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**THE EFFECT OF BEHAVIORAL FACTORS AND DEMOGRAPHICS
UPON ACCEPTANCE OF M-GOVERNMENT SERVICES**

By

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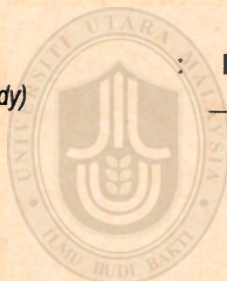
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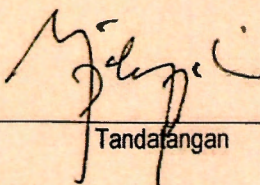
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Abstract

The ubiquitous nature of mobile communications and handsets provides an opportunity to render cost effective and convenient access to governmental services. However, designing acceptable mobile government (m-government) services requires understanding the behavior of its users across all segments of society. This study investigated the influence of behavioral factors on users' acceptance of m-government services, focusing on Pakistan's context. Behavioral factors including awareness, perceived usefulness, perceived ease of use, trust, technology readiness, and hedonic motivation, were assessed for their impact on users' behavioral intentions to accept m-government services. A quantitative research approach was employed to collect a total of 434 responses through stratified sampling from respondents in provincial and federal capitals across the country. Structural Equation Modelling (SEM) was utilized for data analysis, including the moderating effect of four demographic variables—gender, age, income, and education on the relationship between these behavioral factors and users' behavioral intentions. The findings indicated that all behavioral factors significantly influence users' behavioral intentions to accept m-government services. The study also revealed gender differences affecting the relationship between trust, perceived usefulness, perceived ease of use, technology readiness, and users' behavioral intentions to adopt m-government services. Age factor was identified as a moderator of the relationship between awareness, perceived usefulness, perceived ease of use, technology readiness, and users' behavioral intentions. Income factor was found to moderate the relationship between trust, perceived usefulness, perceived ease of use, technology readiness, and users' behavioral intentions. Moreover, education factor was identified to moderate the relationship between hedonic motivation, trust, perceived usefulness, perceived ease of use, technology readiness, and users' behavioral intentions. This research offers insights for future studies aiming to explore moderating effect of demographic variables on behavioral factors. Furthermore, policymakers can utilize these findings to prioritize functional areas of m-government platforms, thereby fostering greater citizen acceptance of m-government initiatives.

Keywords: M-government; User behavior; E-government governance; Demographics factors

Abstrak

Komunikasi mudah alih dan telefon bimbit yang digunakan secara meluas memberi peluang kepada kerajaan untuk memberi perkhidmatan yang kos efektif dan mudah dicapai. Walau bagaimanapun, merekabentuk perkhidmatan *mobile*-kerajaan (m-kerajaan) yang boleh diterima memerlukan pemahaman kelakuan pengguna merentasi semua segmen masyarakat. Kajian ini telah menyiasat pengaruh faktor tingkah laku terhadap penerimaan pengguna perkhidmatan m-kerajaan, memfokuskan kepada konteks Pakistan. Faktor tingkah laku termasuk kesedaran, persepsi kebergunaan, persepsi mudah penggunaan, kepercayaan, kesediaan teknologi, dan motivasi hedonik, telah dinilai kesannya terhadap niat tingkah laku pengguna untuk menerima perkhidmatan m-kerajaan. Pendekatan penyelidikan kuantitatif telah digunakan untuk mengumpul sejumlah 434 respons melalui persampelan berstrata daripada responden ibu kota wilayah dan persekutuan di seluruh negara. Pemodelan Persamaan Berstruktur (SEM) telah digunakan untuk menganalisis data, termasuk kesan penyederhanaan empat pembolehubah demografi, iaitu jantina, umur, pendapatan, dan pendidikan terhadap hubungan antara faktor-faktor tingkah laku dan niat tingkah laku. Dapatan kajian menunjukkan bahawa semua faktor tingkah laku mempengaruhi secara signifikan niat tingkah laku pengguna untuk menerima perkhidmatan m-kerajaan. Kajian ini juga mendedahkan perbezaan jantina dalam mempengaruhi hubungan antara kepercayaan, persepsi kegunaan, persepsi mudah penggunaan, kesediaan teknologi, dan niat tingkah laku pengguna untuk menerima pakai perkhidmatan m-kerajaan. Faktor umur telah dikenal pasti sebagai penyederhana hubungan antara kesedaran, persepsi kebergunaan, persepsi mudah penggunaan, kesediaan teknologi, dan niat tingkah laku pengguna. Faktor pendapatan pula didapati menyederhanakan hubungan antara kepercayaan, persepsi kebergunaan, persepsi mudah penggunaan, kesediaan teknologi dan niat tingkah laku pengguna. Manakala faktor pendidikan menyederhanakan hubungan antara motivasi hedonik, kepercayaan, persepsi kebergunaan, persepsi mudah penggunaan, kesediaan teknologi dan niat tingkah laku pengguna. Kajian ini memberikan pandangan untuk kajian masa depan bagi meneroka kesan penyederhanaan pembolehubah demografi ke atas faktor tingkah laku. Penggubal dasar boleh memanfaatkan penemuan ini untuk mengutamakan bidang fungsi platform m-kerajaan, sekaligus memupuk penerimaan rakyat yang lebih meluas terhadap inisiatif m-kerajaan.

Kata Kunci: M-kerajaan; Tingkah laku pengguna; Tadbir urus e-kerajaan; Faktor-faktor demografi

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[Quran, 2:152]**

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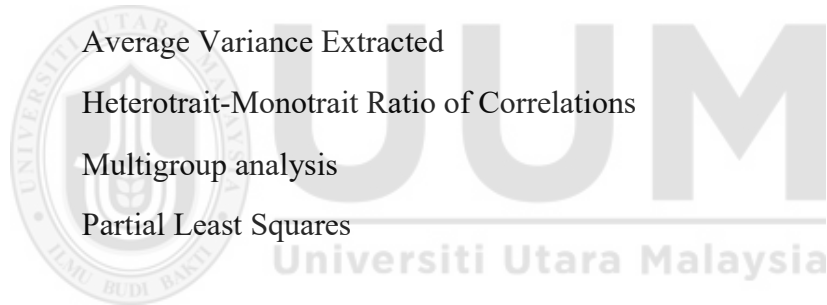
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List of Abbreviations

ICT	Information and communication technology
OECD	Organization of Economic Coordination and Development
EGDI	E-Government Development Index
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Usage of Technology
TPB	Theory of Planned Behavior
DoI	Diffusion of Innovation
SCT	Social Cognitive Theory
TR	Technology Readiness
NPM	New Public Management
EU	European Union
SMS	Short Message Service
LMIC	Low and Middle-Income Countries
mG2C	m-government to citizen
mG2B	m-government to business
mG2E	m-government to employee
mG2G	m-government to government
EGDI	E-Government Development Index
FATA	Federally Administrative Tribal Area
OBOR	One Belt One Road
CPEC	China Pakistan Economic Corridor
RF	Radio Frequency
MSDG	Mobile Service Delivery Gateway
PU	Perceived usefulness
PE	Perceived Ease of Use
AW	Awareness

BI	Behavioral Intentions
HM	Hedonic Motivations
TT	Trust
TRA	Theory of Reasoned Action
TAM	Technology Acceptance Model
TRI	Technology Readiness Index
TPB	Theory of Planned Behavior
PBC	Perceived Behavior Control
SPSS	Statistical Package for Social
SEM	Structural Equation Modeling
VIF	Variance Inflation Factor
CR	Composite reliability
AVE	Average Variance Extracted
HTMT	Heterotrait-Monotrait Ratio of Correlations
MGA	Multigroup analysis
PLS	Partial Least Squares



CHAPTER ONE - INTRODUCTION

1.0. Introduction

This chapter explains background of the study, problem statement, research objectives, research questions, significance of the research and its practical and academic applications, scope of the study and definitions of key terms.

1.1. Back ground of the study

Good governance is the key to eradicate poverty and Information and communication technology (ICT) is an effective medium to deliver it. UN general assembly through the resolution 66/288 have acknowledged that

democracy, good governance and the rule of law, at the national and international levels, as well as an enabling environment are essential for sustainable development, including sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and hunger (p.2).

It recognized the need of developing institutions that are effective, transparent, accountable and democratic in order to achieve sustainable development goals. The same resolution accepts that the active participation of civil society in sustainable development is dependent upon access of information. It further recognized that Information and Communication technology (ICT) is facilitating the flow of information between governments and the public. It then claims that “it is essential to work toward improved access to ICT, especially broad-band network and services, and bridge the digital divide, recognizing the contribution of international cooperation in this regard” (p.8). This resolution shows the commitment of all the member states towards moving to electronic mediums of governance for effective discharge of administrative function (UN, 2012)

A paper presented to the 15th session of Committee of Experts on Public Administration, United Nations Economic and Social Council, discussed necessary principles for the administration of public space. It argued that openness, decision making using consultative process, means to prevent corruption, administration of justice and enabling legal framework are keys to sustainable development. Technology was elaborated as a medium which can help in applying these principles judiciously. The role of Information and Communication technologies (ICT) was emphasized in delivering public services to achieve sustainable development goals (Castelazo, 2016).

E-government is a term coined to define all governmental initiatives being delivered using ICT. A report published in 2003 by Organization of Economic Coordination and Development (OECD) has emphasized a holistic approach of adaption of e-government. It emphasizes upon creating enabling environment to achieve the benefits of e-government (Field, Muller, & Lau, 2003)

OECD has recommended adaptation of e-government by enumerating its advantages. It states that ICT helps improvement in efficient discharge of services through providing ease in data collecting, processing and dissemination of information within and between governments. It argues that e-government assists in better service delivery by providing the opportunity to relieve a citizen from knowing difficult government processes and help in getting a better service experience. It further elaborates that sharing of information available at electronic platforms may help making policy decisions easier and quicker. Thus e-government has the potential to become an agent of change for a better tomorrow. Moreover, it argues that e-government contributes towards building trust and achieving economic policy objectives because of the transparency and efficiency which comes along with it. It also highlights the barriers to the electronic government which hinders its

adaptation and growth. The most important of these barriers are legislative, financial, technological and the digital divide (Field et al., 2003). E-government has the potential to empower individual citizens. It provides them with an alternative channel for interaction with government. It gives choice to the citizen to become an active participant in the governing process rather than remaining a silent observer (Ronaghan, 2002).

Electronic platforms and introduction of Mobile technologies have revolutionized the way governments are being run. E-government provides the opportunity to the developing nations to circumvent the journey of progress. It provides them the chance to develop themselves in relatively shorter span of time (UN, 2003).

Empowerment either social or economic is dependent upon provision of equal opportunity amongst the general public. Electronic government platforms give public access to information. This access provides opportunities to use knowledge. United Nation highlights access to opportunities as a key issue. It promotes idea of using technology to bridge “access to opportunity divide”. UN is of the view that providing access to opportunities can help developing countries improving their living standards while empowering civil society. Thus, UN emphasizes upon the government for adaptation of e-government plans. It promotes application of e-government across all governmental services including health, education, law enforcement and security, commerce and industry, economic development etc. (UN, 2004). United nation claims that E-government has a strong relationship with higher per capita income. It helps in improving economic output of the society (UN, 2005).

Accessing e-government services requires some basic infrastructure like electricity, computer and internet. The supply of electricity in developing countries is not dependable. On the top of this accessing these services are expensive for a common citizen. Accessing e-government services also requires some basic level of computer literacy (Waller & Genius, 2015).

Mobile Government is a form of e-government. It provides the opportunity, of accessing government services to both the government officials and ordinary citizens at a place and time of their choice (G.A. Sandy & McMillan, 2005). High penetration of Mobile phones and availability of mobile networks makes them a good medium to communicate. It may also overcome handicaps associated with the traditional e-governmental platforms especially those related to uninterrupted electrical supply, connectivity and the availability of computer. According to a report published by International Telecommunication Union mobile networks cover more than 95% of the world population (ITU, 2016). Moreover, the broadband services provided by the mobile networks are now more affordable than the fixed broadband (ITU, 2017). The wide ranging and universal nature of mobile devices, their wide spread usage stimulated by increased coverage, cheaper devices, lower tariffs and higher cellular literacy make mobile phones an excellent platform for delivering governmental services.

Mobile government provides the public opportunity to save time, effort and money by accessing government through their mobile devices. It makes government more accessible to the general public especially for those who live in the areas where the relevant governmental offices are not located (Almarashdeh & Alsmadi, 2017). The ubiquitous nature of mobile communications and handsets has evolved e-governments into m-governments. (Katara & Ilavarasan, 2013).

Increased usage of mobile phones provided inclusive development benefits especially to the developing nations. Mobile Applications have provided innovative solutions to the problems faced by masses especially the underserved and underprivileged. From providing solutions to health issues, to reducing gender gap and to bridging the urban and rural divide; Mobiles have proven to be revolutionary platform for households, corporates and governments. Mobile revolution has become a source of inclusive development and pro-poor growth. (Asongu & Nwachukwu, 2016).

Acceptance of m- government services from the demand side may not be as simple a process as it seems. Introduction of mobile platforms to government is not an equation of simply adding business as usual to ICT. It is a much complex problem (Bryant, 2007). It may require process re-engineering or societal and behavioral understanding of both supply and demand side.

Governments are increasingly shifting towards electronic platforms to reap benefits of e-government. However adoption of such initiatives is more dependent upon the societal values and issues than any other thing (UN, 2008). Accessibility to internet, World Wide Web and availability of m-government services does not guarantee the increased use of m-government. It is largely dependent upon the user interest and perception. OECD is promoting the idea of moving from e-government to a comprehensive digital government. In this regard the OECD Digital Government Index assesses six dimensions critical for digital competence in the public sector. Though OECD countries have made good progress on setting the stage ready through providing enabling environment for the digital government. However, it is clear that the transformation to digital government is not possible without focusing on people and their needs. If user doesn't consider it worthwhile then the service cannot become popular. In fact all these digital

governmental services could only help transforming the delivery of governmental services provided these are user driven, built keeping requirements of the users in mind (González-Zapata & Piccinin-Barbieri, 2021)

There are variety of factors which affect usage of mobile platforms for availing governmental services. Policymakers need to identify and address all the challenges which citizens face in their efforts to increase usage of mobile platforms. These factors affect user motivations and satisfactions underlying intentions to use m-government services, and hence affect the level of usage. Convenience, trust, Security and Privacy are some of the most important factors affecting usage. Interestingly, these factors do not affect similarly. Rather, these factors affect differently in different countries. Privacy and security concerns are amongst the most important. These potentially work as barriers impeding m-service usage as they prevent users from trusting and therefore becomes a reason for people avoiding government services using electronic platform. In fact, these concerns are often mentioned as a major reason for non-usage of mobile platforms provided by government. (UN,2012). Lack of training, e-illiteracy and accessibility remain major barriers to the adaptability of mobile and electronic platforms. Governments need to win trust of citizens while ensuring privacy and security of online transactions. (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, 2016-17) Pakistan is the 6th most populous country in the world having population of 193 million (WorldBank, 2017b). 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 users behavior, their social

norms, social influence, performance expectancy and facilitating conditions (Muhammad, Jouni, & Markku, 2013).

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 behaviour which affects acceptance of m-governance. This will help designing an m-government system acceptable for all. Similarly education and income levels also creates hindrances in accepting technology. Lack of education results in digital divide whereas non affordability makes accessibility to devices a problem (UN, 2018b). Both issues ultimately effects upon the behavior accepting m-government services. Age difference have also been as sources of creating difference between technology acceptance behavior (Morris & Venkatesh, 2000). Since age has already been argued as a factor affecting acceptance of e-government services (Sharma, 2015). Therefore, it can be hypothesized that it also affects user's behavior accepting m-government services. Thus, we may say that the four demographic variables i.e. education, gender, income and age effect user's behavior of accepting m-government services. And demographic profiling can help in understanding the user's m-government acceptance behavior (Ahmad & Khalid, 2017).

Popularity of m-government has made many researchers try finding the key success factors for implementing m-government. Trust, Technology readiness and acceptability are identified amongst the factors necessary for the success of any m-government service (G.A. Sandy & McMillan, 2005).

Usefulness of any system is one of the reasons that prospective consumers start adopting it. Technology is no different. Perceived usefulness of m-government system is a reason because of which user start accepting it (Almarashdeh & Alsmadi, 2017). Usability of any system is dependent upon the ease which it could be operated. Easier a system is to use; more are the chances that public would start using it. Perceived ease of use is another factor which plays role in the acceptance of m-government sector. (E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017).

Trust is a major barrier in accessing the governmental services using electronic platforms. This is true even for those people who have the ability and the capability to access electronic governmental services. Their concern for the security and privacy of their information while sharing the data online actually becomes a reason for not using e-governmental services (Waller & Genius, 2015). It may therefore to be important to further investigate the subject to identify specific issues related to the citizen's acceptance of m-government. The identification of the social behavior, norms and the characteristics which help accepting m-government would help making such initiatives quite successful (Almarashdeh & Alsmadi, 2017). Privacy concern of the citizens along with the possibility of incurring financial loss makes users skeptical of using electronic platforms of government services. The perception of risk reduces the ability of user to adopt m-government

services. Thus perceived risk is also amongst one of the factors affecting user's acceptance of m-government services (Ewurah, 2017; Munyoka & Maharaj, 2019).

Users also get influenced by the people especially from the authority figures. This societal influence can play a major role in acceptance of m-government services (Ohme, 2014). Subjective norms, therefore, should also be considered while evaluating factors affecting user's acceptance of m-government services.

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)

In the aforementioned discussion, need for having good governance especially for developing countries like Pakistan has been elaborated. The concept of electronic government and how does it help in improving governance has also been discussed at length. M-government, an extension of e-government, which has proved its high utility due to penetration and ubiquity of mobile devices has also been comprehended. User's acceptance of m-government, its need and the benefits which it does provide was also discussed. Concluding the discussion, it can be argued that awareness, trust, perceived usefulness, perceived ease of use, Technology readiness, along with hedonic motivation are principal factors in users acceptance of m-government and demographics effects human behaviour affecting m-government acceptance.

