-RESEARCH ARTICLE-

GENDER AS A MODERATOR: EXAMINING RELATIONSHIP BETWEEN TECHNOLOGY READINESS, HEDONIC MOTIVATIONS AND USERS' ACCEPTANCE OF MOBILE GOVERNMENT SERVICES IN PAKISTAN

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─**Abstract**─

Governments worldwide have been using technology to provide services to citizens for a while, but the COVID-19 pandemic has accelerated this process. Mobile technology has become a popular method for delivering government services, known as "m-government" services. The impact which these services have on the public warrants a clear understanding of the users' behavior towards accepting the new service delivery mechanism. Both Technology Readiness and Hedonic Motivations were evaluated for their effects upon users' behavioral intentions to accept m-government services. A quantitative research was conducted in Pakistan to determine the users' behavior. A total of 434 responses were collected based upon stratified sample collected from the provincial and federal capitals of the country. Structural Equation Modeling (SEM) was used to analyze the data. It was concluded that both Technology Readiness and Hedonic Motivations significantly affect users' behavioral intentions to accept m-government services. Moreover, Gender was identified as a moderator only between Technology Readiness and users' acceptance of m-governmental services.

1. INTRODUCTION

Modern democratic governmental systems revolve around public reflecting needs, demands, norms and culture of the people living there (Page & Shapiro, 1983). Adaptation to technology seems what societies needs today. It connects the stakeholders in real time. In fact, technology is assisting the governments to evolve further. It provides a platform of mass communication where customized services can be delivered at a minimal cost (Bertot et al., 2010). Providing cost effective, efficient services to all and sundry is what good governance require. United Nations has identified good governance as a solution to the problem of poverty. Use of Technology has also been promoted as an essential tool to deliver good governance by the United Nations (UN, 2012). It has further been identified that technology can add to the transparency reducing corruption while helping achieving the goal of participative governments (Castelazo, 2016).

The emergence of cellular phone as a necessary part of modern day life, its acceptability, and omnipresence combined with cost effectiveness and technological advancement of cellular handsets, have presented a golden chance to governments to use these cellular phones as mediums to approach general public. General public has an affinity developed with mobile technology. Using the mobile technology is considered convenient and affordable across all social and economic classes. Building on this extra ordinary opportunity, governments across the globe, started providing services accessible through mobile phones. Researchers have labeled mobile based government services initiatives as m-government services (Sandy & McMillan, 2005). Researchers explained mobile government services as those which are delivered using mobile handsets simplifying otherwise complex governmental public services deliver mechanisms (Shareef et al., 2016). Researchers appreciated the easy accessibility and convenience which the m-government services provide to both general public and government servants (Sandy & McMillan, 2005). Researchers (Shareef et al., 2016) further explained that mobile government system provides the opportunity of using complex computer backed services using mobile interface. Introducing m-government services removes the requirement of computer literacy of the users from the complex public sector data management systems and replaces it with the friendly interfaces of mobile phones.

M-government services has proven its efficacy in the war against Covid-19. Government have taken advantage of mobile phones for variety of services ranging from announcements and communications of information (Lee & Lee, 2020) to GPS-based contacts tracking (Chan et al., 2020; Lee & Lee, 2020). This has helped general public making useful decisions like working from home, information about the vaccination centers or making utility bills payment sitting from the comfort of their

homes without any additional charges. In fact these services emerged as the best tool of keeping the general public safe from the risk of spreading disease. Saving general public from unnecessary exposures, providing them the opportunity of receiving contact free necessary public services made such services a necessity at the time. This also proved successful in breaking stereo types where many were of the view that delivering such services is not possible over mobile phone.

The widespread use of mobile phones and the extensive coverage of mobile networks make them an effective means of communication. These advantages can also help overcome challenges associated with traditional e-governmental platforms, such as power outages, connectivity issues, and limited access to computers. A report by the International Telecommunication Union has found that mobile networks are available to over 95% of the world's population (ITU, 2016). Additionally, mobile networks now provide broadband services that are cheaper than fixed broadband connections (ITU, 2017). The versatile and widespread nature of mobile devices, along with increased coverage, more affordable devices, lower prices, and higher levels of mobile literacy make mobile phones an ideal medium to deliver government services. Mobile government provides the general public opportunity of accessing governmental services in a cost effective way while saving time using their mobile devices. This makes government easy to access, particularly for those who live in areas located far from where government offices are located (Almarashdeh & Alsmadi, 2017).

Policymakers need to identify the various challenges that citizens face when trying to use mobile platforms for accessing government services. Factors such as convenience, trust, security, and privacy play a significant role in determining usage. However, it is important to note that these factors can affect usage differently in different countries. The use of location tracing apps during the Covid-19 pandemic has led to many privacy concerns among citizens (Chan et al., 2020). Such challenges can potentially become a barriers in the acceptance of m-government platforms (UN, 2012). It is important that vulnerabilities of each m-government service should be well thought off while at the design stage. The users should be made aware of all such risks as well as safeguards provided by the system to meet those risks. Such preemptive actions win trust of citizens. Indeed gaining citizens confidence confirming them privacy and security of their information is a necessity to make such initiatives successful (UN, 2018).

No governmental initiative can become popular till the time it becomes accepted amongst its users. It is necessary to understand the requirements and needs of the targeted users of the applications in order to reap benefits from m-government platforms (Isagah & Wimmer, 2017). M-government is an alternative delivery channel of the governmental services. Using Mobile technology, governments can not only achieve sustainable development goals but also can help establishing two ways communications between the governments and general public. Mobile government platforms make

accessing governmental services easier for general public; Whereas, at the same moment, it helps governments in delivering public services effectively and efficiently (UN, 2016).

With a per capita income of $1629 and GDP growth rate of 5.28 percent (Ministry of Finance, 2017). Pakistan is the 6th most populous country in the world having population of 193 million (World Bank, 2017). Pakistan is 24th largest economy of the world which is projected to take 16th position in the world by the year 2050. This upward movement in GDP is projected due to strong population growth and a large young population; however, failing in creating jobs for the younger population may result in political instability and a reversal of these projections. Required number of jobs can only be created by providing an environment conducive for the businesses and the private sector (PWC, 2017). Government of Pakistan is also adopting electronic platforms to help improving delivery of governmental services. The National IT policy recognizes importance of provisioning electronic platforms for governmental services. Yet the desired outcomes have not been achieved (Arfeen, Iqbal, & Mushtaq, 2017).

The discussion thus leads to the argument that it in order to get better results from m-government initiatives government needs to consider factors which effects upon the acceptability of these amongst the masses. Many studies are being undertaken on the problems faced by governments in adoption of electronic platforms; Research on the issues related to adoption of these services by citizens started gaining momentum quite recently. Most of these studies were targeted towards developed nation ignoring developing countries like Pakistan. It has already been identified that there is relationship between adoption of e-government services and the behavioral factors defining users behavior (Muhammad, Jouni, & Markku, 2013).

Popularity of m-government has made many researchers try finding the key success factors for implementing m-government. Technology readiness of the targeted users is identified as one of the most important factor amongst those necessary for the success of any m-government service (Sandy & McMillan, 2005).

Consumer also get enjoyment while using technology. The feel of playfulness while using a new technological system help users in accepting technology to perform their daily life operations. Hedonic motivation thus becomes an important factor affecting acceptance of m-government services (Venkatesh, Thong, & Xu, 2012).

According to statistics Pakistan has a 48.76% female population (PBS, 2017). Any initiative including that of m-governance could be only accepted in Pakistani society if the women population accepts that. Researchers are arguing upon the effect of gender upon decision making since long. Effects of gender upon ethical decision making (O'Fallon & Butterfield, 2005), online shopping (Amin, Rezaei, & Tavana, 2015) and

acceptance of m-payments (José Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014) have already been identified by researchers. It is important to understand the effect of gender upon the behavior which affects acceptance of m-governance. This will help designing an m-government system acceptable for all.

2. PURPOSE OF THE STUDY

The current study is a step towards understanding m-government services. This study works towards finding out the effect of technology readiness upon behavioral intentions to accept m-government services. Moreover the study aims to evaluate the effect of Hedonic Motivations upon behavioral intentions to accept m-government services. Technology readiness and Hedonic Motivations both are areas which needs detailed evaluations viz-a-viz the effect these variables have upon decision making process related to acceptance of m-government services. Gender is another important dimension which the study is designed to explore. Acceptance of a governmental initiative can only be called successful provided it is accepted amongst its users. Understanding users and their needs is necessary to design successful m-government service model (Isagah & Wimmer, 2017). No initiative could be successful where a majority of population does not accept that. Therefore, it is important to understand how gender effects upon the behavior which affects acceptance of m-governance.

The role of Technology Readiness is more of a stimulant in the study of acceptance of technology. Characteristic's which effect Technology readiness of users may differ from one country to another which may result in difference of Technology Readiness amongst users (Ferreira, da Rocha, & da Silva, 2014). On one hand researchers (Al-Hadidi & Rezgui, 2010; Parasuraman & Colby, 2015; Svendsen et al., 2013) have reported affirmative relationship between technology readiness and users acceptance of technology. On the other hand, researchers (Berndt, Saunders, & Petzer, 2010; Summak, Bağlıbel, & Samancıoğlu, 2010) have also shown insignificant technology readiness amongst users. Moreover, it has also been argued that demographic variables have an effect upon technology readiness of users (Hassan, 2010; Summak, Bağlıbel, & Samancıoğlu, 2010).

Concluding the discussion, it can be argued that Technology readiness alongwith hedonic motivatoin are principal factors in users acceptance of m-government services and gender differences effects human behaviour affecting m-government acceptance

3. LITERATURE REVIEW AND DEVELOPMENT OF HYPOPTHESIS

3.1 Behavioral intentions to accept m-government services

Fishbein and Ajzen (2011) while explaining the reasoned action approach have described behavioral intentions as the most important and immediate precursor of a behavior. The authors argued that intentions if measured rightly are true reflections of

the behavior under discussion (Fishbein & Ajzen, 2011). Behavioral intentions measure influence of planning to performing a specified behavior (Davis, Bagozzi, & Warshaw, 1989). Theory of reasoned action presented behavioral intentions as function of attitude and subjective norms (Madden, Ellen, & Ajzen, 1992). However, this idea was presented for behavior which comes under volitional control. Practically there are events which don't come under volitional control, therefore authors while presenting theory of planned behavior have suggested that intentions are function of not only attitude and subjective norms but also of perceived behavior control (Ajzen, 1991). Researchers (Richard, Ahmed, & Heikki, 2017) used intentions to adopt mobile banking as a proxy of adopting mobile banking services in Pakistan. Ajzen and Fishbein (1975) explained behavioral intentions as representation of expectation of adopting a behavior from a person in a specific environment. Furthermore, they also suggested that behavioral intentions can be taken as the expected action plan. According to the researchers, individual's behavioral intentions, if measured in a correct manner, can forecast individual behavior appropriately (Ajzen & Fishbein, 1975). Researchers (Brandon & Lewis, 1999) have found that behavioral intentions are reliable forecasters of performing actions provided attitudes and behaviors are defined in an appropriate way. Researchers (Greaves, Zibarras, & Stride, 2013) also suggested that the intentions should to be specifically defined and general statements should not be used. The authors clarified this point by explaining that the intention which individuals reports are clear predictors of individual behavior provided attitudes and behaviors are well defined (Greaves, Zibarras, & Stride, 2013). This would result in making the measurement process reliable providing a better understanding of the action an individual may undertake. Many researchers (Chandon, Morwitz, & Reinartz, 2005; Morwitz, 2014) have questioned the ability of the behavioral intention to predict actual behavior. Interestingly, these authors have not entirely rejected the idea of the relationship between intentions and the actual behavior. Rather they argued upon finding better ways to predict behavior (Chandon, Morwitz, & Reinartz, 2005; Morwitz, 2014). However, the majority of the researchers (Kautonen, van Gelderen, & Fink, 2015; Rowe et al., 2016) agree to the predictability of the behaviors through measuring behavioral intentions (Huang, 2009).Believing the arguments as discussed earlier behavioral intentions in the context of this study is also taken as a proxy of users adoption behavior of m-government services as was done by other researchers (Saxena, 2018).

