer resistance to Smartphone among public university students in Pakistan. Based on the study findings, for emotion (negative), Smartphone companies are recommended to give smart functionalities to the consumers that suit their lifestyle (young consumer) that create positive emotion to buy the Smartphone instead of resisting it.

Social influence significantly influences consumer resistance to innovation because young consumers normally want to use some cool Smartphones to show their friends. It has a positive impact on their lifestyle instead of consumer resistance to innovation by social influence. University students are more socialized and this more socialization of consumers creates positive and negative word of mouth between friends toward Smartphone brands. Therefore, Smartphone companies are recommended to provide innovative and new advertisements for the young university students who are the main users of Smartphones. In addition, companies are also suggested to offer good service to meet the consumer's demands for the creation of positive word of mouth.

Smartphone companies are recommended to an emphasis on the Smartphone price in targeting the young consumers in the market. Smartphone companies are recommended to offer good prices for consumers who have low purchasing power like students. In Pakistan, university students have limited pocket money and they are the main users of a Smartphone. Smartphone companies can reduce their Smartphone price because consumers tend to be attracted low price and low resistance to innovation.

Empirically proves that the moderating effect of consumer innovativeness, for instance, motivation influence is more important for consumer innovativeness. Meanwhile, self-efficacy is more salient to the innovativeness of consumers, and a similar price is more important to the consumer innovativeness. Emotion (negative) is a more salient to the consumer innovativeness. As a result, four implications for the companies and managers are that they need to focus on these factors when they launch new Smartphones in the market. Companies and managers may provide the innovative products with salient features to focus the consumers in the context of price, self-efficacy, motivation, and emotion (negative). All in all these practical implications are given on the basis of study findings.

Based on the study findings, this study also provides a deep insight about the consumer perception of price that has a significant influence on consumer resistance to Smartphone among university students in Pakistan. Thus, Smartphone companies are recommended to emphasis on the Smartphone price in targeting the young consumers in the market. This is because in Pakistan, there are a number of Smartphone brands and consumers are very price conscious. According to the law of supply and demand, consumers are more experience and have knowledge about Smartphone brands. Hence, a high price Smartphone creates resistance to purchasing. Accordingly, Smartphone companies are recommended to offer good prices for consumers who have low purchasing power like students. In Pakistan, university students have limited pocket money and they are the main users of a Smartphone. Smartphone companies can reduce their Smartphone price because consumers tend to be attracted low price and low resistance to innovation.

6.3. Limitation and suggestion for future research

First, as students are the sample for gathering data, the results are not generalizable to non-student sample. Therefore, future research needs to consider the sample, taking into account those not students so that the results are more generalizable. Further, more than 90% of the respondents are between 20 and 30 years old. This further limits the ability to generalize the findings. Thus, this study recommends also for future studies to include a wider age range. On top of that, the high number of male respondents (68.4%) also limits this study. This makes gender-based tests a little biased. On the other hand, this study only involves students in public universities. It is recommended that future studies involve students of both public and private universities in Pakistan.

Future studies might overcome all described problems by applying new sampling techniques with a larger population of smartphone users and this could solve the problem of generalization of the findings.

As this study is carried out in the context of Pakistani consumers, the findings are not able to be generalized to consumers of other cultures and countries. The generalization of findings in this study beyond Pakistan requires another study to confirm and verify the results to ensure that it is consistent with the findings of other countries. It is important because culture difference can influence the resistance to innovation. So, it is very essential to conduct the study in a cross-cultural context like national and international context in future studies. It is believed that a duplication of this framework to other countries can discover the significant factors that influence consumer resistance to innovation.

It is so interesting to notice that emotion (negative), price, and social influence are the most significant variables for determining the consumer resistance to innovation. This study is one of the first studies to examine the relationship involving consumer resistance to innovation as well as in the field of a Smartphone. Due to the complexity of validation, further investigation of emotion, price, and social influence may be essential for future research.

On the other hand, this study is quantitative in nature, and it relies on a questionnaire for gathering data. As a response to that, a qualitative or mixed-mode approach on consumer resistance to innovation in the context of Pakistan would be good for the future.

Having gathered the data, SPSS and SmartPLS 2.0 M3 were used to determine the causal relationship between different variables or factors in the model. The tools are very helpful. Accordingly, it should be used in examining the cause-effect relationship among different variables in the future model.

Finally, this study is a cross-sectional that measures consumer's resistance to innovation at one time. This is another limitation of the study because cross-sectional is quite vague in proving a cause- effect relationship. Hence, it is suggested that future research applies longitudinal design because longitudinal study provides the best validation of results and provides helps in evaluating

the validation of the results which are attained from cross-sectional research. This is because of consumer perception, attitude, and behavior for innovation change over time. Nevertheless, this study examines the model of consumer resistance for different innovative products and services also. Hence, the model of consumer resistance to Smartphone may be extended and applied on empirical data, which can be collected from different geographical areas.

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