1.2. Problem Statement

M-government provides an opportunity to reach out at a time of convenience to a user, even to those who are located at otherwise far flung and inaccessible location (Shah & Chattopadhyay, 2016). The ubiquity of mobile communication, and the opportunities it represented, pushed researchers to start investigating issue concerning the challenges which implementation of m-government poses. Researchers have argued about issues of technological challenges, network capabilities and service delivery etc. Carroll (2005) was amongst the first few researchers who raised the question of the acceptance of m-government by the citizens. She rightly pointed out that success of m-government is dependent upon its acceptance by the users of governmental services (Carroll, 2005; Ohme, 2014). OECD in its development co-operation report 2021 has also highlighted the case study of Mexico where it acknowledged that technological interventions, like m-government initiatives, need to have a user's centric approach (Information & Communication Technologies, 2021). Not understanding requirements of users could be a reason that adoption rates of m-government even in the developed nations are low in contrast to their higher adaptation of e-government services (Ohme, 2014).

According to the UN E-Government survey (2022) Pakistan is ranked at 150th place amongst the UN member states in E-Government Development Index (EGDI). Bridging the digital divide is necessary to reduce poverty and to remove disparities. The efforts required to close this digital divide can help reducing economic, social, political and cultural disparities. This also provide help in closing gender inequalities (I. Khan, 2021). Availability and capability of cheap smart phones and mobile broad band has introduced opportunities for government to access geographically and

socially challenged citizens in innovative manner (UN, 2016). Pakistan is a developing nation striving to get benefit from the mobile revolution. In the Digital Pakistan policy 2017, government of Pakistan has shown its resolve to bank upon the growth of smart phones. It has shown determination to provide m-government services especially in achieving sustainable development goals while explicitly naming areas like m-health, m-education, m-commerce and m-agriculture (MoIT, 2017). Researchers have highlighted users' acceptance and participation as one of the major obstacles in its diffusion. It is argued that understanding users behavior is necessary in order to make such initiatives popular (Haider, Shuwen, & Burdey, 2016). It is important to understand the critical factors impacting an individual's behavior intentions to using technology (Huda, 2023).

Usefulness of any technological system is considered to be one of the major reasons of its acceptance (Huda, 2023). M-government is a technological innovation. People should be willing to adopt it provided they get benefits from it. Therefore, the first objective of this study was to explore the relationship between perceived usefulness and acceptance of m-government services.

Utilization of any service can only be made only after getting awareness and knowledge about it. Awareness helps in improving the usability of any service. (Mutahar, Daud, Ramayah, Isaac, & Aldholay, 2018). Awareness regarding benefits, opportunities and functions, which m-government services presents, is necessary to help people understand its importance and usefulness (Ahmad & Khalid, 2017). Therefore, this study planned to investigate the relationship between awareness and m-government acceptance.

Ease of usability makes great contribution towards universal acceptance of technology. Perceived ease of use was identified by David (1985) in Technology Acceptance Model (TAM), similar constructs in Unified Theory of Acceptance and Usage of Technology (UTAUT), Theory of Planned Behavior (TPB), Diffusion of Innovation Theory (DoI) and Social Cognitive Theory (SCT) highlighted ease of use as an important factor affecting technology acceptance behavior (Youngseok Kim & Crowston, 2011). Hence this study was designed to investigate the relationship of perceived ease of use with acceptance of m-government services (Almarashdeh & Alsmadi, 2017).

Trust and Technology Readiness are amongst the most important factors affecting upon acceptance of m-government (Al-Hadidi & Rezgui, 2010). Understanding Technology Readiness of users is important to not only to know the requirements of the users but also to improve service delivery (Parasuraman & Colby, 2015). Acceptance of technology based services is dependent upon personal characteristics of users (Parasuraman, 2000). Researchers have verified that the dimensions of Technology Readiness effects upon the acceptance of technology based solution amongst its users (Svendsen, Johnsen, Almås-Sørensen, & Vittersø, 2013). Knowing the technology readiness helps in designing the technology strategy as well as in managing the relation between users and the organization (V. S. Gupta & Garg, 2015). Pakistan has been placed at 111th place in Technology Readiness sub index in the computation of Global Competitive index (WEF, 2017) Low position of Technology Readiness at the national level requires further investigation of the behavior of individuals towards acceptance of technology. Especially when the government of Pakistan has made a firm commitment to invest in mobile government infrastructure applications and solutions (MoIT, 2017). Understanding the phenomena of technology acceptance might be

necessary to make an informed decision while investing in Technology. Indeed technology readiness plays a pivotal role in facilitating decision of using m-government services (Jou et al., 2024). Therefore, another objective of this study was to inspect the relationship between technology readiness and user's acceptance of mobile government services.

Privacy and governance of data are two major concerns (Attrey, 2021). These concerns becomes impediments for citizens accepting m-governmental services. This explains mistrust of citizens upon the government. By way of believing that either the data handed over to government be accessible to other parties or it would not be protected well enough to keep it safe from unauthorized access (Christopher & Leonidas, 2014). Users trust m-government services if they believe that the system it offers is reliable. This reliability develop positive intentions towards use of mobile government. (Shareef, Kumar, Dwivedi, & Kumar, 2016). Most of the research done in this regard is conducted in western developed countries, where electronic governments systems were established and governments are shifting towards m-government; However, there is a need of conducting research in developing countries (Ohme, 2014). Pakistan is a developing country which has not only started investment in m-government but has announced to make it a full fledge governmental services delivery channel (MoIT, 2017). It is important for Pakistan to understand the role which Trust plays upon the acceptance of mobile government (Mehrparvar, Mohemmi, & Dadmand, 2024). Therefore, to study the association between Trust and acceptance of m-government amongst citizens in Pakistan, was another goal of the proposed study.

When it comes to household, hedonic motivation becomes an important factor shaping technology acceptance behavior (X. Zhang & Maruping, 2008), however the intensity of this effect is

dependent upon the culture (Yogesh K Dwivedi, Shareef, Simintiras, Lal, & Weerakkody, 2016; X. Zhang & Maruping, 2008). Novelty of mobile government services in south east Asia, non-availability of technological artifacts in daily life and cultural values make a unique combination where hedonic motivation can be assumed to be a reason for adopting m-government services (Yogesh K Dwivedi et al., 2016; Patrick & Marques, 2024). Therefore, this study planned to investigate the role of hedonic motivation upon acceptance of m-government services.

Understanding demographical information of the users viz-a-viz the preference of the features of a product helps in developing and marketing the product (M. Creusen, 2010). Demographics based differences can help understanding the choices individuals make regarding acceptance of technology (Ahmad & Khalid, 2017). Recognizing demographics based behavioral differentials in society would help designing m-government mechanisms acceptable for public at large (ALMURAQAB, 2021). Comprehending demographic diversity gives an insight into the perception of general public regarding adoption of m-government services in performing tasks (Shareef, Archer, & Dwivedi, 2012). Education, income, gender and age were evaluated by researchers, while discussing the impact of demographics upon behavior of users (M. Creusen, 2010; Sharma, 2015; Sipior, Ward, & Connolly, 2011; Venkatesh et al., 2012). Therefore, each one of these variables was planned to be evaluated, to understand their impact on user's acceptance of m-government services.

There is 38% less chance of a woman owning a mobile phone than a man in South East Asia (Burchell & Lopez, 2017). Closing the gender gap to mobile access is a step towards creating equal opportunity and economic freedom. Pakistan approximately has a 49% female population(PBS,

2017). Researchers have identified behavioral differences due to gender (Francis, Hasan, Park, & Wu, 2015; Goswami & Dutta, 2015; Macintosh & Krush, 2014; O'Fallon & Butterfield, 2005). It is the responsibility of governments to intervene to bridge the gender based digital divide (UN, 2016). Researchers have confirmed that gender moderates the relationship between behavioral factors and acceptance of technology (Kendziorra & Winkler, 2022). Understanding the behaviour and role of gender is therefore important viz. a viz. user acceptance of m- government services (Almuraqab & Mansoor, 2017).

Age has been identified as a factor affecting behavior towards technology (Morris & Venkatesh, 2000). It has been acknowledged as a moderating variable for behavioral characteristics affecting technology adoption (J. Kim, 2016; C.-H. Liu, Chen, Kittikowit, Hongsuchon, & Chen, 2022). Identifying the affects which age have on m-government acceptance was considered as an important help comprehending the user behavior appropriately (Ahmad & Khalid, 2017).

Household income can have impact upon users behavior towards acceptance of m-governments services (Rojas-Méndez, Parasuraman, & Papadopoulos, 2017; UN, 2018b) (Ahmad & Khalid, 2017). Researchers have identified income as a predictor of technology acceptance (Abuhammad, Khabour, & Alzoubi, 2020). Studying the impact which income differences can have upon behavioral factors affecting acceptance of m-government services was considered necessary in understanding the subject better. Researchers have proved that education is a predictor of utilizing technological resources (Moura, de Almeida, da Silva, Veiga, & Costa, 2020). Education was identified by the United Nations as one of the most important factors affecting acceptance of e-

government (UN, 2014). Studying the impacts of education on the m-government acceptance behavior was considered to provide further insights into the phenomenon.

Perceived usefulness has been proved an important construct affecting user's acceptance of m-government services (Almarashdeh & Alsmadi, 2017). However, there were instances where perceived usefulness was reported as having no effect upon m-government acceptance (Ahmad & Khalid, 2017). The role which demographics play upon perceived usefulness has remained an area of interest for researchers. Few authors claimed that demographics do not have any moderating effect upon the relationship between perceived usefulness and acceptance of technology (J. W. Lee, 2010) whereas there are other who found otherwise (J. Koivisto & Hamari, 2014).

Contrasting views were found regarding the role perceived ease of use play upon acceptance of technology. Few authors (Alrowili, Alotaibi, & Alharbi, 2015; Asmi, Zhou, & Lu, 2016; Husin, Loghmani, Zainal Abidin, Chiong, & Chiong, 2017; Shareef, Dwivedi, Laumer, & Archer, 2016) ranked it as one of the most important factor affecting acceptance of technology whereas others (Ahmad & Khalid, 2017; Changlin Wang, 2014) have denied the presence of any such role affecting technology acceptance.

Researchers have identified opposing views while discussing the function of Trust in the study of user's acceptance of Technology based services (B. Ali, Baluch, & Udin, 2015). There are studies (Almarashdeh & Alsmadi, 2017; Chauhan, 2015; Zada, Falzon, & Kwan, 2016) reporting positive relationship between Trust and acceptance of technology in contrast to the result of other researchers (M. I. Eid, 2011) who have found either insignificant relationship of trust with

acceptance of users or suggested (Yeolib Kim & Peterson, 2017; Yoon & Occeña, 2015) that effect of trust becomes significant when it works with other factors.

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 et al., 2010).

A number of researchers have emphasized upon the role which awareness plays in acceptance of m-government services (Almuraqab & Jasimuddin, 2017; Eastin, Brinson, Doorey, & Wilcox, 2016; Mutahar et al., 2018). Contrastingly, other researchers have denied such claims (Mandari & Chong, 2018; Ohme, 2014). Researchers have also suggested to investigate the moderating effect of awareness upon acceptance of mobile based services (Eastin et al., 2016).

Contradicting views were found regarding the role which hedonic motivation plays in acceptance of mobile based services. A number of researchers found that hedonic motivation effects acceptance of mobile based services (Ali A Alalwan, Dwivedi, Rana, Lal, & Williams, 2015; de Sena Abrahão, Moriguchi, & Andrade, 2016). On the other hand, other researchers found evidence

contrary to these claims (Oliveira, Thomas, Baptista, & Campos, 2016). Similarly contradicting views were found regarding the effect of hedonic motivation upon acceptance of mobile based systems when the research was carried by authors in different geographical regions (Yogesh K Dwivedi et al., 2016).

It has been observed that association between perceived usefulness and acceptance of m-government services has displayed inconsistent results. Similarly, relationship between perceived ease of use and acceptance of technology has also shown contrasting outcomes. Discussion has identified that relationship between Trust and user acceptance of technology shows inconsistent results. Similarly, it is also clear that the relationship between technology readiness and users' acceptance of technology is not constant. The relation between awareness and acceptance of m-government services also have shown inconsistent findings. And finally, relationship between hedonic motivations and acceptance of mobile based services was also identified to be variable. Introducing moderating variables may explain these relationships in better way (Baron & Kenny, 1986). Therefore, it was found appropriate to assume that gender, age, education and income moderates the relationship between perceived usefulness, perceived ease of use, trust, technology readiness, awareness and behavioral intentions to accept mobile government services.

In continuation of previous discussion, another goal of the study was to observe the moderating effect of gender, age, education and income upon the relationship between perceived usefulness, perceived ease of use, trust, technology readiness, awareness, hedonic motivations and user's acceptance of m-government services.

Concluding this discussion, objective of this study was to evaluate effect of awareness, perceived usefulness, perceived ease of use, trust, technology readiness and hedonic motivation upon m-government acceptance; while examining moderating effect of the demographic variables i.e. gender, age, education and family income upon the relationship between perceived usefulness, perceived ease of use, trust, technology readiness, awareness, hedonic motivations and user's acceptance of m-government in Pakistan.

1.3. Research Questions

Following are the questions which the study examined

1. What is the relationship between hedonic motivation and users' behavioral intention to accept m-government services?
2. What is the relationship between awareness and users' behavioral intention to accept m-government services?
3. What is the relationship between trust and users' behavioral intention to accept m-government services?
4. What is the relationship between perceived usefulness and users' behavioral intention to accept m-government services?
5. What is the relationship of perceived ease of use with users' behavioral intention to accept m-government services?
6. What is the relationship between technology readiness and users' behavioral intention to accept m-government services?

7. Do demographic variables moderate relationship between hedonic motivation, awareness, trust, perceived usefulness, perceived ease of use, technology readiness and users' behavioral intentions to accept m-government services?

1.4. Research Objectives

Following were the objectives of the study

1. To examine the relationship between hedonic motivation, awareness, trust, perceived usefulness, perceived ease of use, technology readiness and behavioral intention to accept m-government services.
2. To model the relationship between hedonic motivation, awareness, trust, perceived usefulness, perceived ease of use, technology readiness and behavioral intention to accept m-government services.
3. To evaluate the moderating role of demographic variables between hedonic motivation, awareness, trust, perceived usefulness, perceived ease of use, technology readiness and users' behavioral intentions to accept m-government services.

1.5. Significance and Contribution of the Study

1.5.1. Theoretical Contribution

Many studies have been done on identifying the problems which come in the way of accepting m-government services from the supplier point of view. However, this is the first study which

examined the relationship between effect of hedonic motivation, awareness, perceived usefulness, perceived ease of use, trust, technology readiness and users' behavioral intentions to accept m-government initiatives especially with a context of a developing country i.e. Pakistan. Moreover, it identified the role which demographic variables i.e. gender, age, income and education play on the antecedents of user's acceptance of m-government.

This study introduced a comprehensive model to help understand the m-government acceptance behavior thus opening ways for follow researchers to understand the mechanics which behavior have upon acceptance of m-government services.

This study has tried exploring and expanding horizons of the definition of m-government services, providing an alternative view to m-government research. Taking a leaf from the book of disruptive innovation, the current study has presented m-government services as disruptive innovation. This changes not only the scope of research on the subject but also entirely provides new avenues for the growth of the subject area.

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

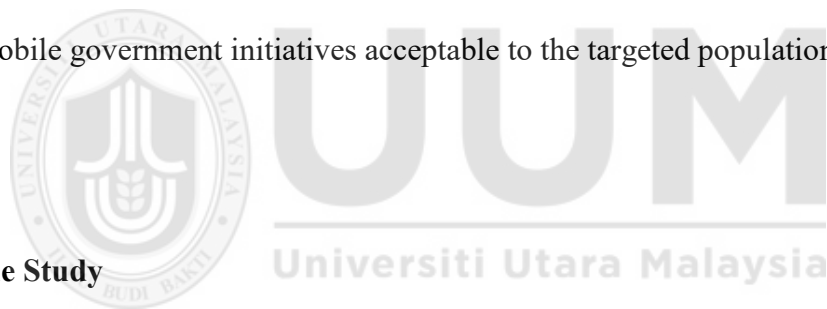
Application of hedonic motivations particularly with reference to governance tools like mobile government services is also an area less explored. This study have added to the knowledge base of effect of hedonic motivation upon the usage behavior of governmental services.

Effects of demographics is an area less explored especially with respect to the acceptance of technology. Present research have contributed to the knowledge of the effect which differences in gender, income, education and age plays on user's acceptance of technological platforms especially with reference to m-government.

1.5.2. Practical Contribution

The results will help, policy makers of developing countries in general and Pakistan in particular, designing more acceptable m-government platforms. Policy makers can now considering developing m-government platform focusing upon the functional areas of m-government platforms which help citizens accepting the m-government initiatives. Moreover, the results of the study, if used delinquently, can help designing such services which are gender neutral, suitable for use across all age groups, easily accessible for people having different level of educational back ground and suitable for varied income groups while focusing on the dimensions ignoring which would not let the m-government medium become popular. This research have provided results which can 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 society. Making m-government initiatives popular and achieving the goals of service delivery unique to m-government services.

The results attained by the study can help policy makers in taking decision of adding features increasing the hedonic motivation of the service adoption to raise the chances of acceptance of m-government services. Similarly, the need of features acceptable to the various classes of the group with reference to their age, gender, income and education can be extracted from the study which can also help in providing guidelines for the developers of such initiatives. The study highlighted the requirement of creating awareness and the way awareness interacts with the important antecedents of m-government acceptance. Thus, making it possible to design awareness programs necessary to target the behavior which is required to appeal to the target user group for adoption of the m-government services. This will further ensure that the public gets complete value for the money spent upon the m-government initiatives. Indeed the results of the study can help designing cost effective mobile government initiatives acceptable to the targeted population.



1.6. Scope of the Study

This research was conceptualized while keeping in view Islamic Republic of Pakistan. The emphasis of the study was on m-governance. The target was to quantitatively examine the relationship between awareness, perceived usefulness, perceived ease of use, trust, technology readiness, hedonic motivation and user's acceptance of m-government amongst citizens of Pakistan. Moreover, the moderating effect of demographic variables i.e. gender, age, education and income upon relationship between perceived usefulness, perceived ease of use, trust, technology readiness and acceptance of m-governments services was also examined. Appropriate sample of citizens having a mobile phone connection was collected to understand the proposed

relationships. However, whatever the sample size was it might still not have been able to get the complete picture of the entire population due to unavoidable sampling biases. Moreover, m-government service is a concept which is in infancy in Pakistan with a small number of applications functional for public consumption. Finding citizens having experience of m-government services was quite of a challenge.