3.2 Technology Readiness

The acceptance of m-governmental services are largely affected by the weight people assign to the technology usage. In fact technology readiness of the general public should provide an opportunity vis-a-vis introducing m-governmental services. The mobile tele density of 86.3 percent shows that mobile technology is accepted well by the people of Pakistan. Whereas mobile broad band penetration of 54.3% confirms that general public is ready and open to explore the opportunities which the mobile internet brings in to the life.

Technology Readiness (TR) is tendency of a person's behavior towards acceptance of technology. It is a set of believes which kicks in while using new technology or innovation (Ferreira, da Rocha, & da Silva, 2014). Rapid changes in technology have brought challenges of acceptability to a new level for service providers, employees and users. Traditionally it was to manage shift from brick and mortar-based distribution channel to electronic platforms. But with the advent of new technologies managers are required to help users adapt innovations by letting the old technology go and learn new. It is a constant struggle between value addition and paying cost of learning and developing trust in new technological approaches. Technology Readiness helps understanding cognitive behavior behind individuals accepting or rejecting technological innovation. This in turn helps managing change in technology effectively (Parasuraman & Colby, 2015). Researchers have widely studied relation of Technology readiness in studies related to acceptance amongst users of new technology and innovation (Parasuraman, 2000; Sugarhood et al., 2014; Witell et al., 2015). This helps organizations understanding the features which may or may not help in making their products acceptable to the users (Ferreira, da Rocha, & da Silva, 2014). Technology readiness helps not only in understanding customers but also in identifying the traits which are necessary to place them in relevant departments and to assign them tasks more suitable to their traits (Parasuraman & Colby, 2015; Walczuch, Lemmink, & Streukens, 2007). Similarly, it becomes important to study the Technology readiness of the staff while introducing them with technology so they can perform their existing tasks efficiently. Kuo, Liu, and Ma (2013) examined the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. They found that optimistic nurses were better in learning technology. They concluded that on job IT training was necessary for the nurses so to help them improve their IT literacy while reducing their technology related anxiety (Kuo, Liu, & Ma, 2013).

Pakistan is a developing country striving to use technology to disseminate education. A research was conducted to measure the technology readiness of school teachers. Their score was identified at moderate (2.86) level which calls for attention of authorities (Qazi, Mustafa, & Sheikh, 2016).

Researchers have identified technology readiness of users of m-government applications as one of the most important factors in its success. They informed that users depart away from those applications which they find difficult to use (Isagah & Wimmer, 2017). M- Government provides a potent process to involve civil society. Technological platforms like m-government applications help users participate even with a low level of motivation. It is a powerful mechanism to engage civil society (Borrero et al., 2014). Digital divide is caused not only due to scarcity of physical infrastructure but it is also due to absence of attitude and aptitude towards technology. Understanding the requirements of the citizens and meeting those requirements is also necessary for the governments. M-government solutions can become only successful if users are ready to trusting and accepting its technology (UN, 2016).

3.2.1 Dimensions of Technology Readiness

Parasuraman (2000) identified four dimensions measuring technology readiness namely innovativeness, optimism, discomfort and insecurity. The researcher identified innovativeness and optimism as drivers of technology readiness whereas discomfort and insecurity were considered as inhibitors (Parasuraman, 2000). Each of these dimensions is discussed below.

3.2.1.1 Innovativeness

Innovativeness was explained by Parasuraman (2000) as an individual's propensity to adopt technology and lead opinion shaping process. Personality traits have been identified to affect individual innovativeness. It has been identified that extraversion, agreeableness, conscientiousness, and openness to experience have positive influence on individual innovativeness. On the other hand, Neuroticism is found to be inversely affecting individual innovativeness. Moreover, researcher has further identified that individual innovativeness have a positive relationship upon perception with life adding to the wellbeing of an individual (Ali, 2019). Other authors also have endorsed this point of view claiming that individual innovativeness explains 69% of Psychological wellbeing's total variance (Ikiz & Asici, 2017). In addition, to the idea that personality traits affect innovativeness (Ali, 2019), researchers (Nisula & Kianto, 2016) have argued that group environment can also influence individual innovativeness. These researchers concluded that temporary group setting differently affect individual effectiveness than formal organizational settings (Nisula & Kianto, 2016). In another study researchers studied individual innovativeness to evaluate acceptance of web based pedagogical tools amongst teachers in Turkey. The researchers argued that higher individual innovativeness leads to acceptance of innovations quicker. They further concluded that activities designed to increase innovativeness of individual teachers may help these teachers in adopting technology (Gökçearslan, Karademir, & Korucu, 2017). Similarly, another research investigating teachers' opinion on using technology, have linked individual innovativeness with acceptance of technology while citing organizational environment as a facilitator. The research explained that organizational context not only helps in improving individual innovativeness but it also assists in acceptance of technology (Martins, 2018). In line with these finding, researchers while evaluating agricultural consultants' intentions towards usage of precision technology in agriculture, have confirmed effect of individual innovativeness in technology acceptance (Tohidyan Far & Rezaei-Moghaddam, 2017). In contrast to these results few authors (Koivisto et al., 2016) have argued that personal innovativeness may negatively affect upon their behavior of accepting technology. Researchers have cited that the individuals higher on the scale of innovativeness becomes critical of technology resulting in having higher expectations from technology then those individuals ranking lower on the innovativeness scale (Koivisto et al., 2016).

3.2.1.2 Optimism

Parasuraman (2000) defined Optimism as optimistic view of technology inculcating confidence of having more control, variety of options and efficacy in the day to day affairs of the individual life. Optimism is a motivator towards technology readiness (Parasuraman & Colby, 2015). While studying e-payment acceptance in Ghana, researchers confirmed positive effect of optimism upon technology-based payment mechanism (Acheampong et al., 2017). Similarly, while evaluating behavior towards usage of fitness application, researchers have confirmed the positive role which optimism plays in predicting technology acceptance of individuals (Chen, 2018). Researchers further argued that optimism have a positive effect upon perceived usefulness and perceived ease of use of health applications. They also suggested that showing performance of technological innovation can help in improving optimism towards technology (Chen, 2018). Similarly, other researchers (Rahman et al., 2017), while studying technology acceptance in micro entrepreneurs in Bangladesh, concluded that optimism has a positive impact upon both perceived usefulness and perceived ease of use. In the same way, while testing technology readiness and acceptance model for mobile payment in Germany and South Africa, researchers found optimism to be having the strongest influence upon perceived usefulness of technology, which in turn was having the strongest affect upon acceptance of technology (Martens, Roll, & Elliott, 2017). This further identifies the basis which optimism provides in acceptance of technology. However, these researchers (Martens, Roll, & Elliott, 2017) found insignificant relationship between optimism and perceived ease of use which was in contradiction with findings of other researchers (Chen, 2018; Rahman et al., 2017).

3.2.1.3 Discomfort

Discomfort is the perception about technology that it cannot be controlled. It is getting beleaguered with mere presence of technology (Parasuraman, 2000). Individuals measured high on discomfort scale face a greater difficulty using technology. They found technology complex to use (Walczuch, Lemmink, & Streukens, 2007). Researchers (Chen, 2018), while evaluating behavior towards usage of fitness application, have confirmed that discomfort is inversely related to ease of use. This was in line with the finding of other researchers (Rahman et al., 2017). Researchers (Chen, 2018) also found that discomfort have no effect upon perception of usefulness of technological interventions. However, other researchers (Rahman et al., 2017), found contradicting results. These researchers, while studying technology acceptance in micro entrepreneurs in Bangladesh, found a positive relationship between discomfort and perceived usefulness. The authors identified fine technical support as a possible reason of this anomaly overcoming discomfort while ensuring usefulness to the users (Rahman et al., 2017). On the contrary, other researchers (Martens, Roll, & Elliott, 2017), while testing technology readiness and acceptance model for mobile payment in Germany and

South Africa, found discomfort having no significant influence upon perceived usefulness of technology. Researchers therefore assumed that level of difficulty in using a system doesn't have any relationship with users' perception towards its usefulness. A system may be considered useful while users may remain vary of the technology. Moreover, these researchers found discomfort having inverse relationship with perceived ease of use of technology in Germany while having insignificant results for same relationship in South Africa (Martens, Roll, & Elliott, 2017).

3.2.1.4 Insecurity

Insecurity is having no trust upon technology; believing that technology cannot make things better and may even jeopardize the environment (Parasuraman, 2000). Insecurity is one of the two inhibitors of technology readiness. Researchers (Chen, 2018), while evaluating behavior towards usage of fitness application, have argued that insecurity positively effects ease of use whereas it is negatively related to perceived usefulness. Similarly, researchers (Rahman et al., 2017) while studying technology acceptance in micro entrepreneurs in Bangladesh, found that insecurity was inversely related to perceived usefulness while it increased perceived ease of use. The researchers termed the positive relationship between insecurity and perceived ease of use unexpected. They identified contextual perception as the reason behind this anomaly. Researchers, further explained that features which makes technology easy to use can help changing the perception of the users so much that perceived ease of use may overcome insecurity (Rahman et al., 2017). On the other hand, other researchers (Martens, Roll, & Elliott, 2017) found insecurity having either no influence (for sample collected from South Africa) or inverse relationship (for sample collected from Germany) with perceived usefulness and perceived ease of use of technology. Contrastingly, few researchers (Koivisto et al., 2016) identified positive influence of insecurity upon perceived ease of use. The authors argued that users feeling insecure with technology become more cautious using technology. According to the authors these insecure users undertake efforts learning technology-based systems. Their efforts thus translate into making usage of technology easier for insecure users in comparison to those who are not that much prepared and want to learn it based upon their own intuition without putting much effort (Koivisto et al., 2016).

H1: There is positive relationship between Technology Readiness and Behavioral Intentions to accept m-government services

3.3 Hedonic Motivation

Researchers have explained hedonic motivation as enjoyment or pleasure taken from use of technology (Brown, Venkatesh, & Bala, 2006; Venkatesh, Thong, & Xu, 2012). Construct of Hedonic motivation is like perceived enjoyment which researchers, while

working on identifying behavioral factors affecting adoption of information systems, have found to be an important factor (Venkatesh, Thong, & Xu, 2012). Technology usage, after providing valuable inputs in workplace, have now seeped in to the daily life of households. Models explaining technology adoption behavior in work place cannot entirely explain the technology adoption behavior in the household (Brown, Venkatesh, & Bala, 2006). Hedonic motivation is an important factor in explaining acceptance behavior of technology in domestic usage (Zhang & Maruping, 2008). Enjoyability of a technological system is a feature which adds to the systems usability. Enjoyability has further been divided into attributes like fun, entertaining, rewarding, aesthetically pleasing and emotionally fulfilling. While studying motives of using social network sites, researchers have identified hedonic motivation as a reason of initiating usage. However, over time, importance of utility services provided by these networks take over and hedonic motivation does not remain the primary reason of the continuance of usage. Authors yet concluded importance of the role which hedonic motivation plays in initiating the process of accepting technology based social networks (Xu et al., 2012). Similarly, while evaluating mobile payments adoption behavior authors have identified that consumers expectations vary with the pleasure which they get by using the services. Researchers concluded that the usage intentions continue when consumers could derive pleasure from it (de Sena Abrahão, Moriguchi, & Andrade, 2016). Researchers have also appreciated the role of hedonic motivation in the adoption of internet banking in Jordan. They concluded that hedonic motivations have significant effect upon intentions to adopt internet banking. Authors further suggested using techniques which enhance hedonic motivations among consumers would help forming habit of internet banking which would lead to the adoption of internet banking (Alalwan et al., 2015).