This was an empirical study recording the responses of the selected samples using sampling techniques. It was dependent upon the answers based upon perception of public service delivery. This may have raised biases since there is no measure of actual behavior of the users.

The study have evaluated the proposed model based upon selected sample in Pakistan. It would be difficult generalizing the outcome for m-government adoption across other countries. Similarly, the research model was tested across metropolitan cities in Pakistan which may not truly be representing the population in rural areas.

1.7. Definitions of Key Terms

Government

“The means by which national policies are enforced, as well as the mechanism for determining national policies” (OECD, 2011).

E-Government

“The use of information and communication technologies, and particularly the internet, as a tool to achieve better government.” (p.24) (Field et al., 2003)

M-Government

M-government solutions provides mobility to offer governmental services. M-government is combination of e-government services with mobility .It assists in provisioning of such services which are not possible to be provided through traditional e-government solutions. (Albesher & Stone, 2016).

Technology Readiness (TR)

TR is peoples’ inclination towards technology adaptation in their life. It is a combination of positive and negative emotions towards technology which decides upon a persons’ tilt towards using new technology. It explains individual behavior which sums up fulfillment and frustrations from using technology while deciding upon adaptation of innovation. It comprises of four components namely optimism, innovativeness, discomfort and insecurity (Parasuraman, 2000).



Trust

Trust is defined as believe between two entities. It is found where the believing entity assume that the believed upon party would not betray and meet the expectation of believing party. In-fact a relation of mutual Trust eases the fear of betrayal or an act of opportunism from all involved (Teo, Srivastava, & Jiang, 2008).

Hedonic Motivation

Hedonic motivation is enjoyment or pleasure taken from use of technology. It is like perceived enjoyment of using technology (Brown, Venkatesh, & Bala, 2006; Venkatesh et al., 2012).

Perceived Usefulness

Perceived usefulness is explained by Davis (1985) as "the degree to which an individual believes that using a particular system would enhance his or her job performance." (Davis, 1985).

Perceived Ease of Use

Perceived ease of use, as defined by Davis (1985), is "the degree to which an individual believes that using a particular system would be free of physical and mental effort." (Davis, 1985).

Awareness

Awareness is having information of purpose and systems of m-government services (Shahzad, Xiu, Khan, & Wang, 2018).

Demographics

Merriam-Webster dictionary defines demographics as “the statistical characteristics of human populations (such as age or income) used specially to identify markets” (Merriam-Webster, 2019).

The current research uses age, gender, income and education as demographic variables.

Behavioral Intentions to accept m-government services

It is defined as an individual's subjective prospects of performing m-government services (Saxena,2018) .



CHAPTER TWO - REVIEW OF LITERATURE AND UNDERPINNING THEORIES

2.0. Introduction

This section explores literature related to all variables of the study. The theories underpinning the establishment of proposed relationship are also reviewed. While reviewing the literature a funnel approach is being adapted. It was envisaged that acceptance of m-government requires understanding the role of ICT in modern governance. Therefore, after discussing basics of m-government acceptance, literature citing the role which ICT plays in governance was discussed. E-government being a part of the role which ICT are playing is discussed afterwards. Evolution of e-government and the ways through which e-government systems are paving way for m-governance were evaluated. At this point m-government literature defining m-government was discerned to understand behavior affecting its acceptance. Global m-government initiatives were evaluated afterwards to further the understanding of governance structure being adapted using m-government technique. Narrowing down to the specific level of the country, where the research was planned, case of Pakistan was evaluated through the literature encompassing m-government acceptance and enabling environment in Pakistan. From there again a global review of the factors affecting m-government initiative was performed. Reviewing the literature a list of key behavioral factors, affecting user's acceptance of m-government services, was developed. Similar items, through the help of literature, were identified so to make a list free from repetitions. Afterwards, the literature was evaluated in detail for the effect of behavioral factors upon acceptance of m-government services, for which the researchers could not develop any consensus. Literature was also reviewed regarding moderating variables. Finally, the theories providing basis to this research thesis were reviewed. Figure 2.0 covers the hierarchy in which literature review was conducted.

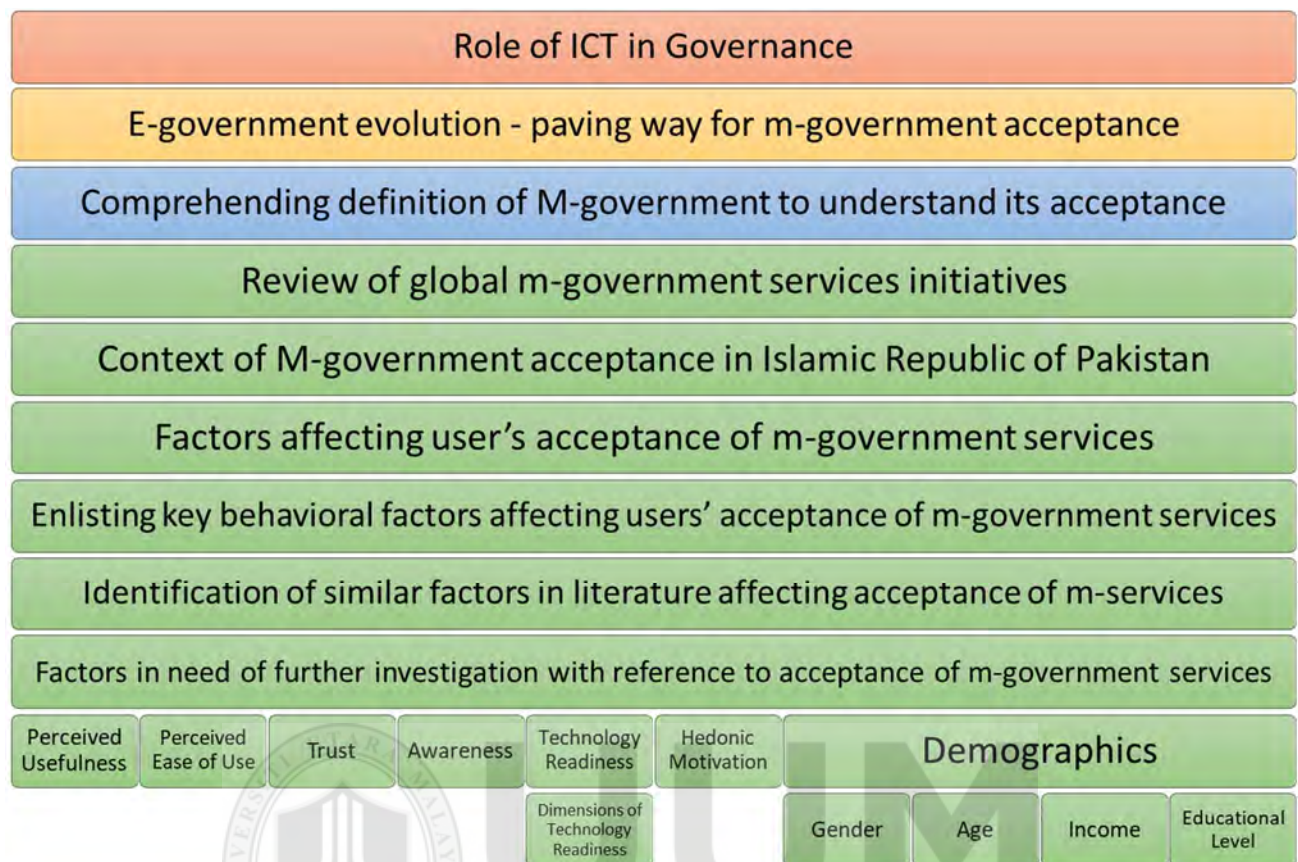


Figure 2.0- Literature review hierarchy

2.1. Acceptance of M-government

M-government is an opportunity especially for developing countries to providing services in a cost-effective manner. Phenomenal increase in internet usage followed by ubiquitous usage of mobile telephony have provided opportunity of reaching out to the general public using m-government services (Alotaibi & Roussinov, 2017; Yogesh K Dwivedi, Sahu, Rana, & Baabdullah, 2018; Ishengoma, 2022). However, success of any service is also dependent upon the acceptance of user. This is also true for m-government services. M-government services, especially viz.a.viz. developing countries, haven't attracted the number of users which initially was expected of it

(Alotaibi & Roussinov, 2017). Lack of research regarding factors affecting acceptance of m-government services in developing countries is cited as one of the reasons of the low adoption rate of m-government services (Alotaibi & Roussinov, 2017).

The possibilities presented by m-government applications are tremendous. However, it is a new field. Models previously developed, to understand the behavior and requirements of citizens availing government services, do not work for m-government because of its unique features. This leaves room for research in the area of user behavior for accepting m-government services (Lu, 2017; Shahzad et al., 2018; Shareef, Kumar, Kumar, & Dwivedi, 2011).

2.1.1. Role of ICT in Governance

The idea of good governance is in continuous state of evolution since last two decades. Concept of governance in public sector tells about the mechanics of government, political decision-making systems while describing the relationship between society and state. Good governance demands to be more effective and efficient. It is composed of all the qualities which any society could wish from government (Grindle, 2017). Good governance is about delivering maximum services of quality to variety of users while investing minimum resources, having efficient collaborative arrangement with private and not for profit organizations, modifying and transforming effectively to the needs of society, providing safe and secure environment, encouraging and instigating equal economic opportunities and growth across society and handling international pressures zealously. The increasing pressure upon public sector on delivery of quality public services in a diversified challenging and inherently dynamic environment requires innovative solutions for public sector

services delivery (Brinkerhoff & Brinkerhoff, 2015). Good governance is at the heart of upward societal movement. It improves not only the living standards but also improves general economic conditions making comfortable living possible for masses. Indeed, good governance is the cornerstone of development. Information and communications technologies (ICT) effectively provide a mean to achieve good governance. The tools provided by ICT not only increase citizens' participation in the governance but also increases transparency and accountability. ICT help getting things done without physical interaction. This nonphysical interaction provides many benefit including reduction in corruption (Yimer, 2015).

ICT are universal in nature. These have capability to aid in almost every kind of work. This has made ICT popular across globe. It also helps making the work processes easier and cost effective while reducing the errors which human are prone to make. The progress of business and society in today world is based upon the tools provided by ICT. It has improved management drastically by providing better record keeping and easier access to retrieving information. Researchers while comparing per capita average income claimed that there used to be no global divide between persons living in two different countries two centuries ago. Disparities between the present day rich and poor countries started growing mostly after the industrial revolution. Introduction of information technology added fire to the fuel which increased the gap further with globalization and the penetration of internet. Information and communication technologies have further increased the disparities between countries around the globe. The difference in degree of diffusion of ICT services in societies is known as digital divide (Kettani & Moulin, 2014). According to OECD digital divide is "a term that refers to the gaps in access to information and communication technology (ICT) - threatens the ICT "have-nots", whether individuals, groups or entire countries".

ICT has become the growth engine of the modern economy. Innovations introduced by ICT has provided boost to economies and people with that. This on the other hand has increased the risk of leaving those behind who either do not have means or education to access ICT. This in turn calls for bridging the digital divide. Hardware related to ICT is nothing without the knowledge of using these. In fact, it is the knowledge combined with human capital which helps exploiting opportunities provided by ICT. It is education and learning which is going to fuel the knowledge-based economies of 21st century. Access to digital technology and technological literacy both are equally important to bridge the digital divide (OECD, 2018). Digital divides are no longer considered to be only a lack of access to ICT infrastructure. Neither are they necessarily a division between high- and low-income countries. Given the progress of e-government, digital divides exist in all countries (UN,2018). United Nations has promoted the idea of using ICT as a medium for creating openness, improving governance, transparency and establishing communication between the government and citizens. It appreciated the role of ICT in achieving sustainable development goals. (Castelazo, 2016).

The world is changing rapidly and so are the requirements to manage government. The idea of a welfare state has placed a lot of challenges upon the governments. And the domain of public administration has evolved drastically in last few decades to meet the modern-day challenges. Public administration has shifted from traditional bureaucratic model to the model of New Public Management (NPM). This model demands management in public sector should not be different then the management in private sector. The NPM model claims that governments can successfully manage today's challenging and complex public systems only if the governments across the globe start adapting the management practices, models and systems followed by the private sector

(Alonso, Clifton, & Díaz-Fuentes, 2015). The successful adoption of ICT by businesses, the benefits being drawn from it and the efficiency which it produced paved its way to further adoption by not only not for profit sector but also by governments. Governments have started integrating many ICT based solutions including ERP systems like many businesses organizations do (Avgerou, Hayes, & La Rovere, 2016). Researchers have proven that the ICT increase efficiency when used even in bureaucratic governmental organizations. ICT are playing pivotal role helping managing and governing bureaucratic organizations. Researchers have argued that use of ICT makes bureaucratic organization better in public service delivery than any other type of organization. The variety of solutions offered by ICT ranging from simple office automation systems to information retrieval and management system, and from decision support systems to the facility of electronic communication, web presence and cloud-based sharing systems provides the opportunity of adding layers of control and access as are required by a bureaucratic organization. Using ICT, the speed of the bureaucratic process increases manifold. Increasing the speed of processes is the biggest challenge in a government organization, this ultimately improves the output and efficiency of the governmental services. The ever-expanding domain of government interventions has increased the work load of governmental organizations tremendously. Complexity of desired intervention has made the role of government further difficult. Information technology offers high quality and cost-effective solutions which also keeps the bureaucratic channels intact, meeting the requirement of transparency while offering controls on access aligned to rules (Cordella & Tempini, 2015).

Good governance navigates society by developing linkages and associations amongst government, civil society and business organizations. All these players need to work together to bring out best

for society. Like any other partnership this also requires discussing information, freely exchanging ideas and sharing challenges and problem which each one faces while performing one's duty. The interdependencies of these partnership require each partner to be aware of the decisions made by other partner, the rationale behind every choice and the implication of the decisions. This is not possible without making the communication easier and the system transparent. Moreover, it requires that each partner have got the access to the information whenever the partner requires it. This promotes the idea of openness and transparency. ICT has the power to not only make the information available and accessible to all the partners but it also helps in making work flow easier and retrieval of information smother. Use of ICT also empower managers to apply "disintermediation"-simplifying the long bureaucratic list of intermediations normally present in the public sector. The usage of ICTs has proven to improve performance while increasing quality and decreasing cost in the public sector (Pollitt & Bouckaert, 2017).

2.1.2. E-government evolution - paving way for m-government acceptance

The advent of information technology has positively affected global efforts of improving public administration. Information technology is used as a medium to transform governance and public services delivery. In today's age of information, ICT is being used as a catalyst of change.(Kettani & Moulin, 2014). Use of ICT in completing the governmental tasks is e-government. (Field et al., 2003). While reviewing the literature one can find variety of e-government definitions each one emphasizing some very important aspects of e-government. The united nations on its website explains e-government entailing all the services provided by the government online. It could range from mere communication or dissemination of information electronically or digital facilitation of

citizens, businesses or governmental organization. The role of e-government has evolved from a medium of communication to usage of ICT based solution to improve governance, enhancing citizens interaction and enabling open governments. UN therefore defines e-government as “the use of ICTs to more effectively and efficiently deliver government services to citizens and businesses. It is the application of ICT in government operations, achieving public ends by digital means”. UN while explaining values behind e-government suggests that the e-government mechanisms should bring efficiency by decreasing costs and increasing productivity. A comprehensive e-government policy should be adapted across the board. The objective should be to share information and work processes amongst different governmental agencies so to conserve resources while adding sustainability. UN claims that by utilizing e-government while restructuring work processes, governments can become more efficient, reducing the completion time of tasks and improving the quality of services. E-government also helps bringing in transparency, accountability and trust of public upon the governance mechanism (UN, 2018a).

United Nations have promoted the use of e-government as a tool to achieve its sustainable development goals. UN suggests that deploying e-government helps in achieving good governance which in turn support developing sustainable and strong societies. UN, believing in power of e-government, is pushing the agenda of e-government adaptation at international level. UN, through High Level Political Forum (HLPF), have made more than 110 member states review their e-government strategies at the state level. The purpose is to push all the member states to adopt a comprehensive, all inclusive, approach towards achieving development across all dimensions of good governance (UN, 2018b).

OECD discussed various definitions of e-government before giving its own version of e-government definition. It refers to a definition recognizing all the services delivered using internet as e-government. Another definition mentioned by OECD associated the term e-government with all ICT enabled governmental activities for either facilitating or delivering governmental services. It also discusses a definition which define e-government to be an agent of change which uses ICT to revolutionize public administration. This definition claims that e-government is the evolution of governmental procedures built around technology. OECD resolves that the subject of e-government is based upon perceptions and technology. All of these are subjects which keep evolving this therefore requires the definition of e-government to be dynamic so it remains up to date even with evolution in technology or with changes in perception. OECD defines e-government as “The use of information and communication technologies, and particularly the Internet, as a tool to achieve better government” (p.22). This definition entails the concept of e-government holistically. OECD appreciating the role of internet has not limited e-government to it but also has encompassed the usage of ICT solutions for effective discharge of governmental services. Moreover, it has emphasized the objective to be achieving better government. The definition of better government is evolving itself. Hence the definition is covering all those aspects of government which are undertaken in order to improve public service delivery. OECD clarifies that e-government is not about introducing ICT tools for performing the government services. But it is a step forward; it is the change in mindset and that is to deliver good governance using tools of ICT. OECD is of the view that the e-government emphasizes upon the same principles of good governance. Moving to e-government may require a principal shift in the existing governmental structure, policies and procedures, but then this brings in effectiveness, transparency, accountability and efficiency. All of these outcomes are similar to what is required of good

governance (Field et al., 2003). Researchers have defined e-government as an opportunity to access government using various mediums of electronic communications. It is a way government make arrangement to serve all its stakeholders using ICT. It includes management, procedures, protocols and regulations required for delivering services (Almarabeh & AbuAli, 2010).

Since its beginning as an experiment, e-government has fairly evolved its role as an essential form of delivering useful services to the citizens. It has not only improved the governance but also has made the governance citizen participatory. Technological innovation along with evolution in social behavior has made e-government expand its limits to the territories unimaginable at the time when the concept of e-government started accepted (UN e-survey,2010). The role of internet, its limitless boundaries and independence of expression which it provides has made people use it as a medium to convey their political views (Spaiser, 2012). This has helped adding political dimension to the role of e-government. Researchers started using the terms of transparency and citizen participation while defining e-government. Governments worldwide are now developing e-government platforms having collaborative relationship with citizens. These projects are primarily extension of e-government. However, a new term, open government, has been coined to distinguish collaborative nature of such projects. Open government requires complete sharing of information at each stage of a project. It makes public data available for use by private parties for the benefit of both. Researchers have defined open government as electronic government but with more emphasis on making public information accessible at every stage. E-government has evolved from the use of ICT for providing governmental services to a tool used for social inclusion, development, promotion of democracy and citizen participation. (E. A. Abu-Shanab, 2015).

Researchers while discussing evolution of e-government have identified that e-government evolution is a slow process. This is not revolutionary in nature. Rather, it is evolving incrementally in a stepped fashion according to the requirements of the role which governments need to play (Janowski, 2015). Role of government is defined by the economic needs and socio-political requirements of society. Evolution of e-government is adding to its complexity. Systems required to run e-government solutions requires sophisticated designs due to the intricate nature of challenges posed by issues of society, customs, behavior, governance and leadership (Katsonis & Botros, 2015). Researchers have also identified that electronic government is becoming more responsive to the issues raised by external environment than the challenges posed by the internal issues like those of technology and operations. Researchers are of the view that shifting e-government focus to the political and institutional reforms will speed up the adaptation process of e-government. It is now suggested that e-government should place more emphasis upon improving the policy and regulatory functions than keeping itself restricted to resolving issues of operational nature (Savoldelli, Codagnone, & Misuraca, 2014). Researchers have argued that the satisfaction of citizens, being the prime responsibility of any government initiative, should become the measure for identifying the evolutionary stage of e-government. E-government evolution is non-symmetric in nature. The evolution of e-government is dependent upon the unique set of internal and external cultural values. It is quite possible that, working within the same state, one organization may evolve at a higher level than another (Stoica & Ilas, 2009; Van der Meer, Gelders, & Rothier, 2014). Transformational, mobile and open governments are three evolutionary stages of e-government, gaining attention from researchers worldwide. Transformational government is based upon the concept of reorganizing public sector to achieving increased efficiency while keeping the citizens interest at the heart of all the restructuring plans. Mobile government is extension of

electronic government which uses mobile technology to provide the e-government services. It is an emerging concept of interest for researchers. It is argued that use of mobile technology can help in building citizens' trust upon government. Open government is built upon the idea of sharing of information. Openness has three aspects namely inclusiveness, transparency and receptiveness (Janowski, 2015) .

Becoming austere was a necessity for majority of organizations during and after the financial crisis of 2008. Global financial crisis pushed everyone to become more efficient while reducing costs. Governments were of no exception. This made e-government further popular to the decision makers since e-government provides a cost-effective way to adding transparency while providing access to the stakeholders and increasing efficiency. Financial crisis was the outcome of mistrust which gave a lesson to governments to build trust in their relationship with the stakeholders. The ability to successfully manage crisis while meeting objectives are foundation of an effective government which also wins trust from public. E-government can assist development in a cost-effective manner. UN in its bi-annual e-government survey reports has mentioned e-government to be citizen centric. It emphasized upon achieving a transparent, accountable and efficient government. UN suggests that e-government is the proven way to achieve these goals. UN further suggests that technology should be utilized innovatively in delivering the public services. It mentioned the growth of digital technologies and the capability which the digital technology has in assisting to deliver tailor made services according to the need of individual. In its latest e-government survey UN has also mentioned the term of digital government and promoted the idea to further its approach of building strong societies (UN,2010,2012,2014,2016,2018). Digital government is the latest extension of the e-government. It is a multi-channel two-way

communication approach between the citizen and the government. The digital government service delivery mechanism is digital by default which requires sometime development of collaborative governance mechanisms. It is a citizen driven model promoting usage of mobile technologies to access public services (Katsonis & Botros, 2015).

2.1.3. Comprehending definition of M-government to understand its acceptance

Democratic norms require governmental policies to be reflective of public opinion (Page & Shapiro, 1983). Modern technology has changed the way governments were supposed to work. It provides opportunities to have real-time communications with the stakeholders. It has further contributed in making the feedback process simpler and convenient enabling masses to raise their concerns without incurring substantial costs (Bertot, Jaeger, Munson, & Glaisyer, 2010). It is the complexity of e-government system which has forced governments to start seeking alternatives. A large proportion of public is not prepared to deal with the requirements of e-government initiatives. E-government systems does not only need the hardware but also requires the user to be fully conversant with the usage of computer-based technology. Diffusion of mobile devices and the easy availability of cheap mobile telecommunication infrastructure has provided the governments with the opportunity to overcome the barriers of e-government by switching over to m-government solutions (Shareef, Kumar, et al., 2016).

M-government is derived from e-government. In fact few authors have presented e-government as the superset of m-government (Z.-J. Chen, Vogel, & Wang, 2016; Shareef, Kumar, et al., 2016). However, there are other researchers who claim that m-government is one step ahead of e-

government due to its ability to deliver government services using mobile networks which has higher penetration in general public in comparison to fixed line internet (Z.-J. Chen et al., 2016). This provides governments with the opportunity of reaching out to a higher proportion of population especially to those located at geographically challenged places (Alharmoodi & Lakulu, 2020). Moreover, the mobile nature of m-government applications also makes them a useful tool in case of emergencies and natural disasters (Shareef, Kumar, et al., 2016).

Idea of open governments' viz.a.viz ubiquitous nature of mobile devices, is helping to take the concept of participatory government to next level. It demands complete transparency and sharing of public data across all stake holders making it freely available for anyone willing to use it. Thus, making it more useful for general public (Cancan Wang, Medaglia, & Irani, 2017). Researchers are suggesting government to take the role of a platform and let the private sector compete in developing useful applications from the public data (O'Reilly, 2011). Making the process of provision of services more transparent and general public winner in the process of opening up of governments (Bertot et al., 2010).

Governments are sponsoring mobile technology-based programs to improve the quality of life of their citizens. European Union (EU) has funded a project namely Mobile Age which focuses on mobile technology, data from open government and the ease in availability of public services to senior citizens (Jarke & Gerhard, 2017). Percentage of elderly population is growing in Europe and is estimated to reach 28% of population. Mobile Age is aiming towards providing digital services using open government data through mobile applications especially to those senior citizens which are not convenient in using traditional digital platform. The project is working on

inclusion of elderly population through the use of mobile technologies reducing the risk of them being left out from digital services which are increasingly used by governmental agencies for effective discharge of their responsibilities (MobileAge, 2018).

Another project namely Flood-Serv sponsored by EU is using mobile technologies to involving general public in designing of emergency services to increase awareness and to mitigate risks of floods (Flood-serv, 2018). Mobile platforms are helping in mobilizing general public while at the same time providing the governments with the opportunities to engage private sector in their quest of serving public better.

M-government is a step ahead of traditional e-government initiatives. It provides opportunities which were not available previously. It not only improves the delivery of government information and services by providing ease in accessibility but it also has overcome connectivity issues inherent in PC-based e-government initiatives. Abundance of mobile devices have helped government opening additional channels of communications with the citizens. This has also proved itself way more useful and cost effective than the traditional wired network both in densely populated and in geographically challenged locations (Katara & Ilavarasan, 2013; OECD, 2011).

Kushchu & Kuscü (2003) have defined mobile government as applications and policy concerning usage of all types of wireless and mobile technologies to provide additional benefits to the beneficiaries of e-government. They have argued that m-government cannot replace the e-government services rather m-government is going to complement e-government services. M-government adds more convenience to the e-government services by providing the users ease of access. It offers mobility to the e-governmental services; providing opportunity to access real time

information. The very nature of mobile and wireless networks provides additional benefit of convenience to the beneficiaries of e-government services in the countries where e-government systems are already established. Nations lagging behind in implementing e-government services has the opportunity to adapt m-government as primary technique of providing citizens access to governmental services especially at the places where access is the challenge (Kushchu & Kuscu, 2003). Sandy & McMillan (2005) supporting the premise of Kushchu & Kuscu (2003) have defined m-government as a “complimentary subset of e-government”. They argue that it is the convenience of mobility which m-government application adds to the e-government (G.A. Sandy & McMillan, 2005). OECD also defines m-government as branch of e-government. It argues that m-government utilizes wireless and mobile technologies to deliver governmental services to the citizens (OECD, 2011). Most researchers while discussing m-government have defined it either as a subset (E. Abu-Shanab & Haider, 2015; Shareef, Kumar, et al., 2016), extension (Trimi & Sheng, 2008) or a domain (Henning, Janowski, & Estevez, 2014) of e-government. However, Albasher & Stone (2016) have opposing views to it. While agreeing to the similarities between e-government and m-government they first take stock of the common factors between e-government and m-government. They argue that both types establish two-way communications, both face risk of privacy and security, both require some ICT skills, both face risk of cost of used devices and accessing internet. According to Albasher & Stone (2016), m-government offers the feature of mobility which is different, unique and an exclusive feature which help offering such diverse range of services which are not possible to be provided through e-government solutions. Therefore, they conclude that m-government should not be considered as subset of e-government. They propose it the other way around, claiming e-government to be a subset of m-government (Albasher & Stone, 2016). There are other researchers (Misuraca, 2009; Rossel, Finger, & Misuraca, 2006) who in

their own way have supported the idea. Rossel, Finger and Misuraca (2006) have argued that m-government is a medium of change which is going to lead modern society by expanding the boundaries of the government to the doorstep of public.

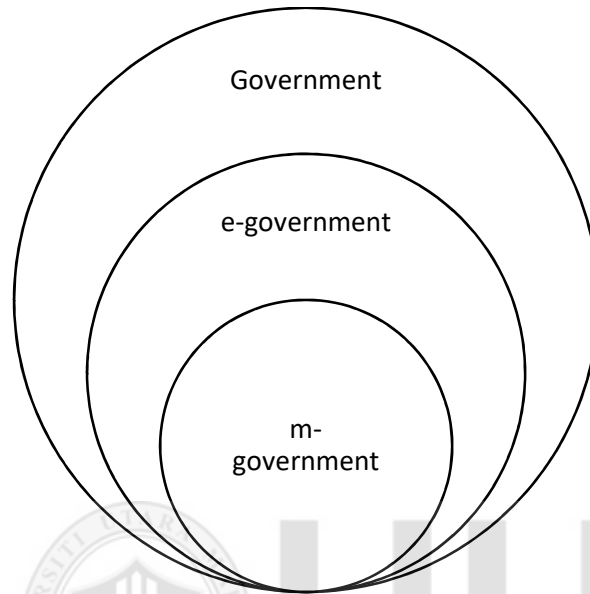


Figure-2.1-a:

Traditional view of relationship with respect to services between government, e-government and m-government

Source: (Albeshar & Stone, 2016)

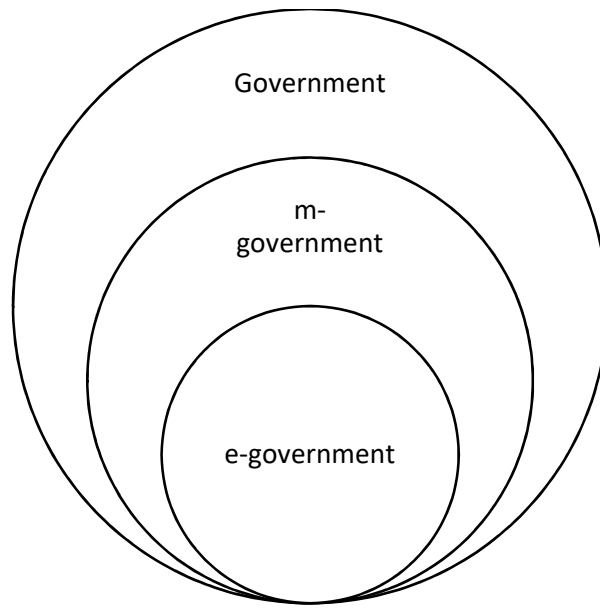


Figure-2.1-b

Alternative view of relationship with respect to time, place, utility and accessibility between government, e-government and m-government

Source: (Albeshier & Stone, 2016)

Researchers have highlighted flexibility of m-government, the possibility of addition of new features and possible usages, as features which if used, can maximize services of m-government (Rossel et al., 2006). While discussing the ways to bridging digital divide Misuraca (2009) argued upon the role of m-government. The researcher suggested that m-government should be viewed more than just another way of accessing e-government. It is a governmental initiative providing benefits to all users while building upon the societal and behavioral change which mobile technology has brought upon the society. Penetration of technology in the life of general public along with the mobility feature of m-government is adding avenues to the application of m-government. It is providing opportunities and options to both the providers and users of governmental services which were unimaginable previously (Misuraca, 2009).

Applications of technology are diverse. Technology opens possibilities and creates avenues which were unimaginable some time ago. It initiates changes which ultimately entirely change the fabric of the society. This results in new needs and new requirements resulting in creation of new solutions to solve the newly introduced problems (M. Lee et al., 2018). M-government being a technological solution is no different. It is bringing possibilities on the table which were unthinkable previously. The dynamic nature of m-government may have pushed researchers to suggest that m-government is more than e-government by arguing that e-government is subservient to m-government where later is claimed to be superset of earlier (Albeshar & Stone, 2016). However, majority of authors do not agree. Researchers after thoroughly evaluating literature regarding m-government have identified two common characteristics of definitions of m-government. First is that m-government is using mobile technologies either for providing another platform for existing e-government services or for developing new services. Second characteristic is that m-government is no different than e-government; it is either subset, complement or extension of e-government services (Palka, Jurisch, Schreiber, Wolf, & Krcmar, 2013; Zefferer & Teuf, 2011). A few of researchers have highlighted features of m-government which they claim serves purposes not covered by e-government. Georgiadis & Stiakakis (2010), while studying adaptability of e-government services to m-government services, have divided e-government services into three categories. Here the authors have identified characteristics of governmental services which according to them should be delivered only through mobile based platforms. Since these services met the needs which were not possible to be met using ordinary e-government services (Georgiadis & Stiakakis, 2010). One can infer from this that the authors are admitting that there are certain citizen needs which cannot be fulfilled using the e-government services. Citizens

cannot use e-government services while they are away from their home or office or while they want to utilize their dead spots in a day etc. These are only m-government services which meet these needs. This gives reader ideas that m-government has characteristics which are different than those of e-government services. This further contradicts Georgiadis & Stiakakis (2010) own point of view of when they claim that m-government is not different from e-government. It seems that the possibilities attached with m-government are numerous. It makes the issue confusing for those who want to evaluate m-government while trying to confine its dynamic nature into the traditional role of e-government. With the advent of 4th industrial revolution, researchers are expecting super disruptive innovation. It is expected that it will bring unexpected effects on human beings. At the societal level, it is expected to increase disparity and initiate the downfall of the middle class while further polarizing the society. This is going to require governments around the globe to not only reorganize but also to redefine their roles. The hyper connected society of the 4th industrial revolution will require dynamic open innovation business model development. This may result in merger of many existing industries and evolution of new breed of business models. It would further require special steps and may even require an entirely new strategy of actions from governmental agencies. The combinational technologies of the 4th industrial revolution would be merging industries while disrupting existing industries (M. Lee et al., 2018). And the same merger of technologies is possible for the m-government services. Mobile government is already a combination of electronic devices and mobile networks. Upcoming 4th industrial revolution is going to evolve m-government further. It is only a matter of time that researchers will start questioning the existing definition of m-governments. In-fact comparing m-government services closely to the definition and requirements of disruptive innovation, as was defined by Christensen et al. (2015), it becomes clear that m-government is a disruptive innovation on the path of offering

disruption to the way governments are running today. The authors explained that disruptive innovation takes places either in low end of the market or provide utility to new set of customers which were not taking advantage of such services previously. Furthermore, the authors claimed that disruptive innovation are adopted by upscale market, making it mainstream only after these innovations improve the quality to meet requirements of the mainstream market (Christensen, Raynor, & McDonald, 2015). M-government offers access to the individuals which had not had the opportunity to directly access governmental services within their geographical location thus providing m-government services foothold in an entire new market place which is the first requirement of being disruptive innovation. And yet m-government services might not provide complete solution to the issues which individuals face due to existing limitations in cellular technology, verification procedures and law of the land. Therefore, it would take time to mainstream m-government services which would be possible only if m-government completely provides all the solution to every kind of access issue required by the individual citizen using it. Thus, it does meet the second requirement of being disruptive innovation as well. However, one can argue that how had it not taken over yet, as disruptive innovation does normally. The answer again lies with the researchers (Christensen et al., 2015) working in the field of disruptive innovation. According to researcher's disruption is a process which takes its due course of time. Moreover, m-government is offering the business model which is very different to what incumbent procedures are offering. Understanding the potential of m-government, the opportunities it offers and the disruption which it has power to initiate; all are important factors necessary to understand the role of m-government. This also defines m-government in a way entirely different than that of most of traditional researchers of m-government services. Few researchers (Albesher & Stone, 2016) have already objected upon the current definition of m-government; presenting their own

understanding and version of m-government. Others will follow suit. The visit of literature clearly tells that m-government is a dynamically evolving field and it is going to create opportunities which are difficult to imagine right now.