Researchers have advised to keep focus upon hedonic aspects of services especially when mobile internet is being used in provisioning of services (Alalwan et al., 2018). Hedonic motivation was found to be a significant factor affecting acceptance of mobile health services in Bangladesh in comparison to USA and Canada where it was identified not affecting the acceptance behavior (Dwivedi et al., 2016). Hedonic motivation gained attention when Venkatesh, Thong, and Xu (2012) updated their famous unified theory of use and acceptance of technology (UTAUT). Authors have considered hedonic motivation to be the most important factor amongst the three factors added in the model (Tamilmani et al., 2019). Scholars have quoted hedonic perspective as driver of the intrinsic motivation (Grant, 2008). Hedonic motivation are named differently by researchers e.g. perceived enjoyment, perceived playfulness, fun and entertainment and (Alalwan et al., 2018; Tamilmani et al., 2019). The addition of hedonic motivation has assisted in changing the perspective of UTAUT from focusing upon extrinsic motivations of organizational users to intrinsic motivation of individual consumer (Alalwan et al., 2018; Tamilmani et al., 2019; Venkatesh, Thong, & Xu, 2012). Similarly, authors updated technology acceptance model by introducing a hedonic variable of perceived enjoyment to the model. Researchers argued that perceived

enjoyment is determinant of perceived ease of use. Authors further argued that the reliability of a well-designed system makes user enjoy the system while reducing anxiety among the users. Furthermore, existence of extrinsic rewards was also identified as source of perceived enjoyment (Venkatesh & Bala, 2008). While conducting meta-analysis of research upon hedonic motivation usage in UTAUT2, researchers identified that out of 79 empirical studies majority used construct of hedonic motivation. Whereas, majority of studies which have not used hedonic motivations have failed to provide justification for excluding the construct in the research design. And, a few amongst these also have recommended to use hedonic motivation in the future research. Researchers have identified that in most of the cases hedonic motivations are found to have a significant effect upon behavioral intentions to use technology (Tamilmani et al., 2019). In contrast to Venkatesh, Thong, and Xu (2012) who argued that age and gender moderate the relationship between hedonic motivation and behavioral intentions. Tamilmani et al. (2019) while performing meta-analysis of hedonic motivation, identified absence of moderating effect of age and gender. Researchers thus advised to choose moderators diligently only at places where context demands these to be used (Dwivedi et al., 2019; Tamilmani et al., 2019).

H2: There is positive relationship between Hedonic Motivation and Behavioral Intentions to accept m-government services

3.4 Gender

Gender has been also explained as a "social structure". A Society can move forward only after realizing how different structures are embedded in its working (Risman, 2004). It is necessary that requirements of each segment of society are identified for all m-government initiatives. This would help designing applications which are acceptable across all users (Isagah & Wimmer, 2017). Understanding behavior of individuals to understand effect of gender upon decision making is a topic widely discussed by researchers. A lot of work is already done on identifying effects of gender upon variety of issues. While reviewing literature on the effect of Gender upon ethical decision making, it was identified that out of the 39 studies 23 found insignificant effect whereas 16 found that women act more ethically then men while making decisions (O'Fallon & Butterfield, 2005). Female CFOs were found risk averse while using more conservative accounting reporting methods than their male counterparts (Francis et al., 2015). Researchers identified that there is difference in making repurchase decision between males and females while buying online. It was argued that intention to repurchase online can be predicted based on gender differences (Amin, Rezaei, & Tavana, 2015). On the contrary, while studying e-government adoption in Oman, researchers found that Gender does not play any role influencing usage of e-government services (Sharma, 2015). Researchers also argued that perception regarding service quality is influenced by gender (Ham & Hayduk, 2003). While studying networking behavior of sales

persons, it was argued that there is difference between job satisfaction and networking behavior of males and females. Females were identified deriving job satisfaction from external networking professional whereas males got it from internal networking (Macintosh & Krush, 2014).

A transactional m-government system may also require m-payments. In a study conducted in 2014, the authors argued that gender has a moderating effect upon the acceptance of m-payment systems. It was stated that with higher ease of use, more men are tend to accept m-payment system (José Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014). Though the result was contradictory to the finding of Venkatesh and Morris (2000). They argued that females prefer those technologies more which are easy to use (Venkatesh & Morris, 2000) .Cultural or social acceptance of Internet use, particularly for women, is another aspect of the connectivity divide. A research study conducted by ITU identified that women have 21 percent less probability of owning a mobile in developing countries. Broadband Commission for Digital Development, in the year 2013, have set a goal of achieving gender equality in accessing broadband by year 2020. In the year 2017, only 45 percent of women were accessing online services in comparison to 51 percent of men world over. A reason could be non-availability or lack of content of interest for women. For example, Oncology Services International, claims that almost one-third of the Member countries (almost 74 states) do not offer information regarding reproductive health-care services (UN, 2018).

Gender plays a major role in the behavior of acceptance of Technology and Innovation. Studying the differences of behavior due to gender helps letting the new technology develop (Goswami & Dutta, 2015). M-government is an innovation. Studying the effect of gender upon acceptance of m-government shall also help developing m-government tools which serve the citizens better.

Importance of gender in profiling of users while studying their behavior of accepting a new technology is undeniable (Ahmad & Khalid, 2017) yet many popular models exploring technology acceptance behavior have chosen to ignore it. Diffusion of innovation theory (Rogers, 2003), theory of reasoned action (Ajzen & Fishbein, 1988), theory of planned behavior (Ajzen, 1991), technology acceptance model (Davis, Bagozzi, & Warshaw, 1989) and technology acceptance model 2 (Venkatesh & Davis, 2000). All chose to completely ignore the effect of demographics upon behavior of users. Both unified theory of acceptance and use of technology (Venkatesh et al., 2003) and unified theory of acceptance and use of technology 2 (Venkatesh, Thong, & Xu, 2012) used gender as one of the moderating variables Paucity of work done in understanding effect of demographic profiles of citizens over adoption behavior of m-government services require detailed analysis of the effect of demographics upon adoption behavior of citizens (Ahmad & Khalid, 2017).

H3: The relationship between Technology Readiness and Behavioral Intentions to accept m-government services is moderated by gender

H4: The relationship between Hedonic Motivation and Behavioral Intentions to accept m-government services is moderated by gender

4. UNDERLYING THEORY

The following section discusses the underlying theory at the heart of the proposed research, its relationship with the variables and factors affecting acceptance of m-government services.

4.1 Theory of Reasoned Action

Theory of propositional control provided the thrust and stimuli required in developing theory of reasoned action (Ajzen, 2012). Against the popular belief that attitude determines behavior in all circumstances Ajzen and Fishbein (1975) presented the idea that intentions instead of attitude are responsible for forming behavior. They believed that people make decisions rationally, evaluating all the information available to them in a systematic manner. The authors argued that people consider the consequences of their actions before choosing their behavior. This provided the basis for theory of reasoned action (TRA). According to the TRA, intentions are predisposed by attitudes and subjective norms.

If an individual's perception of the outcome of adopting a behavior is positive, the individual will have a positive attitude towards adoption of the behavior. On the other hand, if a person considered the outcomes to be undesirable, attitude towards that behavior will be negative. Similarly, if the important persons in one's life consider accomplishing the behavior positive and if one takes inspiration from these important persons then subjective norm is likely to be positive. Vice versa is considered true if the important persons in one's life consider the adoption of behavior as negative. Both the attitudes and subjective norms are calculated using measuring scales which measure level of agreement on a given statement from one extreme to another extreme e.g. from like to dislike. Intention of performing the behavior is contingent upon both the measurement of the subjective norms and attitude. When the compound is positive it reflects the existence of behavioral intention (Glanz, Lewis, & Rimer, 1997). Where, behavior intentions are the central element of predicting behavior (Fishbein & Ajzen, 2011).

TRA doesn't promote the idea that people are rational in their beliefs. On the other hand, it believes that the way in which they make decisions is systematic. TRA explores the idea that while making decision, even those made instantaneously, people process the information in a consistent and rational manner using the set of their previously developed beliefs to form attitudes and subjective norms which ultimately leads to forming behavioral intentions (Fishbein & Ajzen, 2011).

TRA became popular amongst researchers since it got first published. It helped initiating lot of empirical research to forecast and describe behaviors in variety of subject areas (Ajzen, 2012). Researchers validated theory of reasoned action while predicting intentions of Indian consumers of green products. However, the authors argued that the extended theory of planned behavior predicts the behavioral intentions even better than the theory of reasoned action (Paul, Modi, & Patel, 2016). Other researchers (Abraham & Sheeran, 2017) have suggested to use TRA in collaboration with goal theories to enhance its predictability. The authors have further made recommendations regarding mechanisms to promote these ideas in future research were also made (Abraham & Sheeran, 2017).

Failure of previous researchers to find a strong connection between attitudes and behaviors could be attributed towards TRA's success. It found success using attitude as a medium of forecasting and describing behavior; when theories weaved around general attitude were failing. It demands that intention of performing a specific behavior is a combined function of attitude towards that behavior and subjective norm that influences upon the decision to undertake action. The behavior intention is therefore assumed to be direct antecedent of the corresponding behavior (Ajzen, 2012).
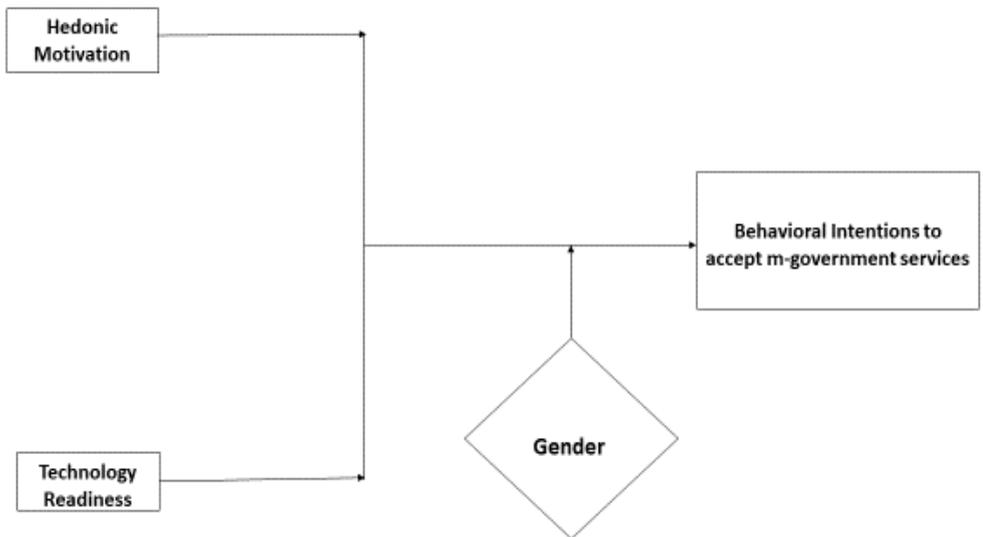
5. RESREARCH METHODOLOGY

5.1 Research Framework

Figure 5.1 - Research framework

M-government is a novel concept having ability, capacity and intent to improve the governmental services delivery mechanism. Understanding user's acceptance behavior of m-government services has remained a challenge since the launch of these services. Few researchers have taken the challenge of developing models to understand user's acceptance of m-governmental services. However, they either presented the model for a specific subset of the population (Abdelghaffar & Magdy, 2012) or have developed the model for specific set of online government services (Shareef, Archer, & Dwivedi, 2012). These models could not explain the m-government acceptance behavior of general public. Neither the researchers could provide a general model explaining user's acceptance of m-government services especially with respect to the demographic diversity.