2.1.4. Review of global m-government services initiatives

Progress made in information technologies have opened avenues for providing access and governmental services to the general public. Development of mobile technologies have opened further opportunities. In order to harness the dividends of mobile technologies governments are encouraging usage of mobile government services (Almarashdeh & Alsmadi, 2017). Infact, m-government services provide an opportunity for digitization of the government services. Researchers have argued that digitization of governmental services helps the government increasing its revenue by reducing the tax evasion (Uyar, Nimer, Kuzey, Shahbaz, & Schneider, 2021)

Mobile government applications have provided cost-effective methods of service delivery while improving governance. Mobile applications have been successfully used in electoral reforms. Mozambique, has used SMS messages to let citizen report irregularities in the electoral process resulting in improved voter participation in the elections. Kenya and Afghanistan both have successfully used mobile phone applications to report fraud and reduce violence during elections.(WorldBank, 2016) Pakistan has used mobile based voter verification system for more than 85 million registered voters (H. Bokhari & Khan, 2012). According to the report of World Bank (2016), governments have successfully used mobile phones as monitoring tool. Uganda has

improved teacher attendance by 11 percent with the help of mobile based monitoring system. Ghana, Tanzania, Kenya and Zambia have used mobile phone in identifying and reporting counterfeit drugs as well as stock outs. Even developed nations like United States and United Kingdom are encouraging citizens to report potholes, illegal dumping and graffiti using mobile applications. Governments have used mobile phone to curb absenteeism especially while monitoring teachers. Similarly monitoring using mobile phones have helped government curb election related violence and fraud in Afghanistan, Mozambique and Kenya. Pakistan has used mobile phones to receive feedback from citizens regarding quality of governmental services and events of corruption. Mobile phones made possible contacting more than 7 million citizens since inception of the service in year 2012; resulting in initiation of departmental inquiry against more than 6000 government officials. Mobile phones have proven useful in providing access to market information to the farmers. Farmers got 12.5 percent better prices for their commodities in Honduras where Short Message Service (SMS) was used to disseminate market information. Similarly, mobile phones helped reducing losses of perishable crops from 21-35 percent in Pakistan which resulted in improving financial condition of poor farmers. Governments across globe are working to reduce poverty, reduce information asymmetries and improve standard of living of the general public. Mobile phones have helped in achieving all these objectives. The cost of searching agricultural prices in rural areas of Niger has been slashed to half through the use of mobile. Access to mobile phones in rural areas of Peru have estimated to increase household consumption by 11 percent in the period between 2004 to 2009. This resultantly has reduced poverty by 8% and extreme poverty by 5.6% (WorldBank, 2016).

Mobile technology is used by authorities in several countries from African and South Asian regions for implementing and monitoring public health initiatives. These technologies are providing useful data which helps government in monitoring and effectively updating strategies for health reforms. These governments are also using mobile technologies for directly communicating with general public by disseminating public health information through robotic audio and text messages. Along with government, non-governmental organizations are also using mobile technologies to provide health information and guidance especially in Low and Middle-Income Countries (LMIC). Researchers are of the view that the involvement of mobile technologies is going to help governments using their public health budgets more judiciously spending the money where it is required (Bloom, Labrique, Hampshire, & Waldman, 2017). Emergency response is another area where the researchers have studied m-government interventions. In a research conducted in Samoa, researchers have identified mobile phone to be the most penetrated and best suited medium for the usage in disaster warning and response systems (Mow, Shields, Sasa, & Fitu, 2017).

Four major domains of m-government have been identified by the researchers. These are m-administration, m-communication, m-services and m-democracy. On the other hand, based upon its dealings with other organizations, researchers have also classified m-government into four types namely m-government to citizen (mG2C), m-government to business (mG2B), m-government to employee (mG2E) and m-government to government (mG2G) (Georgiadis & Stiakakis, 2010; Hussain & Imran, 2014). M-administration is the application of m-government mobile devices and networks are used for improving administration inter and intra governmental agencies. M-communication is about reaching out to the public. Usage of mobile devices provides a cheaper

and effective alternative medium of communication especially for developing countries. It also provides the opportunity to contact the citizens directly eliminating any medium in between. M-services helps processing payments and transactions between the government and citizens. M-democracy is the combination of all those activities which governments undertake to improve democratic processes including those of participation of citizens. This also helps in creating a responsible society and responsive government (Oghuma, Park, & Rho, 2012).

M-government is providing an opportunity of serving citizens at the time and location of their choice; making it convenient both for governments and the citizens (E. Abu-Shanab & Haider, 2015; Mossey & Manoharan, 2017; Saadi et al., 2017). It creates virtual bridges overcoming distances especially for those who have difficulty accessing governmental services due to their geographical limitations. While evaluating e-government solutions in Pacific Island countries researchers have argued that the usage of mobile technology provides solution for some major challenges faced by the governments. It has the potential to improve coordination amongst government department while increasing two way communications with general public (Watson, Suwamaru, Mow, & Logan, 2017). Researchers evaluating smart city platforms in Indonesia concluded that feedback and participation from the citizens through mobile based smart platforms have increase the proportion of problems resolution (Allen, Tamindael, Bickerton, & Cho, 2020).

2.1.5. Context of M-government acceptance in Islamic Republic of Pakistan

Literature indicates lack of infrastructure, high cost of mobile data, behavior of users' towards adopting m-government services and limited functionality of entry level handset as impediments

towards implementation of m-government services (Batchelor, 2009). However, the increasing penetration of mobile telephony represents an opportunity to implementing m-government services (Ogunleye & Belle, 2014). Authors have identified the vision of the government, the support it does provide and technological environment as drivers of m-government services (Ogunleye & Belle, 2014). Lacking these factors may not let successfully implement m-government services. It, therefore, is important to understand the social, political, geographical and economic environment of Pakistan, so to comprehend the factors affecting user's acceptance of m-government services.

Pakistan is a South Asian country located at a strategically important location neighboring Afghanistan in north and west, Iran in southwest, China in northeast and India in east. Arabian Sea and Gulf of Oman covers its southern borders. It has a diversified terrain having some of the tallest mountain like K-2 and Nanga Parbat while having vast plains of Punjab and Sindh, desserts like Thar and a 1000 miles long river like Indus. (PWC, 2018). According to the UN E-government survey 2018, electronic delivery mechanisms like m-government services can prove to be very effective tools of delivering governmental services in geographically diversified developing countries. These tools have been proven useful in the disaster response and risk management. Moreover, it provides access to population living at remote locations (UN, 2018b). Geographical diversity of m-government services further makes Pakistan an ideal place for developing m-government services delivery mechanisms.

Pakistan is situated in an area which remained the forebearer of human civilization. The famous Indus valley civilization which saw its peak at Harappa was in the geographical limits of the region

now included in Pakistan. Pakistan came into being on August 1947, as a Muslim state, after getting independence from British Empire of the subcontinent. Pakistan is a federal republic having parliamentary system of government. It has seen political upheavals since it came into being and have remained under martial law for long duration of time periods. (Commonwealth, 2018). Success of democratic governments are dependent upon how well these could deliver public services. M-government services are online public delivery mechanisms which can improve services delivery manifold (Batara, Nurmandi, Warsito, Pribadi, & Irani, 2017). Success of m-government services in Pakistan therefore would also help further establishing democratic governments.

Pakistan has four provinces namely Khyber Pakhtunkhawa, Punjab, Sind and Baluchistan. It has two centrally administrated areas namely Kashmir and Gilgit Baltistan and one territory namely Federally Administrative Tribal Area (FATA) (Ijaz, 2018). Pakistan is the 6th largest country in the world with a total population of 207.86 million (Buraeu, 2018). The population growth rate is 2.4% where growth in urban population is more than that in rural areas; However urban population is still only 36% of total population (WorldBank, 2017a). It is a young nation with a median age of 23.4 years (CNN, 2018). Research has proven younger generation to be avid users of m-government services (Shareef, Dwivedi, et al., 2016). The demographic diversity of Pakistan is in favor of m-government services.

With the One Belt One Road (OBOR) initiative introduced by China. Pakistan is at a cross roads of growth and development. OBOR has an estimated budget of \$5 trillion. This would be invested in 64 countries covering almost 62% of the world's population contributing 30% to the global

GDP. Pakistan is an important partner of the OBOR project. Gwadar, a port city in Pakistan, is identified as one of the few Silk Road Economic Hubs. Pakistan has inked an agreement with China to establish China Pakistan Economic Corridor (CPEC) as part of the OBOR initiative (Ijaz, 2018).

CPEC is expected to receive a total investment of \$46 Billion for constructing 3000 kms of roads joining Kashghar in China to Gwadar in Pakistan. It includes rehabilitation of 3100 kms of railways lines, laying down of 1200 kms of new lines, commissioning of 21 new plants for electricity production, establishment of 40 economic zones and industrial parks and technical and financial assistance in many other fields especially in power and communication sectors. Gwadar port will have 120 berths and trade initiated from this route is expected to add 15% to the national GDP creating more than 5 million jobs in the process affecting lives of approximately 30 million people (PWC, 2018). Pakistan is 24th largest economy of the world which is projected to take 16th position in the world by the year 2050. This improvement in GDP is expected because of increase in population having a higher percentage of younger population; This could be bane as well as boon for Pakistan. Pakistan may have to see negative consequences of the population growth, if it could not create enough number of jobs for its youth. This may result in not only political but also economic instability reversing all the projections. No government alone can provide such large number of employment opportunities without support from private sector and business organizations. Which in turn is only possible when there is conducive environment for businesses to grow. Good governance and transparency are the pre-requisite for creating favorable environments for growth of businesses (PWC, 2017). M-government services improve public services delivery, increase transparency while helping in establishing good governance practices

(UN, 2018b). A successful m-government program would help Pakistan reaching economic potential necessary to provide employment to the next generation.

With 87% population covered by cellular network, Tele density of 72.4%, 139.8 million mobile subscriptions and broad band penetration of 22.6%, Pakistan is well prepared for the 4th industrial revolution (PTA, 2018). On the GSMA Mobile Connectivity Index Pakistan has jumped from an index score of 28.4 in year 2014 to 37.1 in year. The GSMA Mobile Connectivity Index is built upon four pillars namely infrastructure, affordability, consumer readiness and content and services. It is a weighted average of the scores attained by each nation in each of the dimension. It measures the preparedness of the system of each country for mass adoption of mobile internet (GSMA, 2018). Given the readiness of digital landscape electronic commerce is gaining momentum. The size of e-commerce market is estimated to be somewhere around 100 million USD. This is expected to touch USD one billion mark by the year 2020. The success of e-businesses in Pakistan is further attracting national and international investors to this growing market. Daraz.pk has successfully raised USD 55 million from international investors, Careem has attracted an investment of USD 60 million and Zameen.com got itself an investment of USD 23 million (PTA, 2018). With Alibaba purchasing 100 percent ownership of Rocket's Daraz.pk at a price somewhere around 450 million USD and Ant financials forming strategic partnership with Telenor Microfinance Bank by investing 184.5 million USD, the digital landscape is changing rapidly. Both are first of its kind investments in South East Asia. The digital economy seems to carving a rosy picture of its future (F. Bokhari, 2018; Jajja, 2018). It seems that the socioeconomic environment is ripe for embracing digital platforms. The availability of infrastructure, the growth

of mobile internet and investment in digital platforms proves that the stage is all set for government to fully take advantage of opportunities offered by m-government applications.

Winning the GSMA Government Leadership award 2017, Government of Pakistan has already undertaken many e-government initiatives. Starting from filing of e-tax returns, the e-government services now include e-sahulat centers where bill payment, verification and cash disbursement services are available to the general public. Safe city projects across Pakistan are providing security to citizens by using Radio Frequency (RF) based identities and the use of online cameras. A chip enabled vehicle registration system is also being introduced. Electronic services are being used in issuance of arms license, payment of zakat and pension and collection of toll etc. (PTA, 2018). Researchers have reviewed the environment and the e-government initiatives along with the outcomes of these initiatives in Pakistan. They have compared e-government initiatives in Pakistan with those in China. The authors have highlighted that Pakistan can improve further by following the e-government model adopted by China. They have further highlighted the increase in internet usage in Pakistan along with the penetration of mobile networks. They highlighted areas like health, e-commerce and banking where the digital interventions from the side of government can help the economy to grow while providing opportunities to the people of Pakistan (Ullah, Pinglu, Ullah, Abbas, & Khan, 2021). Building upon the e-government platforms Pakistan is now moving towards the usage of m-government platforms. Pakistan is scaling up use of mobile applications for registering child birth. The introduction of mobile technology in the birth registration process remained successful in all the places where government launched it. The application of technology successfully improved efficiency of government delivery channels without changing any legal or administrative procedure (Telenor, 2018; UNICEF, 2016). Researchers have also

evaluated the readiness of the environment with respect to introduction of mobile learning. This is an opportunity, if utilized appropriately, it can change the educational landscape in Pakistan. Researchers have concluded the environment to be ripe to utilize m-learning environment (Asghar, Barberà, & Younas, 2021). Similarly, researchers have evaluated the usage of mobile phones and internet amongst the farmers in the KPK province of Pakistan. They concluded that the usage of mobile technologies are helping the farmers increasing their income. They suggested the governmental organization to further help farmers through building upon the positive outcomes the mobile and internet technologies are providing (N. Khan, Ray, Zhang, Osabuohien, & Ihtisham, 2022). Other researchers, also have emphasized upon utilizing the ubiquitous nature of mobile devices in Pakistan for creating awareness and education. The researchers have argued that the acceptance and effectiveness of e-governmental services can be improved manifold utilizing m-learning opportunities. The authors have suggested that providing training, knowledge, awareness and learning opportunity through mobile phones could help the citizens understand and utilize ICT based governmental services effectively (Chohan & Hu, 2022). The mobile government systems provide lot of opportunity for people of Pakistan. However, it is necessary develop complete understanding of the factors affecting upon willingness of citizen to adopt m-government services for which research is scarce (Shahzad, Xiu, Khan, & Shahbaz, 2020).

2.1.6. Factors affecting user's acceptance of m-government services

Quality of m-government services have impact upon its acceptance amongst masses. Users have the tendency of adopting m-government services if the users get satisfied with the quality of services (ElSherif, Alomari, & Alkatheeri, 2016). Researchers therefore have worked over identifying features upon which the quality of m-government service is measured by its users. Privacy, getting things done right the first time , getting things done in the expected time frame, fast navigation through applications without jams, ease of use of applications, getting updated information through the application, availability of mobile services, getting 'useful' information through the application, financial security of online transactions, a wide range of services through applications and transparency in action on the applications were identified as the parameters upon which users decide upon the services quality of mobile government (Chanana, Agrawal, & Punia, 2016). Cost is another factor which effects the adoption of m-government services. In fact cost of both technology and infrastructure is considered to be few of the major constraints in the adoption of m-government services (Watson et al., 2017). In another research conducted in America, behavior was identified as one of the most important factors affecting upon the usage of m-government mechanisms (Joseph & Lee, 2019).

Researchers (Changlin Wang & Teo, 2020) in China, to meet the challenge of measuring the success of m-government systems, have developed an m-government success model. Authors argue that information quality and online service quality are directly related with the satisfaction of citizens. They further proved that citizen satisfaction is directly related with perceived value. Wang & Teo concluded that the offline service quality moderates the relationship between online service quality and citizen satisfaction; whereas the citizen satisfaction was found to be partially

mediating the relationship between online service quality and perceived value. The authors emphasized upon citizen satisfaction amongst the most important factor determining the value of the systems. However, the authors have not addressed the issue of the behavioral factors which may affect upon the acceptance of the m-government systems in the citizens.

Researchers (ElSherif et al., 2016), while studying m-government services users' behavior in UAE, have argued that service quality and efficient transactions both have affect upon the user's acceptability of m-government services. They further have concluded that Privacy & Trust and Speed are two variables that are primarily responsible for behavior of users towards acceptance of m-government (ElSherif et al., 2016). Another study conducted in UAE concluded that ease of use, perceived security and perceived privacy were the key critical factors affecting user's acceptance of m-government services (Saadi et al., 2017).

Almuraqqab and Jasimuddin (2017), after reviewing the existing literature, proposed a model to identify factors which affect user acceptance of smart government services so to help in effective execution of smart government services. The authors emphasized upon the importance of usage of m-government services in implementation of smart government services. A total of ten variables were identified from literature which were found affecting m-government services. In addition to the two famous variables of technology acceptance model, perceived usefulness and perceived ease of use, adoption of m-government services is also affected by awareness, facilitating conditions, social influence, perceived cost, perceived trust in government, perceived trust in technology, perceived risk and perceived compatibility (Almuraqqab & Jasimuddin, 2017). However as far as the effect of social influence is concerned, Saxena (2018) has an opinion

different from the model proposed by Almuraqqab and Jasimuddin (2017). Saxena (2018) found that social influence does not have any influence upon acceptance of m-government. This is contrary to the findings of many other authors; all of whom claim that social influence has an effect upon acceptance of m-government services (E. Abu-Shanab & Haider, 2015; Ahmad & Khalid, 2017; Almarashdeh & Alsmadi, 2017; Asmi et al., 2016; José Liébana-Cabanillas et al., 2014; Liébana-Cabanillas, Sánchez-Fernández, & Muñoz-Leiva, 2014; Y. Liu et al., 2014).

Researchers have also argued upon the role which demographics play in the acceptance of m-government services. Males were identified as having more inclination towards using of m-government services then the fairer sex (Saxena, 2018). Albeit there are other researchers who think otherwise, proving that men having lower intention to use m-government (Ohme, 2014) Public sector employees were found to be having a higher tendency of using m-government services then those working for private sector. Individuals in between the age group of 31 to 50 were found having more chances of using m-government services then other age groups. Students were identified to be a group not interested in using m-government services in contrast to the self-employed individuals whom had a very high chance of using such services (Saxena, 2018). In contrast to Saxena's (2018) efforts of reviewing role of demographic values upon acceptance of m-government services, researchers have proposed demographic variables as moderators in explaining roles of other behavioral variables to the acceptance of m-government acceptance (Ahmad & Khalid, 2017). Researchers have argued that age, gender and house hold income moderates the relationship between trust, social influence and acceptance of m-government services. It was identified that trust had a greater effect upon acceptance of m-government services in the male consumers (Ahmad & Khalid, 2017). This was in line with the results of another

research conducted in China where gender moderated behavior in acceptance of m-government. Researchers found that young males, who live far from a village center or market, and have some knowledge of recent government policies, tend to have a more positive perception of mobile government, and therefore become potential adopters of the service. They also identified that the trust level in m-government decreases for people who belong to higher income group, even though the same group like to get information regarding mobile government using internet (Y. Liu et al., 2014). Similarly, in another research conducted in Spain, researchers argued that gender has moderating effect upon trust and users' attitude towards acceptance of mobile payment system. They further have elaborated that trust was found to be having a greater impact towards acceptance of mobile payment system in women then that in men (José Liébana-Cabanillas et al., 2014). This was in contradiction to the findings of other researchers who have found the impact of trust higher amongst male users in adoption of mobile based technological initiatives (Ahmad & Khalid, 2017). Researchers have not only investigated the moderating effect of gender and income while studying the acceptance of mobile based technological solutions but also have studied the effects which other demographic variables have upon acceptance of mobile based technological solutions. Researchers while studying antecedents of the adoption of new mobile payment systems in Spain, have concluded that age moderates the relationship between trust and the attitude forming acceptance of mobile payment system. (Liébana-Cabanillas et al., 2014).