Continuing the discussion developed in literature review, the research framework is based upon technology acceptance model (Davis, 1985). Since m-government is a tool which governments are using to communicate with general public (World Bank, 2016). Hence it is important to understand the technology adoption behavior of consumer. Unified theory of acceptance and use of technology (UTAUT) 2 has been built upon the concept of consumer acceptance of technology. It updated UTAUT by introducing three new variables namely hedonic motivation, price value and motivation, to help understanding consumer acceptance of technology (Venkatesh, Thong, & Xu, 2012). The role of demographical variables as moderator, introduced in the original UTAUT (Venkatesh et al., 2003) was also kept in UTAUT2 (Venkatesh, Thong, & Xu, 2012). The proposed model not only takes the variable of hedonic motivation from UTAUT2 but also have used a demographical variable i.e. gender as moderator as was done both in UTAUT and UTAUT2.

A thorough review of literature helped in understanding the variables which effect m-government acceptance behavior. In the lines of UTAUT2 construct of hedonic motivation was made part of the model to understand m-government acceptance behavior. Technology readiness, was also included in the model since it has proven role in acceptance of technology (Lin & Chang, 2011) especially where self-service technology like m-government applications have been used by consumers (Kumar, Sachan, & Mukherjee, 2017). As depicted in the Figure 5.1, the model proposes that Technology readiness and Hedonic Motivations have a direct effect upon behavioral intentions to accept m-government services. The model further proposes that demographic variable gender moderates the relationship between each of the independent variable of Technology readiness, Hedonic Motivation and behavioral intentions to accept m-government services.

5.2 Research design and measurement instrument

This study employs quantitative approach while using survey instruments. The result of survey is normally described in quantitative data (Walliman, 2017). Hair, Bush, and Ortinau (2003) suggested that application of quantitative methods comes from the desire of researchers to comprehend relationship, between chosen characteristics and real-life

phenomena, using inductive approach with the help of information from a representative portion of population. This can be achieved by collecting measurable data in an orderly fashion from great number of people (Hair, Bush, & Ortinau, 2003). Furthermore, researchers discussing social research techniques have recommended using quantitative approach where the problem is that of identification of factors affecting an outcome (Creswell & Creswell, 2017).

Survey method has been recommended by researchers due to its capability of identifying reasoning and providing explanation for a question at hand (Zikmund William & Babin Barry, 1997). It has the capability to summarize data gathered from huge sets of data collected from a large group of informants. Moreover it can measure several variables simultaneously and can test number of hypothesis (Neuman & Robson, 2014).

The study was cross sectional in nature. Crosse sectional method of study is recommended by researchers in comparison to longitudinal method based on simplicity and cost effectiveness (Neuman & Robson, 2014). Indeed many researchers (Alalwan et al., 2018; Haider, Shah, & Chachar, 2017; Richard, Ahmed, & Heikki, 2017) in the area of acceptance of technology have adopted cross sectional technique vis-à-vis time frame of their research work.

5.3 Operational Definitions

Data collection in the proposed study is to be done using questionnaires. The questionnaire was developed using items either adopted or adapted by studies conducted in the relevant field for each item being measured. Following sections discuss the sources and reason for each of the adoption and adaptation.

5.3.1 Behavioral Intentions to accept m-government services

Venkatesh, Thong, and Xu (2012), while proposing extension in unified theory of acceptance and use of technology, have used three items and seven-points Likert scale to measure behavioral intentions (Venkatesh, Thong, & Xu, 2012). Aboelmaged (2010), while evaluating robustness of TPB in forecasting entrepreneurial intentions, have used three items and six-point Likert scale to measure behavioral intentions. Other researchers also have used three items and five-points Likert scale to measure behavioral intentions of users for accepting of new technologies (Wong, Hsu, & Chen, 2018). On the other hand authors measuring mobile banking adoption intentions have used three items but seven-point Likert scale (Richard, Ahmed, & Heikki, 2017). Moreover other researchers (Lin, 2007) measured behavioral intention while predicting intentions of consumers for online shopping. Since, the researchers (Lin, 2007; Richard, Ahmed, & Heikki, 2017) successfully have used the measurement scale of behavioral intentions in the research studies which are relevant to the proposed study. Therefore the scale used in these studies are adapted as is suggested in Table 5.2-1.

Table 5.2-1: Questions on behavioral intentions adapted and modified from - Richard, Ahmed, and Heikki (2017) & Lin (2007)

I would use m-government services for my needs of interacting with government
Using m- government services for having transactions with government is something I intend to do
I can see myself using m- government services for handling my transactions with government
I will strongly recommend m- government services to others

5.3.2 Technology Readiness

Parasuraman (2000) proposed to measure technology readiness of individuals so to help in developing an understanding regarding the role which technology plays in the life of its users. He developed the construct and multiple item scale to measure technology readiness of individuals (Parasuraman, 2000). Parasuraman (2000) identified four dimensions measuring technology readiness; where innovativeness and optimism were considered as drivers of technology readiness, and, discomfort and insecurity were taken as inhibitors. The same are planned to be adopted by the proposed study. The construct developed to measure technology readiness as proposed by Parasuraman (2000) served well measuring technology readiness. However, the change of technology, tastes and preference of general public over time has challenged its relevance. Moreover, it's length, having 36-items, makes it difficult to use (Parasuraman & Colby, 2015). Therefore, the study used Technology readiness index 2.0 as proposed by Parasuraman and Colby (2015). This 16-item scale is not only simple to use but also recommended to measure technology readiness of users while measuring other variables (Parasuraman & Colby, 2015). This made TRI 2.0 more relevant for adoption by this research as suggested in Table 5.2-2 since the research framework in the study has other variables to measure alongside technology readiness.

Table 5.2-2: Questions on Technology readiness-adapted and modified from Parasuraman and Colby (2015)

Optimism
New technologies contribute to a better quality of life
m-government gives me more freedom of mobility
m-government gives people more control over their daily lives
Technology makes me more productive in my personal life
Innovativeness
Other people come to me for advice on new technologies
In general, I am among the first in my circle of friends to acquire new technology when it appears
I can usually figure out new high-tech products and services without help from others
I keep up with the latest technological developments in my areas of interest

Discomfort
When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do
Technical support lines are not helpful because they don't explain things in terms, I understand
Sometimes, I think that technology systems are not designed for use by ordinary people
There is no such thing as a manual, for a high-tech product or service that's written in plain language
Insecurity
People are too dependent on technology to do things for them
Too much technology distracts people to a point that is harmful
Technology lowers the quality of relationships by reducing personal interaction
I do not feel confident doing business with a place that can only be reached online

5.3.3 Hedonic Motivation

Alalwan et al. (2015) used three items and seven points Likert scale to measure hedonic motivation while researching upon factors affecting adoption of internet banking in Jordan. Similarly, Alalwan, Dwivedi, & Rana, (2017) used three items and seven points Likert scale in order to measure hedonic motivation of banking services users in adoption of m-banking services. Measurement scale used by Venkatesh, Thong, and Xu (2012), while proposing extension in unified theory of acceptance and use of technology, is easy to follow and being adopted by many authors (Alalwan, Dwivedi, & Rana, 2017; Alalwan et al., 2015). The three items scale used by researchers (Venkatesh, Thong, & Xu, 2012) was adapted by this study. Moreover six items scale built on hedonic joy used by authors (Lowry et al., 2012) while proposing the hedonic motivation system adoption model was also adopted in this study. Table 5.2-3 explains the items to measure hedonic motivation.

Table 5.2-3: Questions on hedonic motivation-adapted and modified from Venkatesh, Thong, and Xu (2012) and Lowry et al. (2012)

Using mobile government services is fun
Using mobile government services is enjoyable
Using mobile government services is very entertaining
Using mobile government really annoyed me

5.4 Sampling

A sample, if selected correctly using the correct procedure, could depict characteristics of the entire population (Creswell & Creswell, 2017; Dawson, 2002). Though most researchers (Creswell & Creswell, 2017; Sekaran & Bougie, 2016) agree that keeping sample size large helps in getting better results. However, resource constraints push researchers to sometime compromise upon size of the sample (Sekaran & Bougie, 2016).

Researchers have argued that larger samples are required to draw inferences upon a smaller population whereas smaller samples may work for larger population (Neuman & Robson, 2014). However, authors have warned against selecting too large a sample since it may introduce Type II errors. That is acceptance of the hypothesis when it is false (Sekaran & Bougie, 2016). Therefore, optimum size of sample is of utmost importance. Roscoe (1975) argued that the sample size should be somewhere between 30 to 500. However, in case of existence of subgroup, selection of sample from each subgroup was suggested to be of 30 (Roscoe, 1975). Moreover, Roscoe (1975) further suggested that in case of multi-variate research sample size should be 10 times more than that of the number of variables involved. On the other hand, Krejcie and Morgan (1970), argued that with the increase in the size of population the sample size might also be increased. However, they further argued that the required incremental increase in sample size should be at diminishing rate. The authors concluded that sample size becomes relatively constant at around 380 cases. Table 5-3 describes the sample size with reference to the size of population.

An individual mobile user is a sampling unit in the study. According to the Pakistan Telecommunication Authority, the regular of telecom sector, Pakistan has a total of 161,014,397 mobile users. Which is the total size of population for the study under consideration.

Table-5-3: Sample size determination

Population (N)	15,000	20,000	30,000	40,000	50,000	75,000	1,000,000
Sample Size (S)	375	377	379	380	381	382	384

Source: (Sekaran & Bougie, 2016)

According to the guidelines provided by researchers, the sample size was required to be around 384 for population having size of equal to or more than one million (Sekaran & Bougie, 2016). Using formulae provided by authors, sample size was calculated at 385 for a population of 161,014,397 individuals (Krejcie & Morgan, 1970). However, after adjusting for rounding off the total proposed sample size would be 386 individuals. Details in this regard can be seen in the next section.

5.4.1 Data collection procedures

Provisional census report 2017 has divided Pakistan into six administrative regions i.e. KPK, FATA, Punjab, Sind, Balochistan and Islamabad (PBS, 2017). However, the recent merger of FATA with KPK has reduced the administrative units to five. Now there are four provinces namely Khyber Pakhtunkhwa (KPK), Punjab, Sind and Balochistan. And one federally controlled capital territory namely Islamabad capital territory. Table 5.3-1 explains the administrative unit wise population of Pakistan

Table 5.3-1: Population of Pakistan

Total	KPK	Punjab	Sind	Balochistan	Islamabad
207,774,520	35,525,047	110,012,442	47,886,051	12,344,408	2,006,572

Source: (PBS, 2017)

In order to truly represent target population, sample were collected from all the heterogeneous groups exiting in the population (Neuman & Robson, 2014). Though these administrative units are based upon geographical diversity but there are also cultural, societal and other factors which makes each of these units heterogeneous. Each administrative unit was considered a strata and proportionate sampling was to be made from that. Table 5.3-2 which represented the proportion of samples which were to be collected from each region. This proportion was calculated by dividing the population of each region by total population.

Table 5.3-2: Proportion of samples to be collected from each administrative unit

Total	KPK	Punjab	Sind	Balochistan	Islamabad
100	17.1	52.95	23.05	5.94	0.97

Note: Figures are rounded to two decimal places. Source: Author

Sample were collected proportionately representing all the administrative units. Data collected from all administrative unit helped making the result generalizable. Furthermore, in order to make selected sample more representative of population, data was collected using mall intercept method from customer care centers of all telecom service providers located in each provincial headquarters. Mall intercept is a popular method of data collection (Hornik & Ellis, 1988), especially frequented by researchers in marketing, in which a researcher intercepts a sample of passerby shoppers and ask them for their willingness for taking part of any survey (Rice & Hancock, 2005).

6. DATA ANALYSIS

Survey method has been used in this study to collect data. Researchers (Altmann et al., 2020) working to evaluate mobile governance initiatives have considered this to be a reliable method. The response rate was 62% when for the survey conducted physically whereas it was reduced to 36% when survey questionnaire were distributed using technology. The difference in response rates got remained in line with the research done by other researchers (Blumenberg & Barros, 2018) who have concluded that web based survey methods have lower response rates in web based survey in comparison to other methods.

The study received 434 responses. The data was prescreened to get the final usable sample. Researchers have agreed that missing data strongly impacts not only the quality of the research but it also have an effect upon statistical outcomes (Dong & Peng). The scholars further have suggested that the statistical analysis could be biased if there are more than 10% missing values. Researchers (Kang, 2013) agree to the fact that the phenomenon of missing

data is an issue commonly faced by the community of researchers. Researchers (Cheema, 2014) are of the view that any of the missing data handling techniques could be used when less than one percent of the data is missing. Only two questionnaires had missing values, which is less than 1% of the total data collected. Kang (2013) suggested to omit cases having missing values in line with the method of complete case analysis or the method of list wise deletion. Therefore both of these questionnaire were excluded from the data set.

Furthermore, three sets of questionnaires were removed as the standard deviation for the responses for all the variables under study was zero. Similar response on all data items reflects upon the unengaged respondents. Keeping the information, recorded from unengaged respondent, may have impacted the quality of the results negatively.

A data point which substantially differs from other data points is an outlier. Identification of the outlier could be quite tricky. Ignoring these outlier might result in missing a unique insight into the characteristics of the population parameter. However, on the other hand, keeping these outlier may skew the data providing inaccurate picture of the population. Therefore it is essential to handle outliers in an objective manner (Hair Jr et al., 2010). The outliers generally place a huge impact on substantive findings concerning association among constructs (Aguinis, Gottfredson, & Joo, 2013). It, therefore is important to evaluate the outliers to recognize whether these are problematic. Quantitative models are used to examine the data for outliers (Mohrman & Lawler III, 2012). Mahalanobis distance test is used in the study to find outliers. Three outliers were identified from the demographics. Moreover, a total of seven outliers were identified from the independent variables. The observations were deleted where the p-value was less than 0.001. Removing the outliers, records from unengaged respondents and the records having missing data; the final useable data set was reduced to 419 records. Thus the overall reduction of cases is just 3.5 percent which is well below the acceptable value i.e., 10% (Mohrman & Lawler III, 2012).

Out of the 419 participants, 212 (50.6 percent of the total sample size) participants were male whereas the remaining 207 (49.4 percent of the total sample size) were female. This shows the data represented both the genders almost equally. The SmartPLS-SEM has a two-stage data analysis process. The first stage is the measurement model and the second is hypotheses testing. In the first stage, item loadings, variance inflation factor (VIF), Cronbach's alpha, Composite reliability (CR), average variance extracted (AVE), Heterotrait-Monotrait ratio of correlations (HTMT), and descriptive statistics were calculated.

This study checked the loadings of the items to check how each item represents the underlying construct. Researchers have suggested these loadings to be equal to or higher than 0.7 ($\geq$0.70) in order to be considered suitable for the linked construct (Hair et al., 2019). Whereas, other researchers Hair Jr et al. (2010) have suggested the factor loading to be considered acceptable if the values come equal to or higher than 0.50. The item loadings in this study were within the suggested range.

Past studies have suggested that the VIF value should be ≥3.30 (Hair et al., 2019) and as per Hair et al. (2010) it must be less than 10. The findings of the current study are in line with the suggested threshold,

The internal consistency of variable items has been measured using Cronbach's alpha. Researchers have advised the alpha level to be ≥0.70 (Moslehpour et al., 2022). The findings exhibit that all the values were as per the suggested threshold (0.755-0.943). Rho_A calculates the reliability of every construct, and the index is set to 1, the recent study fulfills the criteria (see Table 5.4-2).

Moreover Composite Reliability (CR) was also measure to assess the internal consistency of the construct. The results in Table 5.4-2 exhibit that CR for variables is within the acceptable range as is recommended by other researchers (Moslehpour et al., 2022). Convergent reliability is tested using value of AVE. The values of the AVE is well above then the suggested threshold of ≥0.50. This is in line with the recommendations of researchers (Hair et al., 2019).

Discriminant validity was confirmed using the heterotrait-monotrait (HTMT) ratio of correlations as was proposed by Henseler, Ringle, and Sarstedt (2015) Results have shown the HTMT values to be less than 0.90 or all the variables which is in line with the advice of the researchers.

Table 5.4-1: Outer loadings of the Factors and VIF

Item	BI	HM	TR	VIF
BI1	0.793			1.603
BI2	0.831			2.050
BI3	0.808			1.895
BI4	0.761			1.470
HM1		0.809		1.509
HM2		0.868		1.746
HM3		0.812		1.592
TR1			0.756	2.346
TR10			0.679	1.861
TR11			0.682	1.989
TR12			0.690	1.855
TR13			0.670	1.730
TR14			0.643	1.748
TR15			0.668	1.810
TR16			0.692	1.981
TR2			0.805	2.937
TR3			0.743	2.351
TR4			0.735	2.155
TR5			0.709	1.957
TR6			0.727	2.006
TR7			0.720	2.010
TR8			0.732	2.104
TR9			0.696	1.994

Note: VIF=Variance Inflation Factor

Table 5.4-2: Reliability and Validity

Variable	Cronbach's Alpha	rho_A	Composite Reliability (CR)	Average Variance Extracted (AVE)
BI	0.811	0.811	0.876	0.638
HM	0.775	0.782	0.869	0.689
TR	0.935	0.94	0.942	0.505

Table 5.4-3: Discriminant Validity - HTMT

Variable	BI	HM	TR
BI	1		
HM	0.505	1	
TR	0.67	0.443	1

The Hedonic Motivation has the lowest mean (3.453) score with the highest standard deviation, showing that a reasonable number of users are using m-government services since it gives them joy. Similarly, Behavioral Intentions has the highest value (3.884) of mean, while having the standard deviation value of 0.825 showing the higher acceptability of m-government services. Whereas, Technology Readiness has the mean value of 3.803 which the lowest standard deviation (0.583) amongst all the variables observed under the study (see Table 5.4-4).

Table 5.4-4: Descriptive Statistics

Variable	Sum	Mean	Std. Deviation
BI	1627.5	3.884	0.825
HM	1446.7	3.453	0.853
TR	1593.6	3.803	0.583

At the second stage of the PLS-SEM analysis bootstrapping method was used. Researchers have considered Bootstrapping a process that is an alternative to traditional testing of hypothesis. Authors have validated it for its applicability in variety of situations and for its easy understandability (Ringle, Wende, & Becker, 2015). The maximum iterations were decided to be 300 (Ringle, Wende, & Becker, 2015), and the number of bootstrap samples was between 500-5000 and the number of cases was considered the same as the number of observations. The study has avoided the goodness of fit due to its less interpretation power using PLS-SEM (Bagozzi & Yi, 1988).

The findings of revealed Hedonic motivation positively and significantly affects behavioral intentions (O= 0.093, t= 2.217). Also, the technology readiness is positively and significantly related to the behavioral intentions (O= 0.286, t= 6.517) (see Table 5.4-5). Hence, H1 and H2, both were accepted. Likewise, the Figure below shows the path coefficient between all the direct hypotheses.

Table 5.4-5: Path Coefficients of the Direct Paths (H1 & H2)

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P-Values
HM → BI	0.093	0.092	0.042	2.217	0.027
TR → BI	0.286	0.291	0.044	6.517	0.000

Multigroup analysis (MGA) or between-group assessment was used to check for moderating effect of gender upon the relationship between Hedonic Motivation, Technology Readiness and Behavioral Intentions to accept m-governmental services. MGA allows researchers to examine variations between several groups in two similar models when the teams are understood (Hair et al., 2017). It has the capability to recognize the existence or lack of Multigroup variations anchored with the PLS methods. As per Hair et al. (2017), MGA is one of the most effective methods to analyze moderation in several relationships. Standard moderation assesses a single structural association at the point of interaction between the exogenous (two) construct's product and the endogenous construct. While MGA provides a more whole picture of the moderator's effects on the assessment outcomes as the focus shifts to check the effects on examining the effect of the moderator on all developed hypotheses.

This approach is a non-parametric significance assessment of variations in the groups that develop PLS-SEM bootstrapping results. As can be observed from Table 5.4-6, results are significant for the group difference based on gender for TR where all values of p is less than 0.05 whereas the results are insignificant for HM where the p-values is of 0.058 which is more than the 5% threshold. Hence, H3 was rejected while H4 was accepted (see Table 5.4-6). Similarly, the group difference based on the gender using parametric approach was also assessed using the outer loadings, t-value and p-value.

Table 5.4-6: Group Difference – Gender

Path	Path Coefficients-diff (GROUP_Gender (1.0) – GROUP_Gender (2.0))	p-Value new (GROUP_Gender(1.0) vs GROUP_Gender(2.0))
HM → BI	0.156	0.058
TR → BI	0.247	0.003

Note: male = 1; female = 2

7. DISCUSSION

The study proves that there is a significantly positive relationship between hedonic motivation and behavioral intention to accept m-governmental services. As shown in the Table 5.4-5, the value of t-statistic appeared to be 2.217. This confirms the relationship to be significant since the value of t-statistic is greater than 1.645, where p-value is 0.027 which is also less than 0.05. The findings are in line with the findings of authors Dwivedi et al. (2016) for their study conducted in Bangladesh. These are also

in agreement with the research work of the authors (Alalwan et al., 2015; de Sena Abrahão, Moriguchi, & Andrade, 2016). But this contradicts the finding of the other authors (Oliveira et al., 2016). Cultural differences could be one reason for such contradicting difference in results (Dwivedi et al., 2016). Demographics could be another reason. Researchers (Dwivedi et al., 2016) have already found that Hedonic motivation affects differently upon, behavioral intentions of users acceptance of mobile based technology, living in different geographical locations. Pakistan is a young nation which has its own unique geographical, social, demographic and cultural traditions. Being young technology attracts them. Moreover, it is a nation which doesn't have much of an entertainment opportunities available. Using mobile based applications give them the opportunity to explore new things while having a peace at back of the mind that they are utilizing their time effectively using the mobiles while getting enjoyment out of it. The confirmation from the quantitative data that hedonic motivation have a positive relation with users' behavioral intentions to accept m-governmental services is very much in line with and according to the prevailing social norms.

Technology readiness are believes which come in while using new technology. The t-statistic of the relationship between technology readiness and behavioral intentions to accept m-government service was calculated to be 6.517 with value of $p<0.01$. This shows that the relationship between both the variable in significant. It confirms that the hypothesis developed in the city that there is a positive relationship between technology readiness and behavioral intentions to accept m-government services. The results are similar to the findings of researchers (Al-Hadidi & Rezgui, 2010; Parasuraman & Colby, 2015; Svendsen et al., 2013). However, these results are contrary to the findings of the researchers (Berndt, Saunders, & Petzer, 2010; Summak, Bağlıbel, & Samancıoğlu, 2010) who have shown insignificant relationship between technology readiness and users' acceptance of technological interventions similar to m-government services.

The study has proven that the gender differences effects the relationship between technology readiness and behavioral intentions of users in acceptance of m-government services. This therefore reinforces the idea of taking care of the needs of the gender while designing the mobile based services for the usage of general public. This is in line with the theory of acceptance and use of technology (Venkatesh et al., 2003) and unified theory of acceptance and use of technology 2 (Venkatesh, Thong, & Xu, 2012) where authors claimed that gender moderates the acceptance behavior of technological services; whereas it contradicts the finding of authors who claimed that gender does not have effect upon usage of technology based services (Sharma, 2015). The study has further rejected the idea of gender moderating the relationship between Hedonic Motivation and Behavioral intentions of users in acceptance of m-government services. It shows that hedonic motivation have an equal effect upon behavioral intention of all the gender classes. This makes a lot of sense if evaluated considering the culture of Pakistan where the research was conducted. Governmental services in Pakistan are

availed for activities having an impact upon the entire family. Therefore, availing governmental services is considered a serious business and the interest in these services is not affected by the difference in gender.