Perceived usefulness (PU) and perceived ease of use (PE) are two variables, which according to the widely quoted technology acceptance model, affect individual technology acceptance behavior. PU defines user perception of the odds of gaining advantage in completing tasks by adopting new technology whereas PE refers to the degree of ease through which technology could

be used (Davis, Bagozzi, & Warshaw, 1989; Saxena, 2018; Wong, Ng, & Lo, 2018). Authors have discussed the effects of PU and PE over the acceptance of mobile based technological initiatives including that of m-government services. While studying security response system in Pakistan researchers have confirmed that PU has a positive relationship with m-government acceptance (Shahzad et al., 2018). This is in line with the findings of other researchers who have claimed that both PU and PE are vital for acceptance of m-government services as well for other electronic platforms for government services (E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). Few of these researchers ranked PE as the most important factor in acceptance of electronic based government platforms including m-government services. It was also claimed by the same group of researchers that presence of PE helps generating PU amongst users (Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). In contrast to these claims, there are few other researchers who have denied this importance of PE. Researchers, while discussing the effect of PE on perceived value of the m-government usage in China, have argued that PE doesn't have any effect upon the perceived value. They further have claimed that reduction in the complication and increase in user friendliness of IT based products have made PE no longer an important element of IT usage (Changlin Wang, 2014).

Ahmad & Khalid (2017) also contradicted relationship of both PU and PE with the adoption of m-government services in UAE. They argued that awareness is required for making users understand usefulness of m-government services. Absence of the information regarding the advantages of adopting m-government system especially at the initial stages of adoption leaves users uninformed about the benefits of the system. Moreover, the skepticism of users and their belief regarding

incapability of the government also affect users' belief of PU and its role in adoption of m-government services (Ahmad & Khalid, 2017). Ahmad & Khalid (2017) also have denied the role of PE in acceptance of m-government services contradicting the popular view presented by Davis (1989) in the TAM which was widely endorsed by other researchers (E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). Researchers concluded that the users were more concerned with the advantages of the facility irrespective of usability of application or user friendliness of the mobile interface. Moreover, they blamed the incompatibility of mobile operating system in aiding utilization of m-government services which resulted in absence of users belief of PE (Ahmad & Khalid, 2017).

Awareness was found to be another variable affecting m-government services. Researchers have argued that awareness affects intention to use m-government services. However, they have claimed that it is PU which is required for this relation to exist. They reasoned that information accessed through awareness increases the PU which ultimately effects upon acceptance of m-government services (Shahzad et al., 2018). This is in line with the claims of Ahmad & Khalid (2017) who maintained that it is only awareness through which users can understand usefulness of a system. Researchers have argued that awareness helps in making m-government services acceptable while reducing the apprehensions of users especially in the introductory phases of such services. Moreover, it helps user in understanding the services and its usage (ElSherif et al., 2016). Researchers have emphasized upon increasing public awareness of the impact which m-government services can make to the delivery of governmental service. It is suggested that awareness could be increased by creating visibility of m-government services through advocacy

campaigns and capacity building initiatives. Researchers have referred to awareness as one of the main challenges in of adoption of m-government services (Oghuma et al., 2012). Ohme (2014), though agreeing to the role of awareness in principal, have further analyzed awareness in combination of user experience. While studying m-government adoption in Germany, Ohme (2014) has argued that users who don't have familiarity with the m-government services are more willing to adopt it then those who already have knowledge about it. A greater aptitude and familiarity of technologies does not essentially boost acceptance of m-government. The author argued that the behavior towards adoption gets marred by negative experiences of using such technological solutions. The researcher have therefore advised governments to improve user delivery and its experience (Ohme, 2014).

Researchers have claimed that perceived risk plays a leading role in shaping behavior regarding adoption of m-government services. Perceived risk indicates an individual's behavior regarding fear of incurring loss while selecting a course of action. Presence of PR decreases the chances of m-government adoption(Saxena, 2018). It is line with the finding of other researchers, who while discussing electronic government user's privacy concerns, have deliberated upon the risks of leakage of personal information shared using web services. They concluded that information related perceived risk is increased by privacy concerns and perceived risks negatively affects acceptance of e-government services (D. Liu & Carter, 2018). It is argued that the perception of risk highly affects citizen's behavior. Lack of experience of the technology may make the user feeling in an insecure and a riskier state of mind. Researchers have emphasized upon taking measures to reduce risk especially in the initial phase of m-government services. These risk reduction strategies should be directed towards the data security concerns of end users which shall

include but are not limited to identity theft, hacking, unauthorized data access, data manipulation and non-solicited usage of mobile services using patterns of end users (Almuraqab & Jasimuddin, 2017). This was in line with findings of researchers in Spain where while evaluating antecedents of adoption of mobile payment system they found that perceived risk had negative relationship with intentions to use (Liébana-Cabanillas et al., 2014).

Ohme (2014) proposed to embrace risk reduction strategy to increase adoption of m-government services. A point which was agreed by other researchers (José Liébana-Cabanillas et al., 2014) while working in Spain on role of gender upon acceptance of mobile payment services. They argued that the success of the m-payment services would be dependent upon reduction of perceived risk (José Liébana-Cabanillas et al., 2014). Ohme (2014) maintained that users make informed decision while comparing alternatives in accessing services. M-government services are adopted only after user consider risks vis-à-vis the benefits of availing such services. Privacy and security concerns are factors for which individuals evaluate their risk while using m-government services since by using these services individuals give access to their personal mobile devices. Ohme (2014) differs to the opinion of researchers (Almuraqab & Jasimuddin, 2017; D. Liu & Carter, 2018; Saxena, 2018) who used variable of perceived risk as the only measure of risk. Ohme (2014) argued that in order to understand the impact of risk perception of individuals, over their decision to adapt m-government services, a comprehensive evaluation of their perceived risks is required. He therefore proposed that in order to understand risk perception of users of m-government services perceived risk should be divided further in performance risk, security risk, time risk, social risk and privacy risk. The author concluded that perceived time risk and perceived security risks

are the only two risk factors, out of six dimensions of perceived risk, which affect behavior necessary to accept m-government services (Ohme, 2014).

Cost is another factor influencing adoption behavior of services using mobile platforms. Realizing its importance many researchers have suggested to consider cost while offering m-government services. Provision of technology is providing governmental services help providing essential services at reduced cost (UN, 2018b). Though, technology may prove cost effective for the government reducing cost of providing governmental services. Yet, it has this disadvantage of increasing access cost especially for the people belonging to the poor communities. It is the cost of acquiring the platform, that is of mobile phone procurement, which pushes up the cost of access for the citizens (UN, 2018b). Almuraqab and Jasimuddin (2017) argued that in an era of smart services, mobile internet is essential to avail these services. Government services, when accessed through smart devices, need internet connectivity. In line with the cost issue raised by UN (2018), the authors agreed to the fact that the cost of mobile devices and that of accessing the m-government services should be low. The researchers have proposed to consider the cost effect of internet connectivity upon acceptance of m-government services. They argued that perceived cost decreases the acceptance of m-government services (Almuraqab & Jasimuddin, 2017). In contrast to what Almuraqab & Jasimuddin (2017) proposed, Ahmad & Khalid (2017) started on an assumption that cost positively affects citizens adoption of m-government. The authors argued that UAE, being the region under investigation, is amongst the fastest growing nations in Arab world. They further elaborated that both the cost of mobile devices and internet access should not affect the adoption of m-government services in UAE, given the higher buying power of general population, luxurious life style and affinity to high end products. Finally, the authors concluded

that the cost does not have any effect upon the acceptance of m-government services in UAE rejecting their initial assumption (Ahmad & Khalid, 2017). This conclusion is complete negation to what other authors (Almuraqab & Jasimuddin, 2017; UN, 2018b) have been proposing but could be true due to the unique demographical characteristics of UAE. This is also in contrast to what Almaradesh & Alsmadi (2017) proposed. They in line with many other researchers (Almuraqab & Jasimuddin, 2017)(UN,2018) have argued about cost having negative relationship with the adoption of m-government services. They explained that service cost influences user's behavior of accessing the governmental service. Authors claimed, that promotion of the value which user would receive against the cost which user would borne, should be advertised comprehensively. This according to researchers would help user accept the price of m-government services by comparing costs and benefits of traditional office-based services with m-government services. They further explained that cost of services should be reflective of the value of the services. The authors have highlighted a very interesting relation between cost and intentions of using m-government services. The cheaper the m-government services, the more the users are excited about it (Almarashdeh & Alsmadi, 2017). Researchers also have highlighted that mobile technologies have been proven more beneficial in spurring growth in developing countries than developed countries. Explaining this phenomenon, the authors claimed that mobile based services help in reducing transaction cost by increasing efficiency and productivity. Moreover, the authors highlighted infrastructural cost issues related to the offering of m-government services. Researchers then suggested a unique solution of using public private partnerships to overcome investment related cost. The writers further claimed that the adoption of PPP in offering m-government services would reduce overall cost for the users of the services thus making it more attractive for adoption. The researchers also suggested to use an exclusive mobile service delivery

gateway (MSDG). This according to the authors would not only help mainstreaming the m-government services but also would assist in reducing the overall cost of m-government operation through sharing resources. Authors emphasized that such a platform could also help governments in designing, testing, deploying and managing m-government services in the areas where these could not be thought about earlier (Oghuma et al., 2012).

Confidentiality, integrity, and availability of m-government applications were also identified as the factors having affect upon successful implementation of m-government services (Al Shamsi, Bamatraf, Rahwan, Aung, & Svetinovic, 2017).

Existing literature was extensively reviewed to understand the factors which effect upon acceptance of m-government services. Only papers related to acceptance of e-government, m-government and m-banking services were selected. Table-2-1 summarizes the key findings, context and objectives of the literature reviewed for understanding the adoption behavior of m-government services.

Table-2-1

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Elbatany, Dafoulas, & Saleeb, 2023)	Exploring Factors Affecting Mobile Government Services Adoption in the Egyptian Context.	To identify factors in the adoption of mobile government services, recognizing the main mobile government acceptance factors.	Egypt	Qualitative Research methods were employed where the inductive approach was followed, by conducting semi-structured interviews of 13 individuals including technology experts and customers with technological experience.	TRA, TPB, TAM, TRI, UTAUT	The factors affecting m-government adoption in the Egyptian context were identified as follows: facilitating conditions, opportunities and challenges, technology and information systems, and perceived usefulness. Similarly, trust, cost, privacy, and age were identified as obstacles in the adoption of m-government services.
(Zheng & Ma, 2022)	How Citizen Demand Affects the Process of M-Government Adoption: An Empirical Study in China	to examine the antecedents of citizen adoption of an m-government application	China	Conceptual study with the proposed framework empirically tested by collecting online sample of 1009 users of a traffic mobile application.	TAM, TPB, UTAUT	The results explained that citizens' commuting demands significantly affected their awareness of the APP, but did not impact their current and planned future uses, which were primarily affected by the citizens' perceptions and habits.

Table-2-1 (Continued)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Mensah, Dadson, Mwakapasa, & Ukolov, 2024)	The determinants of Mobile government services adoption: The moderating effect of perceived government support (PGS)	To investigate the role that the government support can play on m-government services acceptance. The study examines the moderating influence of perceived government support (PGS) on m-government services usage	China	Conceptual study with the proposed framework empirically tested by collecting online convenient sample of 414 University community members including teachers, students and non-teaching staff. SEM was used employing both SPSS and PLS 3.0 to analyze data.	UTAUT	Contrary to the finding of previous studies it was identified that PE did not impact the acceptance behavior of m-government services. FC, security and privacy, trust in m-government and quality of information had a direct positive influence on m-government services adoption. PGS was identified having significant moderating influence on PE, FC, and trust towards the adoption of mobile government services. However, perceived government support had no significant moderating effect on security and privacy and information quality on the adoption of m-government services.

Table-2-1 (Continued)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Saxena, 2018)	Role of “perceived risks” in adopting mobile government (m-government) services in India	To identify factors influencing adoption of m-government	India	Conceptual study with the proposed framework quantitatively tested by using survey results from 331 citizens. Multiple regression was used to analyze data	TRA, TPB, TAM, DOI, UTAUT	PR, SE and ATT all effect upon the acceptance of m-government services whereas SI was found as having no significant influence. The adaptability of m-government is dependent upon how useful users found these services. M-government services are required to be user friendly so to make these popular amongst masses. Demographic factors were also found affecting m-government adoption.
(Shahza d et al., 2018)	m-Government Security Response System: Predicting Citizens’ Adoption Behavior	To develop a model determining citizen adoption behavior of m-government security response services (SRS) in developing countries	China/ Pakistan	Conceptual study with the proposed framework empirically tested using survey results from 505 citizens. SEM was used to analyze data	Uncertainty reduction theory (URT), e-government adoption model (GAM)	Awareness, perceived compatibility, availability of resources, accuracy, completeness, convenience, personalization, perceived response time, PU, Transparency and Trust are positively associated with intentions to use m-government SRS. PU mediates relationship between awareness and intentions to use m-government. Transparency mediates relationship between Information quality characteristics (accuracy & completeness) and intentions to use m-government. Trust mediates relationship between channel characteristics (convenience & personalization) and intentions to use m-government.

Table-2-1 (Continued)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Ahmad & Khalid, 2017)	The adoption of M-government services from the user's perspectives: Empirical evidence from the United Arab Emirates	To examine the factors that affect the user's adoption of m-government services	UAE	Conceptual study with the proposed framework quantitatively tested through conducting survey of 338 students. SEM was used to analyze data.	TAM	Proves that Trust and social influence affects the decision to adopt m-government whereas gender, age and household income moderate this relationship.
(Almaras hdeh & Alsmadi, 2017)	How to make them use it? Citizens acceptance of M-government.	To measure the user's acceptance of mobile governments by investigating the important factors that play a main role in the citizen's perspective	Saudi Arabia	Conceptual study with the proposed framework quantitatively tested through conducting survey of 468 citizens. SEM was used to analyze data.	UTAUT / TAM/ TPB/ TRA	Argues that the variables perceived usefulness, social influence, cost of service, perceived ease of use and perceived trust has significant direct effect on the citizens behavioral intention to use mobile government and indirect effect on the actual use behavior.

Table-2-1 (Continue)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Shareef, Dwivedi, et al., 2016)	Citizens' Adoption Behavior of Mobile Government (mGov): A Cross-Cultural Study	To understand cross cultural differences in adoption of mobile government services	Canada, Bangladesh & Germany	Conceptual study with the proposed framework quantitatively tested. Data was collected in 3 countries simultaneously using the same questionnaire. Complete questionnaires were collected from 243 citizens in Bangladesh, 162 users in Canada and 172 users in Germany. SEM was used to analyze data.	Technology organization environment framework, TPB, social identity theory, DOI,	Perceived ease of use, perceived usefulness, perceived reliability and perceived security affects citizens adoption of m-government. Moreover, perceived ease of use affects perceived usefulness whereas perceived security has an influence upon perceived reliability. Differences were identified between adoption behavior of the sample countries. Unlike Canadian and German users; perceived empathy not only positively affected the adoption of m-government services but also supports its perception of reliability for users in Bangladesh. However, unlike citizens of Bangladesh perceived compatibility increased the perceived usefulness for users of Canada and Germany. Difference in magnitude of beliefs were identified for both German and Canadian users. Though these were otherwise showing similar results.

Table-2-1 (Continued)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(ElSherif et al., 2016)	Mobile Government Services Satisfaction and Usage Analysis: UAE Government Smart Services Case Study	To analyze and examine user satisfaction and intentions of repeat use of m-government services. In order to identify ways through which mobile government services can be improved.	UAE	Case Study with the proposed framework quantitatively tested. Results from 128 participants were collated and analyzed using descriptive statistical analysis, ANOVA analysis, reliability analysis, correlation analysis and regression analysis.	Servqual/ National Satisfaction index/	Privacy & trust and speed form the user's behavior towards adoption of m-government services. Availability & accessibility and reliability & accuracy both help forming attitude towards service quality. Satisfaction from having perception of quality of services and effective transaction increases the usage of m-government services. Usage also increases satisfaction and increases the chances to use the service again.
(Asmi et al., 2016)	E-government Adoption in Developing Countries: Need of Customer-centric Approach: A Case of Pakistan	To study effect of social behavior and trust upon tax payers in existing e-services provided by federal board of revenue.	Pakistan	Case Study with the proposed framework quantitatively tested. Questionnaire s from 153 users were analyzed using SEM.	TAM	The study identified both Trust and Social Influence as exogenous variables for the prediction of perceived ease of use; whereas perceived usefulness and intentions to use were identified as endogenous variable for predicting e-government adoption.
(Alrowili et al., 2015)	Predicting citizens' acceptance of M-government services in Saudi Arabia an empirical investigation	To understand, identify obstacles, determine causes and recognize influences upon society's acceptance of m-government services.	Saudi Arabia	Conceptual study with the proposed framework quantitatively tested through conducting survey of 451 students. SEM was used to analyze data	TAM	In addition to the variables of TAM; Trust, experience and time have effect upon the user's acceptance of m-government.

Table-2-1 (Continued)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(E. Abu-Shanab & Haider, 2015)	Major factors influencing the adoption of m-government in Jordan	To identify key factors and perception of Jordanians regarding those which affect upon citizens adoption of SMS based m-government services.	Jordan	Conceptual study with the proposed framework quantitatively tested through conducting survey of 470 citizens. Correlation and multiple regression were used to analyze data.	TAM/ TRA	Perceived ease of use, perceived usefulness, social influence, perceived compatibility and perceived responsiveness are all predictive of behavioral intentions to use m-government. On the other hand, perceived cost could not predict the behavioral intentions to use m-government.
(H. Zhang, Xu, & Xiao, 2014)	Diffusion of e-government: A literature review and directions for future directions	To have a meta-analytic review of diffusion of e-government literature.	Meta-Analysis	Literature was searched from leading journals and conferences of both Information Systems and public administration. Key word search was also made from leading repositories and databases. Reports and Working papers were also included in the literature review. Articles were classified in two groups namely empirical and non-empirical	N/A	Diffusion research was identified revolving around following four broad areas 1. factors influencing the diffusion of e-government 2. e-government diffusion systems and applications, 3. the influence of e-government diffusion on government agencies and employees, and 4. the relationships between ICT infrastructures and the diffusion of e-government Two broad areas were identified which need further research 1. Dynamics of e-government diffusion 2. Diffusion mechanisms of e-government diffusion.