8. RESEARCH IMPLICATIONS

Technology readiness, is relatively new area of research. The current research has contributed towards identifying the relationship of technology readiness viz.a.viz adoption of technology in a developing country, which is a lesser explored area especially with reference to the country of research i.e. Pakistan.

Application of hedonic motivations particularly with reference to governance tools like mobile government services is also an area less explored. This study has made additions to the knowledge base of effect of hedonic motivation upon the usage behavior of governmental services.

The effects which gender have on acceptance of technology is a less explored area especially with respect to the acceptance of m-government services. Present research has contributed to the knowledge regarding the effect which variations in the demographic variables i.e. gender play on user's behavioral intentions to accept technological platforms especially with reference to m-government.

M-government is an excellent way of delivering government services to the doorstep of the stakeholders at a fraction of the cost of delivering these services physically. The recent pandemic outbreak has further exaggerated the importance of the m-government services since these services required no human interaction, providing access to the information to all the stake holders while keeping everyone involved in the process safe. Moreover, the same services had seen provided tremendous support mapping the spread of the pandemic leading to making strategies fighting back. However, there still remains issues amongst the general population in adopting many mobile government services. The results of this research will help, policy makers of developing countries in general and Pakistan in particular, designing more acceptable m-government platforms.

This research would guide policy makers in identifying the methods and techniques which may help designing the m-government systems in a way which make these acceptable across all segments of society. Making m-government initiatives popular and achieving the goals of service delivery unique to m-government services.

Technology readiness of the various segments of society is a challenge. This is one point considering which many governmental departments do not launch their alternative services delivery methods especially mobile based services initiatives. The research is going to help such governmental organizations to make decision based upon the data and results made available.

International donor agencies with a target to achieve sustainable development goal need objective evidence while launching their interventions in developing countries. Pakistan is a developing countries which receives a lot of help from international donors for improving their governance systems. The research would provide these donor as well as governmental agencies design, pilot and implement mobile based technological interventions making the life of the residents of the area easier. The donor agencies while at the planning phase can devise and design their programs in line with the results provided by this research thus saving these agencies not only time but also would save money by providing concrete evidence on the factors which have affect upon behavioral intentions to accept m-government services.

9. LIMITATIONS

It was a cross sectional study, due to constraints of both time and cost. Though, it has answered the questions fairly being raised by the researcher. However, a longitudinal study may have provided a better understanding of the subject while delving deeper into details.

Restrictions related to COVID-19 started getting implemented across the country while collecting data which resulted not only a lot of difficulties in data collection but also led to compromise on the quality of data collection.

The research was conducted in Pakistan, which is a developing nation having cultural norms, traditions and habits. Generalizing these results across other countries might not be entirely true. Moreover, even in Pakistan the research was limited to the urban centers of Pakistan resultantly might be missing capturing characteristics and concerns of the people living in the smaller towns and villages.

Many individuals getting selected in the sample, had not actually ever used any m-government service. Though the questionnaire had complete definition of m-government services along with the local examples, whereas enumerators further explained the same, to every individual interviewed, in detail. Assuming the usage and answering questions while having neither the previous knowledge nor any experience about such a service may have impacted upon the selection of the answers.

The study was quantitative in nature, like all other quantitative research designs the study couldn't capture the exact feelings of the respondents. Respondents were given a choice to answer the questions on a pre deiced scale. This might make answers given by the respondents biased. Though the validity and the reliability of the subjective instruments were established and standard practices were used to avoid any such problem. However using mixed methods would have been even a better option where both qualitative as well as quantitative techniques were used. This might have provided a better and detailed understanding of the subject.

10. RESEARCH RECOMMENDATIONS

The study focused on the moderating effects which a demographic variable i.e. gender had on the relationship between behavioral factor and behavioral intentions to accept m-governmental services in Pakistan. It may be pertinent to note that Pakistan is a south Asian developing nation. Evaluating these results for different geographical locations and regions could help further understand the subject.

Observing mediating effect of gender upon the relationship between behavioral factors and behavioral intentions to accept m-governmental services could add greatly to the body of knowledge.

The research conducted was cross sectional in nature, however conducting a longitudinal study can also add further clarity to the area. Observing behavioral intentions before using a mobile based governmental service and then recording the intentions after using such a service could further identify effects of demographic variables upon behavioral factors, behavioral intentions and their relationship between each other.

A comparative study based on the same research framework can also be done where the research would be conducted both in developing nations and developed nations. This would prove helpful identifying differences while developing a deeper understanding of the behavioral intentions.

In this study only one demographic variables i.e. gender was evaluated for its moderating effect upon relationship between behavioral factors and behavioral intentions to accept m-governmental services. Additional demographic variables like age, education, income, marital status, race, occupation, nationality, family size, ethnicity and religion can be used to find both their moderating and mediating effects upon the relationship between behavioral factors and behavioral intentions to accept m-government services.

11. CONCLUSION

This study is the first of its kind study undertaken to evaluate the moderating effect of Gender upon the relationship between behavioral factors and the behavioral intentions to accept m-government services. It helped devising a route at which researchers could tread while fully understanding the mobile based governmental initiatives and services. The outreach, usability and ubiquitous nature provides such opportunities of using these systems for general public which are not possible for an e-government system, especially when taken with the view of a developing nation like Pakistan where computer literacy is low but the penetration of mobile technologies is very high. Taking advantage of the abundance of mobile technologies and general public accessibility to the mobile phones, countries like Pakistan have a great opportunity serving the public

through these mobile technologies. COVID-19 also introduced the need of introducing contact less governmental delivery mechanism. Interestingly, m-government services provide effective contact less services in a fraction of cost than the traditional governmental services. With government willingness towards launching such m-government services the only impediment is the human behavior of accepting such services. All investments in such services can be at loss if proper care towards designing mobile based governmental services is not taken. The current study provides a step towards the need of the hour. Government has launched many such services in Pakistan yet the best results could only be produced if these services are designed while taking care of the behavioral needs of the general public.

Moreover, the study evaluated the literature for the behavioral factors affecting m-governmental services. The idea was to identify the explanation between the differences in results from various researches around the globe. Gender was examined for the moderating effect which it has upon the relationship between behavioral factors and behavioral intentions to accept m-governmental services. The study has highlighted the importance of hedonic motivation for the general public showing intention to use m-governments services. Therefore, for success of any mobile government initiative, it is to be designed well with a user interface which should maintain that interest in the m-government application which keep the users motivated hedonically. M-government services are the future of governments' services, it opens up host of opportunities for under privileged and underserved communities. It is most pertinent for the researches, especially those working in the developing countries, to further the research on the topic, so to make the journey towards adoption of m-government services easier.

REFRENCES

Abdelghaffar, H., & Magdy, Y. (2012). The adoption of mobile government services in developing countries: The case of Egypt. *International Journal of Information, 2*(4), 333-341. Retrieved from https://www.researchgate.net/profile/Hany-Abdelghaffar/publication/268393482

Aboelmaged, M. G. (2010). Six Sigma quality: a structured review and implications for future research. *International Journal of Quality & Reliability Management, 27*(3), 268-317. doi: https://doi.org/10.1108/02656711011023294

Abraham, C., & Sheeran, P. (2017). Implications of goal theories for the theories of reasoned action and planned behavior. In *Planned Behavior* (pp. 101-122). Routledge. doi: https://doi.org/10.4324/9781315126449-7

Acheampong, P., Zhiwen, L., Antwi, H. A., Otoo, A. A. A., Mensah, W. G., & Sarpong, P. B. (2017). Hybridizing an extended technology readiness index with technology acceptance model (TAM) to predict e-payment adoption in Ghana. *American Journal of Multidisciplinary Research, 5*(2), 172-184. Retrieved from http://www.onlinejournal.org.uk/index.php/ajmur/article/view/129

Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-practice recommendations for defining, identifying, and handling outliers. *Organizational Research Methods, 16*(2), 270-301. doi: https://doi.org/10.1177/1094428112470848

Ahmad, S. Z., & Khalid, K. (2017). The adoption of M-government services from the user's perspectives: Empirical evidence from the United Arab Emirates. *International Journal of Information Management, 37*(5), 367-379. doi: https://doi.org/10.1016/j.ijinfomgt.2017.03.008

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes, 50*(2), 179-211. doi: https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (2012). Martin Fishbein's legacy: The reasoned action approach. *The Annals of the American Academy of Political and Social Science, 640*(1), 11-27. doi: https://doi.org/10.1177/0002716211423363

Ajzen, I., & Fishbein, M. (1975). A Bayesian analysis of attribution processes. *Psychological bulletin, 82*(2), 261–277. doi: https://doi.org/10.1037/h0076477

Ajzen, I., & Fishbein, M. (1988). *Theory of reasoned action-Theory of planned behavior*. University of South Florida. Retrieved from https://www.sciencedirect.com/topics/psychology/theory-of-planned-behavior

Al-Hadidi, A., & Rezgui, Y. (2010). Adoption and diffusion of m-government: Challenges and future directions for research. In *Collaborative Networks for a Sustainable World* (pp. 88-94). Springer, Berlin, Heidelberg. doi: https://doi.org/10.1007/978-3-642-15961-9_9

Alalwan, A. A., Baabdullah, A. M., Rana, N. P., Tamilmani, K., & Dwivedi, Y. K. (2018). Examining adoption of mobile internet in Saudi Arabia: Extending TAM with perceived enjoyment, innovativeness and trust. *Technology in Society, 55*, 100-110. doi: https://doi.org/10.1016/j.techsoc.2018.06.007

Alalwan, A. A., Dwivedi, Y. K., & Rana, N. P. (2017). Factors influencing adoption of mobile banking by Jordanian bank customers: Extending UTAUT2 with trust. *International Journal of Information Management, 37*(3), 99-110. doi: https://doi.org/10.1016/j.ijinfomgt.2017.01.002

Alalwan, A. A., Dwivedi, Y. K., Rana, N. P., Lal, B., & Williams, M. D. (2015). Consumer adoption of Internet banking in Jordan: Examining the role of hedonic motivation, habit, self-efficacy and trust. *Journal of Financial Services Marketing, 20*(2), 145-157. doi: https://doi.org/10.1057/fsm.2015.5

Ali, I. (2019). Personality traits, individual innovativeness and satisfaction with life. *Journal of Innovation & Knowledge, 4*(1), 38-46. doi: https://doi.org/10.1016/j.jik.2017.11.002

Almarashdeh, I., & Alsmadi, M. K. (2017). How to make them use it? Citizens acceptance of M-government. *Applied Computing and Informatics, 13*(2), 194-199. doi: https://doi.org/10.1016/j.aci.2017.04.001

Altmann, S., Milsom, L., Zillessen, H., Blasone, R., Gerdon, F., Bach, R., et al. (2020). Acceptability of App-Based Contact Tracing for COVID-19: Cross-Country Survey Study. *JMIR Mhealth Uhealth, 8*(8), e19857. doi: https://doi.org/10.2196/19857

Amin, M., Rezaei, S., & Tavana, F. S. (2015). Gender differences and consumer's repurchase intention: the impact of trust propensity, usefulness and ease of use for implication of innovative online retail. *International Journal of Innovation and Learning, 17*(2), 217-233. doi: https://doi.org/10.1504/IJIL.2015.067409