Table-2-1 (Continue)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Changlin Wang, 2014)	Antecedents and consequences of perceived value in Mobile Government continuance use: An empirical research in China	To understand usage of m-government services		Developed a conceptual framework through literature review. Quantitatively tested framework sending questionnaires to 528 willing to participate companies. 353 questionnaires were received out of which 327 were analyzed using partial least square.	TAM	PU, mobility and perceived security have positive relationship with PV; where mobility has the strongest relationship. On the other hand, PE has shown an insignificant relationship. Perceived value in m-government continuance uses increases Trust and satisfaction. PV has shown direct positive relationship with all three dimensions of Trust i.e. trust in technology, trust in agent and trust in government
(Shaukat & Shah, 2014)	Farmers Inclination to Adoption of Mobile Phone Agriculture Information and Trade Systems in Pakistan	To identify and assess farmer's readiness and barriers in implementing a mobile information and trade system	Pakistan	Developed a conceptual framework through literature review. Qualitative research where researcher conducted interviewing farmers from four cities of Pakistan.	TAM/ Technology readiness Index (TRI)/ Decision Support System (DSS).	With a high level of optimism and innovativeness; the farmers are willing to adopt mobile phone-based information and trade system. However, this requires removal of uncertainty and present faulty system.

Table-2-1 (Continue)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Ohme, 2014)	The acceptance of mobile government from a citizens' perspective: Identifying perceived risks and perceived benefits	To recognize the deterrents in adoption of m-government while identifying factors which help increasing its adoption.	Germany	Conceptual study with the proposed framework quantitatively tested through conducting survey of 325 users of the e-government services.	TAM/ TPB	While testing the questionnaire the participants could not understand the difference between the construct of both SR and SN. Hence both were removed from the questionnaire and the framework. PU and PE affect the attitude towards m-government which in turn influences intentions to use m-government. On the other hand, against the expectations, PBC got identified as a negative predictor of the behavior intention to use m-government. Only two of the risks namely perceived time risk and perceived security risk were found having affect upon m-government acceptance. Most interestingly it was found that PU has more effect upon the acceptance of m-government services then the effects of risk. This has proved that users are willing to take risks to adapt m-government provided the benefits are worth it. It was also identified that the attitude towards e-government indicates towards attitude towards m-government yet it does not predict that the user may use an m-government application. Awareness was also seen as a factor affecting attitude towards m-government though it does not have a significant affect upon intentions to use it.

Table-2-1 (Continue)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Y. Liu et al., 2014)	An empirical investigation of mobile government adoption in rural China: A case study in Zhejiang province	To investigate the perceptions of rural populations that affect the adoption of mobile government services in the sparsely populated rural areas of developing economies.	China	Conceptual study with the proposed framework quantitatively tested through conducting survey of 409 rural families. Structural model analysis was used to analyze data.	TAM	The results indicate that young males, who live far from a village center or market, and have some knowledge of recent government policies, tend to have a more positive perception of mobile government, and therefore become potential adopters of the service. Perceived ease of use, near-term usefulness, long-term usefulness, integrity, benevolence, image and social influence have significant and positive influences on the intention to use mobile government.
(Liébana - Cabanillas et al., 2014)	Antecedents of the adoption of the new mobile payment systems: The moderating effect of age	To examine the effect of age upon customers' acceptance of mobile payment system.	Spain	Conceptual study with the proposed framework quantitatively tested through conducting online survey of 2012 web users of Facebook.	TAM/ TRA/ Unified Theory of acceptance and use of technology (UTAUT)	BI was largely affected by EI which in turn was dependent upon SI and SN. PU was identified having second largest influence upon BI. Thirdly risk was confirmed to be having negative relationship with BI. ATT was also confirmed having affect upon BI of young users. The research confirmed that age has an effect over user's behavior upon acceptance of mobile payment services.

Table-2-1 (Continue)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(José Liébana-Cabanillas et al., 2014)	Role of gender on acceptance of mobile payment	To develop and confirm a model explaining acceptance of mobile payment system while analyzing role of gender as a moderator.	Spain	Conceptual study with the proposed framework quantitatively tested through conducting online survey of 2012 web users of Facebook.	TAM/ TRA/ UTAUT	EI was found to be having the determining predictor of BI; where EI was based upon SI and SN. PU of men; was found to be at second position while predicting BI. ATT was observed to have a substantial relationship with BI in women but was insubstantial in men. And Risk was analyzed to having a negative relationship with BI. It was further confirmed that PE has higher effect upon PU among men then in women. Furthermore, Trust was found having greater impact on ATT of women than in men.
(Althunibat, Alrawashdeh, & Muhairat, 2014)	The acceptance of using m-government services in Jordan	To identify factors motivating citizens in using m-government services	Jordan	A total of 300 questionnaires were distributed amongst citizens out of which 275 were found good to be used for analysis.	TAM	PU and PE both have significant influence upon behavioral intentions to accept m-government services.
(Hung, Chang, & Kuo, 2013)	User acceptance of mobile e-government services: An empirical study	To recognize factors determining user acceptance of m-government services.	Taiwan	A valid web based survey sample of 331 m-government services users was used to collect data. Analysis was done using structural equation modeling.	TPB	PU, PE, Trust and Interactivity were found to have significant relationship towards ATT. EI and interpersonal influence were identified to be the determinant of SN. Self efficacy and facilitating conditions were found to be effecting PBC. ATT, SN and PBC determine the user's intention to accept m-government.

Table-2-1 (Continue)

Key studies in m-government, e-government and m-banking acceptance behavior

Author, Year	Title of the Article	Problem & Objective	Context, Sample	Methodology	Theory	Key findings/ Results
(Oghum a et al., 2012)	Adoption of mGovernment service initiative in developing countries: A citizen-centric public service delivery perspective	To highlight the significance of m-government by Deliberating upon the possibilities which it can offer. And also, to help developing countries recognise the opportunities which m-government can potentially bring in.	Meta-Analysis/ Case Study	Literature review of papers published on the topic as well as review of white papers and case studies on performance of m-government.	DOI/grounded theory	PPP model was identified as a key technique to implement m-government. It was found it that using its unique mobility feature, m-government can be used in those field which presently are not covered by present e-government initiative. Moreover, in order to make m-government successful, governments should develop three separate strategies for infrastructure development, user adoption and organisational change. Trust, public awareness, access cost, infrastructural constraints and lack of an enabling legal framework were identified as major challenges in adoption of m-government.

2.1.7. Enlisting key behavioral factors affecting users' acceptance of m-government services

Universal popularity of mobile based services has ignited interest amongst researchers to identify factors which assist users in accepting mobile based services. Several authors have worked upon factors which affect user's acceptance of mobile based services. Table 2-2a summarizes the most frequent related factors proposed by researchers for having impact on user acceptance of mobile based services that seem to be more relevant to m-government and in the context of this study. These factors are taken from studies on acceptance of m-government, e-government and m-banking services only.

Table-2-2a

Factors affecting acceptance of m-government, e-government and m-banking services

Factor Name	Reference
Perceived Usefulness	(E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Althunibat et al., 2014; Asmi et al., 2016; Hung et al., 2013; Husin et al., 2017; Liébana-Cabanillas et al., 2014; Ohme, 2014; Shahzad et al., 2018; Shareef, Dwivedi, et al., 2016; Changlin Wang, 2014)

Table-2-2a (Continue)

Factors affecting acceptance of m-government, e-government and m-banking services

Factor Name	Reference
Perceived Ease of Use	(E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Althunibat et al., 2014; Asmi et al., 2016; Hung et al., 2013; Husin et al., 2017; Liébana-Cabanillas et al., 2014; Y. Liu et al., 2014; Ohme, 2014; Saadi et al., 2017; Shareef, Dwivedi, et al., 2016; Shaukat & Shah, 2014; Changlin Wang, 2014)
Privacy	(ElSherif et al., 2016; D. Liu & Carter, 2018; Ohme, 2014; Saadi et al., 2017)
Perceived Security	(Ohme, 2014; Saadi et al., 2017; Shareef, Dwivedi, et al., 2016; Changlin Wang, 2014)
Trust	(Ahmad & Khalid, 2017; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Asmi et al., 2016; ElSherif et al., 2016; Hung et al., 2013; Husin et al., 2017; José Liébana-Cabanillas et al., 2014; Liébana-Cabanillas et al., 2014; D. Liu & Carter, 2018; Shahzad et al., 2018; Shaukat & Shah, 2014; Changlin Wang, 2014)

Table-2-2a (Continue)

Factors affecting acceptance of m-government, e-government and m-banking services

Factor Name	Reference
Social Influence	(E. Abu-Shanab & Haider, 2015; Ahmad & Khalid, 2017; Almarashdeh & Alsmadi, 2017; Asmi et al., 2016; José Liébana-Cabanillas et al., 2014; Liébana-Cabanillas et al., 2014; Y. Liu et al., 2014; Saxena, 2018)
Awareness	(Ahmad & Khalid, 2017; Almuraqab & Jasimuddin, 2017; ElSherif et al., 2016; D. Liu & Carter, 2018; Ohme, 2014; Shahzad et al., 2018)
Perceived Image	(Husin et al., 2017; Y. Liu et al., 2014)
Facilitating conditions	(Almuraqab & Jasimuddin, 2017; Hung et al., 2013)
Perceived Cost	(E. Abu-Shanab & Haider, 2015; Ahmad & Khalid, 2017; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Oghuma et al., 2012; Watson et al., 2017) (UN, 2018)
Perceived Risk	(Almuraqab & Jasimuddin, 2017; José Liébana-Cabanillas et al., 2014; Liébana-Cabanillas et al., 2014; D. Liu & Carter, 2018; Ohme, 2014; Saxena, 2018)
Perceived compatibility	(E. Abu-Shanab & Haider, 2015; Almuraqab & Jasimuddin, 2017; Saadi et al., 2017; Shahzad et al., 2018; Shareef, Dwivedi, et al., 2016)
Perceived Response Time	(Shahzad et al., 2018)

Table-2-2a (Continue)

Factors affecting acceptance of m-government, e-government and m-banking services

Factor Name	Reference
Perceived Time benefit	(Alrowili et al., 2015)
Experience	(Alrowili et al., 2015)
Perceived value	(Changlin Wang, 2014)
Satisfaction	(Changlin Wang, 2014)
Timeliness	(Shaukat & Shah, 2014)
Perceived Time risk	(Ohme, 2014)
Long term usefulness	(Y. Liu et al., 2014)
Short term usefulness	(Y. Liu et al., 2014)
Availability of resources	(Shahzad et al., 2018)
Accuracy	(Shahzad et al., 2018)
Completeness	(Shahzad et al., 2018)
Transparency	(Shahzad et al., 2018)
Convenience	(Shahzad et al., 2018)
Personalization	(Shahzad et al., 2018)
Self-efficacy	(Saxena, 2018)
Familiarity	(D. Liu & Carter, 2018)
Relative Advantage	(Saadi et al., 2017)
Trialability	(Saadi et al., 2017)
Observability	(Saadi et al., 2017)
Demographics	(Ahmad & Khalid, 2017)

Table-2-2a (Continue)

Factors affecting acceptance of m-government, e-government and m-banking services

Factor Name	Reference
Factor Name	Reference
Variety of services	(Ahmad & Khalid, 2017)
Perceived reliability	(Shareef, Dwivedi, et al., 2016)
Perceived Empathy	(Shareef, Dwivedi, et al., 2016)
Subjective Norms	(Hung et al., 2013; José Liébana-Cabanillas et al., 2014; Liébana-Cabanillas et al., 2014; Ohme, 2014)
Perceived Behavioral Control	(Hung et al., 2013; Ohme, 2014)

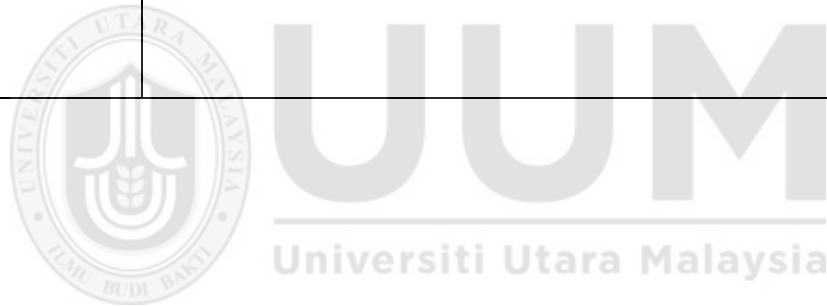


Table-2-2b

Factors affecting acceptance of m-government, e-government and m-banking (Factor wise presentation)

Author, Year	Perceived usefulness	Perceived ease of use	Privacy	Perceived security	Trust	Social Influence	Awareness	Perceived Image	Facilitating Conditions	Perceived cost	Perceived Risk	Perceived Compatibility	Perceived response Time	Perceived time benefit	Experience	Perceived value	Satisfaction	Timeliness	Perceived time risk	Long term usefulness	Short Term Usefulness	Availability of resources	Accuracy	Completeness	Transparency	Convenience	Personalization	Self-efficacy	Familiarity	Relative advantage	Triability	Observability	Demographics	Variety of services	Perceived reliability	Perceived Empathy	Subjective Norms	Perceived Behavioral Control	
(Saxena, 2018)						✓					✓																	✓											
(Shahzad et al., 2018)	✓				✓		✓					✓	✓									✓	✓	✓	✓	✓	✓												
(D. Liu & Carter, 2018)			✓		✓		✓				✓																		✓										
(Saadi et al., 2017)		✓	✓	✓								✓																		✓	✓	✓							
(Husin et al., 2017)	✓	✓			✓			✓																															
(Almuraqab & Jasimuddin, 2017)	✓	✓			✓		✓		✓	✓	✓	✓																											
(Ahmad & Khalid, 2017)					✓	✓	✓			✓																								✓	✓				
(Almarashdeh & Alsmadi, 2017)	✓	✓			✓	✓				✓																													

Table-2-2b (Continue)

Factors affecting acceptance of m-government, e-government and m-banking (Factor wise presentation)

Author, Year	Perceived usefulness	Perceived ease of use	Privacy	Perceived security	Trust	Social Influence	Awareness	Perceived Image	Facilitating Conditions	Perceived cost	Perceived Risk	Perceived Compatibility	Perceived response Time	Perceived time benefit	Experience	Perceived value	Satisfaction	Timeliness	Perceived time risk	Long term usefulness	Short Term Usefulness	Availability of resources	Accuracy	Completeness	Transparency	Convenience	Personalization	Self-efficacy	Familiarity	Relative advantage	Triability	Observability	Demographics	Variety of services	Perceived reliability	Perceived Empathy	Subjective Norms	Perceived Behavioral Control
(Shareef, Dwivedi, Laumer, & Archer, 2016)	✓	✓		✓								✓																							✓	✓		
(ElSherif et al., 2016)			✓		✓		✓																															
(Asmi, Zhou, & Lu, 2016)	✓	✓			✓	✓																																
(Alrowili, Alotaibi, & Alharbi, 2015)	✓	✓			✓									✓	✓																							
(E. Abu-Shanab & Haider, 2015)	✓	✓				✓				✓		✓																										
(Zhang, Xu, & Xiao, 2014)																																						
(Changlin Wang, 2014)	✓	✓		✓	✓												✓	✓																				
(Shaukat & Shah, 2014)		✓			✓														✓																			

Table-2-2b (Continue)

Factors affecting acceptance of m-government, e-government and m-banking (Factor wise presentation)

Author, Year	Perceived usefulness	Perceived ease of use	Privacy	Perceived security	Trust	Social Influence	Awareness	Perceived Image	Facilitating Conditions	Perceived cost	Perceived Risk	Perceived Compatibility	Perceived response Time	Perceived time benefit	Experience	Perceived value	Satisfaction	Timeliness	Perceived time risk	Long term usefulness	Short Term Usefulness	Availability of resources	Accuracy	Completeness	Transparency	Convenience	Personalization	Self-efficacy	Familiarity	Relative advantage	Triability	Observability
(Ohme, 2014)	✓	✓	✓	✓			✓				✓								✓													
(Y. Liu et al., 2014)		✓				✓		✓												✓	✓											
(Liébana-Cabanillas, 2015)	✓	✓			✓	✓					✓																					
(José Liébana-Cabanillas, 2015)					✓	✓					✓																					
(Althunibat, Alkhatib, & Alkhatib, 2015)	✓	✓																														
(Hung, Chang, & Chen, 2015)	✓	✓			✓				✓																							
Oghuma et al., 2015			✓	✓	✓		✓			✓																						

A review of the table 2-2a identifies that Trust, PE and PU are three factors which were investigated the most for their impact upon acceptance behavior of mobile based services. These factors were found to be quite effective in shaping behavior of users towards acceptance of mobile based services initiatives.

Additionally, Privacy, perceived risk and perceived security also remained quite popular in research circles. The privacy and security of data is the perceived risk about which the users worry the most (Almuraqab & Jasimuddin, 2017). Users get insecure about an application where the privacy of the data is not confirmed (Balapour, Nikkhah, & Sabherwal, 2020). It has already been proven by the researchers that, in an intangible environment, privacy and security concerns increase perceived risk for the online customers (Elbatanouny et al., 2023; Nepomuceno, Laroche, & Richard, 2014). These three variables are related to each other and it feels unnecessary to investigate the effect of these variables separately. Therefore, investigating regarding perceived risk of the users should serve the purpose of seeking desired effect upon the m-government services. However, many authors have already investigated the effects which perceived risk have upon acceptance of m-government services.

Both Social influence and subjective norms have also been investigated for their affect upon acceptance of mobile based initiatives. In-fact, social influence is being measured by the variable of subjective norms in both theory of reasoned action and theory of planned behavior. Authors (E. Abu-Shanab & Haider, 2015; Youngseek Kim & Crowston, 2011; Richard, Ahmed, & Heikki, 2017) have taken these variable similar, it is therefore safe to deduce that subjective norms

represent social influence. Measuring the effect of only social norms would provide the same results as measuring effects of both these variables. (Abu-shahab 2015 also has integrated both SI and SN)

Awareness is another variable which received attention of the researchers. It is not possible to start the usage of m-government service till the users not are being made aware of the service (Zheng & Ma, 2022). Thus, an appropriate awareness campaign might be necessary to initiate the usage of the product. The level of the knowledge may increase the comfortability of the user and therefore might affect the users' acceptance of the m-government services.