Arfeen, M. I., Iqbal, J., & Mushtaq, M. J. (2017). Model for e-Government Implementation in Pakistan. In *Proceedings of the 10th International Conference on Theory and Practice of Electronic Governance* (pp. 57-61). Association for Computing Machinery. doi: https://doi.org/10.1145/3047273.3047372

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science, 16*(1), 74-94. doi: https://doi.org/10.1007/BF02723327

Berndt, A. D., Saunders, S. G., & Petzer, D. J. (2010). Readiness for banking technologies in developing countries. *Southern African Business Review, 14*(3), 47-76. Retrieved from https://www.ajol.info/index.php/sabr/article/view/76386/66843

Bertot, J. C., Jaeger, P. T., Munson, S., & Glaisyer, T. (2010). Social media technology and government transparency. *Computer, 43*(11), 53-59. doi: https://doi.org/10.1109/MC.2010.325

Blumenberg, C., & Barros, A. J. D. (2018). Response rate differences between web and alternative data collection methods for public health research: a systematic review of the literature. *International Journal of Public Health, 63*(6), 765-773. doi: https://doi.org/10.1007/s00038-018-1108-4

Borrero, J. D., Yousafzai, S. Y., Javed, U., & Page, K. L. (2014). Expressive participation in Internet social movements: Testing the moderating effect of technology readiness and sex on student SNS use. *Computers in Human Behavior, 30*, 39-49. doi: https://doi.org/10.1016/j.chb.2013.07.032

Brandon, G., & Lewis, A. (1999). Reducing household energy consumption: A qualitative and quantitative field study. *Journal of Environmental Psychology, 19*(1), 75-85. doi: https://doi.org/10.1006/jevp.1998.0105

Brown, S. A., Venkatesh, V., & Bala, H. (2006). Household technology use: Integrating household life cycle and the model of adoption of technology in households. *The Information Society, 22*(4), 205-218. doi: https://doi.org/10.1080/01972240600791333

Castelazo, J. R. (2016). Institutional capacity for the administration of public space. In *Committee of Experts on Public Administration*. United Nations Economic and Social Council. Retrieved from https://digitallibrary.un.org/record/822487?ln=en

Chan, J., Gollakota, S., Horvitz, E., Jaeger, J., Kakade, S., Kohno, T., et al. (2020). Pact: Privacy sensitive protocols and mechanisms for mobile contact tracing. *arXiv preprint arXiv:2004.03544*. doi: https://doi.org/10.48550/arXiv.2004.03544

Chandon, P., Morwitz, V. G., & Reinartz, W. J. (2005). Do intentions really predict behavior? Self-generated validity effects in survey research. *Journal of Marketing, 69*(2), 1-14. doi: https://doi.org/10.1509/jmkg.69.2.1.60755

Cheema, J. R. (2014). A review of missing data handling methods in education research. *Review of Educational Research, 84*(4), 487-508. doi: https://doi.org/10.3102/0034654314532697

Chen, M.-F. (2018). Incorporation of health consciousness into the technology readiness and acceptance model to predict app download and usage intentions. *Internet Research, 28*(2), 351-373. doi: https://doi.org/10.1108/IntR-03-2017-0099

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage Publications.

Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results* (Doctoral dissertation, Massachusetts Institute of Technology). Retrieved from https://dspace.mit.edu/bitstream/handle/1721.1/15192/14927137-MIT.pdf

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science, 35*(8), 982-1003. doi: https://doi.org/10.1287/mnsc.35.8.982

Dawson, C. (2002). *Practical research methods: a user-friendly guide to mastering research techniques and projects*. How To Books

de Sena Abrahão, R., Moriguchi, S. N., & Andrade, D. F. (2016). Intention of adoption of mobile payment: An analysis in the light of the Unified Theory of Acceptance and Use of Technology (UTAUT). *RAI Revista de Administração e Inovação, 13*(3), 221-230. doi: https://doi.org/10.1016/j.rai.2016.06.003

Dong, Y., & Peng, C. (2013). Principled missing data methods for researchers. *SpringerPlus, 2*, 222. doi: https://doi.org/10.1186/2193-1801-2-222

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the unified theory of acceptance and use of technology (UTAUT): Towards a revised theoretical model. *Information systems frontiers, 21*, 719-734. doi: https://doi.org/10.1007/s10796-017-9774-y

Dwivedi, Y. K., Shareef, M. A., Simintiras, A. C., Lal, B., & Weerakkody, V. (2016). A generalised adoption model for services: A cross-country comparison of mobile health (m-health). *Government Information Quarterly, 33*(1), 174-187. doi: https://doi.org/10.1016/j.giq.2015.06.003

Ferreira, J. B., da Rocha, A., & da Silva, J. F. (2014). Impacts of technology readiness on emotions and cognition in Brazil. *Journal of Business Research, 67*(5), 865-873. doi: https://doi.org/10.1016/j.jbusres.2013.07.005

Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behavior: The reasoned action approach*. Psychology Press. doi: https://doi.org/10.4324/9780203838020

Francis, B., Hasan, I., Park, J. C., & Wu, Q. (2015). Gender differences in financial reporting decision making: Evidence from accounting conservatism. *Contemporary Accounting Research, 32*(3), 1285-1318. doi: https://doi.org/10.1111/1911-3846.12098

Glanz, K., Lewis, F. M., & Rimer, B. K. (1997). Linking theory, research, and practice. *Health behavior and health education: Theory, research, and practice, 2*, 19-35.

Gökçearslan, Ş., Karademir, T., & Korucu, A. T. (2017). Preservice teachers' level of web pedagogical content knowledge: Assessment by individual innovativeness. *Journal of Educational Computing Research, 55*(1), 70-94. doi: https://doi.org/10.1177/0735633116642593

Goswami, A., & Dutta, S. (2015). Gender Differences in Technology Usage—A Literature Review. *Open Journal of Business and Management, 4*(1), 51-59. doi: http://dx.doi.org/10.4236/ojbm.2016.41006

Grant, A. M. (2008). Does intrinsic motivation fuel the prosocial fire? Motivational synergy in predicting persistence, performance, and productivity. *Journal of applied psychology, 93*(1), 48–58. doi: https://doi.org/10.1037/0021-9010.93.1.48

Greaves, M., Zibarras, L. D., & Stride, C. (2013). Using the theory of planned behavior to explore environmental behavioral intentions in the workplace. *Journal of Environmental Psychology, 34*, 109-120. doi: https://doi.org/10.1016/j.jenvp.2013.02.003

Haider, Z., Shah, A., & Chachar, A. A. (2017). Citizens' Adoption of Electronic Government in Pakistan by Improving Technology Acceptance Model. *Government: Research Journal of Political Science, 5*, 77-108.

Hair, Black, J. W., Babin, B. J., & Anderson, E. R. (2010). *Multivariate Data Analysis (7th Ed.)*. Edinburgh: Pearson Education Limited.

Hair, J. F., Bush, R. P., & Ortinau, D. J. (2003). *Marketing Research*. New York, NY: McGraw-Hill Higher Education.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Sage Publication: Thousand Oaks.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review, 31*(1), 2-24. doi: https://doi.org/10.1108/EBR-11-2018-0203

Hair Jr, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Edinburgh: Pearson Education Limited.

Ham, L., & Hayduk, S. (2003). Gaining competitive advantages in higher education: analyzing the gap between expectations and perceptions of service quality. *International Journal of Value-Based Management, 16*(3), 223-242. doi: https://doi.org/10.1023/A:1025882025665

Hassan, A. (2010). Difference in Male and Female about the Awareness of Educational Technology at B. Ed Level. *Pakistan Journal of Life and Social Sciences, 8*(2), 89-93. Retrieved from https://www.pjlss.edu.pk/pdf_files/2010_2/89-93%20Aneela-final%20print.pdf

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science, 43*(1), 115-135. doi: https://doi.org/10.1007/s11747-014-0403-8

Hornik, J., & Ellis, S. (1988). Strategies to Secure Compliance for a Mall Intercept Interview. *Public Opinion Quarterly, 52*(4), 539-551. doi: https://doi.org/10.1086/269129

Huang, Y.-C. (2009). *Examining the antecedents of behavioral intentions in a tourismcontext* (Doctoral dissertation, Texas A&M University). Retrieved from http://hdl.handle.net/1969.1/ETD-TAMU-2009-05-498

Ikiz, F. E., & Asici, E. (2017). The Relationship between Individual Innovativeness and Psychological Well-Being: The Example of Turkish Counselor Trainees. *International Journal of Progressive Education, 13*(1), 52-63. Retrieved from https://ijpe.inased.org/files/2/manuscript/manuscript_224/ijpe-224-manuscript-152403.pdf

Isagah, T., & Wimmer, M. A. (2017). Mobile Government Applications. In *Proceedings of the 10th International Conference on Theory and Practice of Electronic Governance* (pp. 423-432). Association for Computing Machinery. doi: https://doi.org/10.1145/3047273.3047305

ITU. (2016). *ICT Facts Figures 2016*. International Telecommunication Union (ITU). Retrieved from http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf

ITU. (2017). *ICT Facts Figures 2017*. International Telecommunication Union. Retrieved from http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf

José Liébana-Cabanillas, F., Sánchez-Fernández, J., & Muñoz-Leiva, F. (2014). Role of gender on acceptance of mobile payment. *Industrial Management & Data Systems, 114*(2), 220-240. doi: https://doi.org/10.1108/IMDS-03-2013-0137

Kang, H. (2013). The prevention and handling of the missing data. *Korean journal of anesthesiology, 64*(5), 402-406. doi: https://doi.org/10.4097/kjae.2013.64.5.402

Kautonen, T., van Gelderen, M., & Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice, 39*(3), 655-674. doi: https://doi.org/10.1111/etap.12056

Koivisto, K., Makkonen, M., Frank, L., & Riekkinen, J. (2016). Extending the Technology Acceptance Model with Personal Innovativeness and Technology Readiness : A Comparison of Three Models. In J. Versendaal, C. Kittl, A. Pucihar, & M. K. Borstnar (Eds.), *BLED 2016 : Proceedings of the 29th Bled eConference "Digital Economy"* (pp. 113-128). Moderna organizacija. Retrieved from http://aisel.aisnet.org/bled2016/41

Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement, 30*(3), 607-610. doi: https://doi.org/10.1177/001316447003000308

Kumar, R., Sachan, A., & Mukherjee, A. (2017). Qualitative approach to determine user experience of e-government services. *Computers in Human Behavior, 71*, 299-306. doi: https://doi.org/10.1016/j.chb.2017.02.023

Kuo, K.-M., Liu, C.-F., & Ma, C.-C. (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. *BMC medical informatics and decision making, 13*(1), 88. doi: https://doi.org/10.1186/1472-6947-13-88

Lee, D., & Lee, J. (2020). Testing on the move: South Korea's rapid response to the COVID-19 pandemic. *Transportation Research Interdisciplinary Perspectives, 5*, 100111. doi: https://doi.org/10.1016/j.trip.2020.100111

Lin, H.-F. (2007). *Framing hedonic and utilitarian product attributes in advertisements: The impact of regulatory fit on persuasion*. The Pennsylvania State University. Retrieved from https://www.proquest.com/openview/a2998a194fd2a716b1cf9a1b49da3fe4

Lin, J.-S. C., & Chang, H.-C. (2011). The role of technology readiness in self-service technology acceptance. *Managing Service Quality: An International Journal, 21*(4), 424-444. doi: https://doi.org/10.1108/09604521111146289

Lowry, P. B., Gaskin, J., Twyman, N., Hammer, B., & Roberts, T. (2012). Taking 'fun and games' seriously: Proposing the hedonic-motivation system adoption model (HMSAM). *Journal of the Association for Information Systems, 14*(11), 617-671. Retrieved from https://ssrn.com/abstract=2177442

Macintosh, G., & Krush, M. (2014). Examining the link between salesperson networking behaviors, job satisfaction, and organizational commitment: Does gender matter? *Journal of Business Research, 67*(12), 2628-2635. doi: https://doi.org/10.1016/j.jbusres.2014.03.022

Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin, 18*(1), 3-9. doi: https://doi.org/10.1177/0146167292181001

Martens, M., Roll, O., & Elliott, R. (2017). Testing the Technology Readiness and Acceptance Model for Mobile Payments Across Germany and South Africa. *International Journal of Innovation and Technology Management, 14*(06), 1750033. doi: https://doi.org/10.1142/S021987701750033X

Martins, C. (2018). The Individual innovativeness theory: a framework to investigate teachers' views on technology. In *ICICTE 2018 Proceedings* (pp. 360-370). Retrieved from http://www.icicte.org/assets/9.2_martins.pdf

Ministry of Finance. (2017). *Pakistan Economy Survey 2016-17*. Government of Pakistan. Retrieved from http://www.finance.gov.pk/survey_1617.html

Mohrman, S. A., & Lawler III, E. E. (2012). *Generating knowledge that drives change*. Academy of Management Briarcliff Manor, NY.

Morwitz, V. (2014). Consumers' purchase intentions and their behavior. *Foundations and Trends in Marketing, 7*(3), 181-230. doi: http://dx.doi.org/10.1561/1700000036

Moslehpour, M., Chau, K. Y., Tu, Y.-T., Nguyen, K.-L., Barry, M., & Reddy, K. D. (2022). Impact of corporate sustainable practices, government initiative, technology usage, and organizational culture on automobile industry sustainable performance. *Environmental Science and Pollution Research, 29*(55), 83907-83920. doi: https://doi.org/10.1007/s11356-022-21591-2

Muhammad, O. A., Jouni, M., & Markku, O. (2013). Factors affecting e-government adoption in Pakistan: a citizen's perspective. *Transforming Government: People, Process and Policy, 7*(2), 225-239. doi: https://doi.org/10.1108/17506161311325378

Neuman, W. L., & Robson, K. (2014). *Basics of social research*. Pearson Canada Toronto.

Nisula, A.-M., & Kianto, A. (2016). The Antecedents of Individual Innovative Behaviour in Temporary Group Innovation. *Creativity and Innovation Management, 25*(4), 431-444. doi: https://doi.org/10.1111/caim.12163

O'Fallon, M. J., & Butterfield, K. D. (2005). A review of the empirical ethical decision-making literature: 1996–2003. *Journal of business ethics, 59*(4), 375-413. doi: https://doi.org/10.1007/978-94-007-4126-3_11

Oliveira, T., Thomas, M., Baptista, G., & Campos, F. (2016). Mobile payment: Understanding the determinants of customer adoption and intention to recommend the technology. *Computers in Human Behavior, 61*, 404-414. doi: https://doi.org/10.1016/j.chb.2016.03.030

Page, B. I., & Shapiro, R. Y. (1983). Effects of public opinion on policy. *American political science review, 77*(1), 175-190. doi: https://doi.org/10.2307/1956018

Parasuraman, A. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. *Journal of service research, 2*(4), 307-320. doi: https://doi.org/10.1177/109467050024001

Parasuraman, A., & Colby, C. L. (2015). An updated and streamlined technology readiness index: TRI 2.0. *Journal of service research, 18*(1), 59-74. doi: https://doi.org/10.1177/1094670514539730

Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of retailing and consumer services, 29*, 123-134. doi: https://doi.org/10.1016/j.jretconser.2015.11.006

PBS. (2017). *Press Reslease on Provisional Summary Result of 6th Poppulation and Housing Census-2017*. Pakistan Bureau of Statistics-PBS. Retrieved from www.pbscensus.gov.pk/sites/default/files/Population_Results.pdf

PWC. (2017). *The Long View How will the global economic order change by 2050?* PricewaterhouseCoopers. Retrieved from http://www.pwc.com/gx/en/world-2050/assets/pwc-the-world-in-2050-full-report-feb-2017.pdf

Qazi, A., Mustafa, Y., & Sheikh, S. (2016). School Leadership's Technology Readiness for ICT Integration in Schools in Developing Countries like Pakistan. In *Proceedings of the 2nd International Conference on Emerging Trends in Engineering, Management and Sciences (ICETEMS-2016)*. Retrieved from https://www.researchgate.net/profile/Muhammad-Yasir-Mustafa/publication/316190419

Rahman, S. A., Taghizadeh, S. K., Ramayah, T., & Alam, M. M. D. (2017). Technology acceptance among micro-entrepreneurs in marginalized social strata: The case of social innovation in Bangladesh. *Technological Forecasting and Social Change, 118*, 236-245. doi: https://doi.org/10.1016/j.techfore.2017.01.027

Rice, R., & Hancock, L. (2005). The mall intercept: A social norms marketing research tool. *The Report on Social Norms, 4*(7), 4-7. Retrieved from http://www.socialnormsresources.org/pdf/MallIntercept.pdf

Richard, G.-G., Ahmed, S. A., & Heikki, K. (2017). Mobile banking services adoption in Pakistan: are there gender differences? *International Journal of Bank Marketing, 35*(7), 1088-1112. doi: https://doi.org/10.1108/IJBM-09-2015-0142

Ringle, C. M., Wende, S., & Becker, J. M. (2015). *SmartPLS 3*. SmartPLS GmbH, Boenningstedt. Retrieved from http://www.smartpls.com

Risman, B. J. (2004). Gender as a social structure: Theory wrestling with activism. *Gender & society, 18*(4), 429-450. Retrieved from https://www.jstor.org/stable/4149444

Rogers, E. M. (2003). *Diffusion of innovation theory*. New York: Free Press.

Roscoe, J. T. (1975). *Fundamental Research Statistics for the Behavioural Sciences* (2nd ed.). New York: Holt Rinehart & Winston.

Rowe, R., Andrews, E., Harris, P. R., Armitage, C. J., McKenna, F. P., & Norman, P. (2016). Identifying beliefs underlying pre-drivers' intentions to take risks: An application of the Theory of Planned Behaviour. *Accident Analysis & Prevention, 89*, 49-56. doi: https://doi.org/10.1016/j.aap.2015.12.024

Sandy, G. A., & McMillan, S. (2005). A success Fators Model for M-Government. *Euro mGov*, 349–358. Retrieved from http://mgov.cn/lab/Archives/EuromGov2005/PDF/36_R348SG.pdf

Saxena, S. (2018). Role of "perceived risks" in adopting mobile government (m-government) services in India. *foresight, 20*(2), 190-205. doi: https://doi.org/10.1108/FS-08-2017-0040

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.

Shareef, M. A., Archer, N., & Dwivedi, Y. K. (2012). Examining Adoption Behavior of Mobile Government. *Journal of Computer Information Systems, 53*(2), 39-49. doi: https://doi.org/10.1080/08874417.2012.11645613

Shareef, M. A., Kumar, V., Dwivedi, Y. K., & Kumar, U. (2016). Service delivery through mobile-government (mGov): Driving factors and cultural impacts. *Information systems frontiers, 18*(2), 315-332. doi: https://doi.org/10.1007/s10796-014-9533-2

Sharma, S. K. (2015). Adoption of e-government services: The role of service quality dimensions and demographic variables. *Transforming Government: People, Process and Policy, 9*(2), 207-222. doi: https://doi.org/10.1108/TG-10-2014-0046

Sugarhood, P., Wherton, J., Procter, R., Hinder, S., & Greenhalgh, T. (2014). Technology as system innovation: a key informant interview study of the application of the diffusion of innovation model to telecare. *Disability and Rehabilitation: Assistive Technology, 9*(1), 79-87. doi: https://doi.org/10.3109/17483107.2013.823573

Summak, M. S., Bağlıbel, M., & Samancıoğlu, M. (2010). Technology readiness of primary school teachers: A case study in Turkey. *Procedia-Social and Behavioral Sciences, 2*(2), 2671-2675. doi: https://doi.org/10.1016/j.sbspro.2010.03.393

Svendsen, G. B., Johnsen, J.-A. K., Almås-Sørensen, L., & Vittersø, J. (2013). Personality and technology acceptance: the influence of personality factors on the core constructs of the Technology Acceptance Model. *Behaviour & Information Technology, 32*(4), 323-334. doi: https://doi.org/10.1080/0144929X.2011.553740

Tamilmani, K., Rana, N. P., Prakasam, N., & Dwivedi, Y. K. (2019). The battle of Brain vs. Heart: A literature review and meta-analysis of "hedonic motivation" use in UTAUT2. *International Journal of Information Management, 46*, 222-235. doi: https://doi.org/10.1016/j.ijinfomgt.2019.01.008

Tohidyan Far, S., & Rezaei-Moghaddam, K. (2017). Determinants of Iranian agricultural consultants' intentions toward precision agriculture: Integrating innovativeness to the technology acceptance model. *Journal of the Saudi Society of Agricultural Sciences, 16*(3), 280-286. doi: https://doi.org/10.1016/j.jssas.2015.09.003

UN. (2012). *The Future we want*. Rio de Janeiro, Brazil: United Nations. Retrieved from https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_66_288.pdf

UN. (2016). Un e-government survey 2016 (e-government in support of sustainable development). *United Nations*. Retrieved from https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2016

UN. (2018). *United Nations E-Government Survey 2018-Gearing E-Government To Support Transformation Towards Sustainable And Resilient Societies*. New York: United Nations. Retrieved from https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2018-Survey/E-Government%20Survey%202018_FINAL%20for%20web.pdf

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision sciences, 39*(2), 273-315. doi: https://doi.org/10.1111/j.1540-5915.2008.00192.x

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science, 46*(2), 186-204. doi: https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS quarterly, 24*(1), 115-139. doi: https://doi.org/10.2307/3250981

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS quarterly, 27*(3), 425-478. doi: https://doi.org/10.2307/41410412

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly, 36*(1), 157-178. doi: https://doi.org/10.2307/41410412

Walczuch, R., Lemmink, J., & Streukens, S. (2007). The effect of service employees' technology readiness on technology acceptance. *Information & Management, 44*(2), 206-215. doi: https://doi.org/10.1016/j.im.2006.12.005

Walliman, N. (2017). *Research methods: The basics*. New York: Routledge. doi: https://doi.org/10.4324/9781315529011

Witell, L., Anderson, L., Brodie, R. J., Colurcio, M., Edvardsson, B., Kristensson, P., et al. (2015). Exploring dualities of service innovation: implications for service research. *Journal of Services Marketing, 29*(6/7), 436-441. doi: https://doi.org/10.1108/JSM-01-2015-0051

Wong, S.-L., Hsu, C.-C., & Chen, H.-S. (2018). To buy or not to buy? Consumer attitudes and purchase intentions for suboptimal food. *International journal of environmental research and public health, 15*(7), 1431. doi: https://doi.org/10.3390/ijerph15071431

World Bank. (2016). *World Development Report 2016: Digital Dividends*. World Bank Group: Washington, DC. Retrieved from http://www.worldbank.org/en/publication/wdr2016

World Bank. (2017, April17,2017). Population Ranking. *World Development Indicators, The World Bank*. Retrieved from https://data.worldbank.org/data-catalog/Population-ranking-table

Xu, C., Ryan, S., Prybutok, V., & Wen, C. (2012). It is not for fun: An examination of social network site usage. *Information & Management, 49*(5), 210-217. doi: https://doi.org/10.1016/j.im.2012.05.001

Zhang, X., & Maruping, L. M. (2008). Household technology adoption in a global marketplace: Incorporating the role of espoused cultural values. *Information systems frontiers, 10*, 403-413. doi: https://doi.org/10.1007/s10796-008-9099-y

Zikmund William, G., & Babin Barry, J. (1997). *Exploring marketing research.* Dryden.