Cost is another factor which researchers have investigated for its affect upon user's acceptance of mobile based services. Researchers have found contradicting result of the effect of cost upon user's acceptance of m-government services. Number of researchers found that cost has a negative relationship with adoption of m-governments services researchers (Almuraqab & Jasimuddin, 2017; UN, 2018b) whereas others have identified that there is no relationship between cost and users acceptance of m-government services (E. Abu-Shanab & Haider, 2015; Ahmad & Khalid, 2017). Venkatesh, Thong & Xu (2012) have integrated price value in the UTAUT model to address the cost issue in use of technology especially with respect to the consumers. Since these are the consumers who must bear price of device as well as of connectivity while using technology-based services. Authors argued that price value has a direct relationship with behavioral intentions to use technology when the value driven from the product is more than the cost incurred upon technology usage (Venkatesh et al., 2012). Interestingly, perceived usefulness is the degree of belief that the technology usage would add value to user's productivity (Venkatesh, 2000). Telecom services are known to reduce costs. These are the benefits over costs which makes public adopt m-government

services (Oghuma et al., 2012; UN, 2018b). Value is explained as the benefits relative to costs (Porter & Kramer, 2019). Researchers while studying behavior about college students have concluded that cost was prominent aspect of their experience at the college (Wu & Corpus, 2023). Since perceived usefulness is about the value and experience which individual believe that the individual would receive by using technology. Therefore, it can be deduced that while perceiving about the usefulness of a technological system a user take stock of all benefits and cost related to the adaption and usage of system. From this, one can conclude that the effect of price value or perceived cost is counted by the user as part of the perceived benefits from adapting the system. Hence it is assumed that the construct of perceived usefulness covers the effect of perceived cost. Identifying effect of perceived cost might not be necessary where effect of perceived usefulness is already investigated.

Perceived compatibility is one more factor which researchers have checked for its effect upon adoption of mobile based services. According to Rogers (1995), perceived compatibility is the degree to which a novel technological solution matches to the practices, standards and the requirements of the prospective user. Compatibility states about the perception of the consumer regarding compatibility of the offered service with the consumers existing routine and desires. It explains the degree to which mobile based service matches with the way end users want to consume the service (Almuraqab & Jasimuddin, 2017). Researchers have argued that perceived compatibility has a positive relationship with adoption of m-government services (Abu-Shanab & Haider, 2015; Almuraqab & Jasimuddin, 2017; Shahzad et al., 2018). Yet there are researchers who have found no significant impact of perceived compatibility upon acceptance of m-government services (Shareef, Dwivedi, et al., 2016). While conducting a cross cultural study of

adoption behavior of citizens in Bangladesh, Germany and Canada, Shareef et al (2016) maintained that perceived compatibility does not have any effect upon adoption of m-government services in all the three countries under review. They further elaborated that perceived compatibility helps increasing user's perception of usefulness of m-government services in Canada and Germany but not in Bangladesh. Construct of Perceived compatibility was introduced in the Innovation Diffusion theory (Rogers, 2003). Authors have argued that the construct of perceived compatibility also works as facilitating condition in adoption and use of information and communication technology (Youngseek Kim & Crowston, 2011) .

Referring to the table-2, until now only those factors are discussed which have been referred by two or more authors. As it is clearly visible in the table-2, Perceived Image, Facilitating Conditions and Perceived Behavior Control (PBC) are the three variables, each of which have been referred in two instances only from amongst the related literature under review. It seems that either these variables were not popular amongst the researcher community or these variables covers the same information which was already covered by the researchers under the variables with different nomenclature measuring the same construct. Perceived Image refers to the degree to which the innovation improves one's position in one's social circle. Image is the variable used by Venkatesh in both the updates of Technology acceptance model i.e. TAM 2 and TAM 3. Venkatesh (2013) argues that image has significant effect upon subjective norm. However, Venkatesh (2003) while presenting UTAUT ignored image as a separate external variable and only took social influence as an external variable having effect upon user's adoption behavior. It can be deduced that Venkatesh considered social image variable having characteristics overlapping with those of social influence. Therefore, choosing social influence can cover what social image had to offer.

Facilitation conditions refers to the believe of individual regarding the organizational and infrastructural support available for using technology (Venkatesh, Morris, Davis, & Davis, 2003)(Almuraqab & Jasimuddin, 2017). Whereas, PBC refers to a person's perception regarding the person's ability to control a situation (Ohme, 2014). UTAUT facilitation conditions construct captures the perceived behavioral control concept from TPB and compatibility from the theory of diffusion of innovation (DoI). (Kijisanayotin, Pannarunothai, & Speedie, 2009; Venkatesh, Morris, Davis, & Davis, 2003). Ajzen while disintegrating PBC, positioned facilitating conditions as a component of PBC (Ajzen, 1991; H.-F. Lin, 2007). This further indicates that the construct of PBC covers what the researchers wanted to measure from facilitating conditions. It can be further implied that PBC covers all the aspects similar to and covered by the construct of facilitating conditions. It, therefore, can be assumed that reviewing the effect of perceived behavior control upon acceptance behavior should have been enough. Evaluating Facilitating conditions along with PBC is duplication of work. Furthermore, researchers have also argued that PBC of the TPB is similar to the construct of perceived ease of use from TAM (Youngseek Kim & Crowston, 2011). Therefore, perceived ease of use is the construct which can be used instead of PBC while covering all aspects of facilitating conditions. For the purpose of identifying the effect of user's adoption behavior in this proposal, perceived ease of use will be used to cover the effects of PBC and constructs similar to PBC.

Perceived Response Time, Perceived Time benefit, Perceived value, Satisfaction, Timeliness, Perceived Time risk, Long term usefulness, Short-term usefulness, Availability of resources, Accuracy, completeness, Transparency, Convenience, Personalization, Self-efficacy, Familiarity,

Relative advantage, Trialability, Observability, Demographics, Variety of services, Perceived empathy and Perceived reliability are the variables which are mentioned only once in table above. Some of these variables are mere repetition of the same ideas.

Perceived Response Time, Perceived Time benefit, Perceived value, Timeliness, Long term usefulness, Short-term usefulness, Accuracy, Convenience and Relative advantage; all these variables try comprehending the benefit which an individual user want to derive from using mobile based services. In fact, this is what perceived usefulness is all about. The advantages which user gets by switching over to mobile based services. The crux of all these variables is covered by the construct of the perceived usefulness. In fact, the researchers evaluating impact of Perceived usefulness does not need to measure the effect of any of these variables. It should be considered unnecessary to cover the same characteristics under different nomenclature thus making the model difficult and lesser parsimonious in nature.

Satisfaction results in when the expectations of users are met (Changlin Wang, 2014). Achieving Satisfaction results in continuance usage of technological services. Several researchers have used the construct of Satisfaction while using Theory of Expectation Confirmation to study post adoption behavior of the ICT (Youngseek Kim & Crowston, 2011). Authors also have studied Satisfaction while extending technology acceptance model for observing the effect of m-government adoption upon continuance usage of m-government services (Changlin Wang, 2014). Authors have criticized using the constructs of adoption studies to post adoption studies (Youngseek Kim & Crowston, 2011). Assuming vice versa to be true, it can be inferred that using the construct of satisfaction might not bear useful results in understanding the adoption behavior

of the m-government services. Since Satisfaction is an important construct for measuring the effect of continuance usage of ICT which is post adoption behavior.

Perceived risk refers to the perception of individuals regarding the chances of losses an individual may face while performing a task (D. Liu & Carter, 2018). Time risk is a facet of perceived risk (Ohme, 2014). This means that the construct of perceived risk covers the dimension of time risk as well. Avoiding repetition could be the reason that most researchers have ignored time risk while using the variable of perceived risk.

Availability of resources was found having no affect upon acceptance of m-government by researchers (Shareef et al., 2011). Though few has reported otherwise (Shahzad et al., 2018). Authors while discussing online behavior of individuals have described consumer perception of availability of resources as part of the Perceived Behavior Control (H.-F. Lin, 2007). Ajzen decomposed PBC into two components namely facilitating conditions and self-efficacy (Ajzen, 1991; H.-F. Lin, 2007). Self-efficacy is the degree of belief of an individual regarding individual's capabilities of using technology based services(H.-F. Lin, 2007; Saxena, 2018). The construct of PBC measures effect of both self-efficacy and facilitating conditions.

Authors have discussed Completeness with reference to m-government adoption as availability of complete information to fulfil the user's requirement and for the user's complete understanding (Shahzad et al., 2018). This is similar to what authors have elaborated while referring to awareness. Awareness in m-government is providing complete knowledge about the information, revamping, application, and goals of the established government system (Shahzad et al., 2018). Thus, it is safe

to infer that Completeness and Awareness measure the same characteristics and Awareness covers all the characteristics of completeness. Consequently, finding effect of Completeness upon user's behavior of adopting mobile based services is not required where the effect of awareness is already under discussion.

Transparency is another factor which was found under discussion only once while reviewing recent literature on adoption of mobile based services. Transparency was identified by authors as a medium to reduce uncertainty (Venkatesh, Thong, Chan, & Hu, 2016). Since m-government is a new form of contact between government and general public therefore the reduction in uncertainty should help the adoption process. Moreover, authors have concluded that the relationship of the user's acceptance behavior, with Information quality and channel characteristics, is both mediated and moderated by Transparency (Venkatesh et al., 2016). It can be inferred that the role of transparency is significant upon acceptance behavior. Though the role of transparency is undeniable yet there are authors who believe that transparency is the result of such initiatives like m-government services. These Authors have emphasized that ICT and its application in government promotes transparency (Castelazo, 2016; Field et al., 2003; UN, 2018a; Yimer, 2015). M-government is an application of ICT. It produces and promotes transparency. Transparency might be highly effective in keeping the continuous use of m-government services, but it can be ignored while identifying factors affecting first time acceptance of m-government services.

Personalization in e-government services is described by researchers as the degree to which services can be modified according to the individual need. It helps citizens receiving only those services which they require in the way they want it. Saving citizens from unnecessary information

and redundant formats (Venkatesh et al., 2016). This adds to the benefits of using m-government services. Researchers have also argued that personalization improves productivity of the users (Shahzad et al., 2018; Venkatesh et al., 2016). This implies that capability to get the services personalized in the usefulness of the mobile based services. And the perceived benefit from this would be considered as perceived usefulness of the mobile based services. Hence it can be determined that personalization provides benefit and the effect of this benefit would be measured by the perceived usefulness of the mobile based services.

Familiarity continuously affects the decision-making process (Swire, Ecker, & Lewandowsky, 2017). While working on mobile banking framework authors identified that familiarity facilitates the initial trust in the mobile banking services which in turn affects acceptance of m-banking services (Afshan & Sharif, 2016). Authors have argued that familiarity may affect trust both positively or negatively. Researchers believed that the effect of familiarity upon trust is dependent upon one's previous experiences. Familiarity build's trust when the service provider has shown a reliable behavior and ruins it when service provider acts otherwise. Furthermore, researchers have argued, that while using electronic platforms for accessing governmental services, familiarity helps individuals recognize and effectively manage their privacy risk and concerns. Familiarity is described as antecedent of Trust and Privacy risk of the users of e-government services. Therefore, it can be deducted from the arguments given earlier that familiarity might not directly affects acceptance behavior but it affects those factors which in turn affects acceptance of e-government services. Hence, familiarity, though indirectly, may affect acceptance behavior of e-government services. Researchers have identified familiarity as a stage of awareness (Puspitasari, 2017). Therefore, investigating the effect of awareness upon user's behavior serves the purpose.

Familiarity being a stage of awareness should not be taken separately. This, otherwise, would just add up to the job of researchers investigating the factors affecting user's behavior.

Acceptance of information systems is an area of researchers' interest. Several theories are available and consequently being adapted by the researchers to understand ICT adoption behavior of users (Youngseek Kim & Crowston, 2011). Observability and Trialability are constructs adapted from the Innovation Diffusion Theory. Researchers have related both constructs to the construct of facilitation conditions (Youngseek Kim & Crowston, 2011). Hence measuring the effect of facilitating conditions upon acceptance behavior of users indeed covers both observability and trialability.

Demographics have been ignored more often in recent study of the technology acceptance behavior. In fact, demographic profiling may help understand behavior of the users regarding accepting m-government services (Ahmad & Khalid, 2017). While applying TAM, many authors have either applied demographic variables to help understand acceptance behavior or objected upon the lack of such variables thereof (Hernández, Jiménez, & José Martín, 2011). Gender, a demographic variable, was introduced as a moderating variable in UTAUT (Venkatesh & Davis, 2000). Whereas other researchers have also found demographic variables like age and education having significant effect upon acceptance of electronic government services (Sharma, 2015). Demographics are important variables which help understanding acceptance behavior of technological initiatives. It would be valuable using these in understanding user's m-government acceptance behavior.

Value added services is another variable which was only proposed once in the recent literature reviewed for identifying factors affecting acceptance of m-government services. The authors (Ahmad & Khalid, 2017) who proposed variety of services relationship with acceptance of m-government services concluded against the proposed relationship. These researchers explained that irrespective of the variety of services offered by m-government, if the users believe that these services would not provide value addition, there would not be any effect of variety of services upon acceptance of m-government services. Relationship of variety of services with acceptance behavior of m-government services is contingent upon the belief of users regarding the additional benefit which users would reap by adapting m-government services (Ahmad & Khalid, 2017). Taking cue from the researchers' argument, it can be then assumed that it is usefulness of services which would influence user's acceptance of m-government services. This affect can be captured by the construct of perceived usefulness while leaving the variable variety of services aside.

Perceived reliability is the belief of the users that the m-government services are trust worthy and dependable (Shareef, Dwivedi, et al., 2016). Authors have also considered trust as a trusting attitude. It is willingness of an entity to become dependent on another in crucial situations (Fuller, Serva, & Baroudi, 2010). Perceived reliability is related to Trust. Both the constructs measure same behavior. Therefore, there is no need of seeking the effect of perceived reliability, when the variable of Trust is investigated for its affect upon user's acceptance behavior.

2.1.8. Identification of similar factors in literature affecting acceptance of m-services

Review of literature has led to identification of several similarities between the constructs of factors affecting adoption of mobile based services. In the above discussion an effort has been made to identify the variables having characteristics like those of the other constructs. Also, some factors were identified as not quite necessary for understanding the acceptance behavior of m-government services. Table 2-3 describes the factors which may affect m-government services adoption while reporting similar factors in front of each of these.

Table-2-3: Comparison of similar factors affecting m-services acceptance

Factors	Similar constructs
Perceived Usefulness	Perceived Response Time, Perceived Time benefit, Perceived value, Timeliness, Long term usefulness, Short-term usefulness, Accuracy, Convenience, Relative advantage, Personalization, Value added services, Cost
Perceived Ease of Use	Perceived Behavior Control, Perceived compatibility, Observability and Trialability, Facilitation Conditions, Self-efficacy, Availability of resources
Trust	Perceived reliability
Perceived Risk	Privacy, Perceived Security, Time Risk
Subjective Norms	Social Influence
Awareness	Completeness, Familiarity
Demographics	N/A

It should be noted that a total of 37 factors were identified in table-2-2a, which according to the literature are affecting user's acceptance of m-government, e-government and m-banking. After identifying for similarities and repetitions these 37 factors were reduced to 7, which are presented in table-2-3.

2.1.9. Factors in need of further investigation with reference to acceptance of m-government services

Though, factors presented above represent all aspects affecting acceptance of m-government services being tested by the researchers. Yet there are few dimensions which are left unexplored especially vis-à-vis acceptance of m-government services. Technology readiness, being one important factor. Technology readiness has an impact upon the experience of using technology-based services. Authors have suggested caution while evaluating e-services experience of users who have more experience of getting services through human contact of service agents in comparison to those receiving these services electronically (Kumar, Sachan, & Mukherjee, 2017). Researchers have evaluated role of technology readiness in acceptance of self-service technology. They have argued that PU, PE, attitude towards use and intention to use are enhanced by the technology readiness of the users (J.-S. C. Lin & Chang, 2011). M-government is not only an electronic service but it is also a self-service technology. User experience of m-government services and ultimately its adoption by the user then should be largely dependent upon the technology readiness of the user. This discussion thus adds another factor i.e. Technology Readiness which affects acceptance of m-government services.

The rapid growth of technology and its ubiquitous availability have helped consumers to reap the benefits of technology which were previously available only to the organizational users (Tamilmani, Rana, Prakasam, & Dwivedi, 2019). This exposed individual consumers to plethora of opportunities where they need to make decision of technology adoption. Venkatesh et al (2012), proposed introducing new constructs to the unified theory of acceptance and use of technology

(UTAUT) to understand consumer behavior of technology acceptance. Introducing few new constructs, researchers extended the application of UTAUT to understand consumer behavior of acceptance of technology (Venkatesh et al., 2012). Hedonic motivation is argued to be the most important factor introduced in UTAUT2 (Tamilmani et al., 2019). Since mobile government is also directed towards consumers therefore including hedonic motivation would improve the predictability of the proposed model. Hence, it is proposed to add hedonic motivation as another factor affecting acceptance of m-government services.

As discussed earlier perceived usefulness, perceived ease of use and Trust are the factors which were found being investigated several times with respect to the effect which these variables have upon acceptance of technology. However, these researches have produced contrasting results. There are authors who claimed that perceived usefulness affects acceptance of technological platforms and then there are authors not agreeing to this claim. Similarly, there are researchers who claim PE influencing acceptance of technological platforms whereas there are other who negate. On the same lines, Trust was found to be affecting acceptance of electronic platforms but on the other hand authors have reported otherwise as well. This contrast being reported in the research of these variables.

Awareness is a factor claimed necessary by researchers for making the m-government acceptable amongst users (Ahmad & Khalid, 2017; ElSherif et al., 2016; Shahzad et al., 2018). However, there are researchers who claimed that awareness of technology does not necessarily lead to acceptance of m-government services rather they claimed that awareness sometime stops potential

users of adoption (Ohme, 2014). This contrasting opinion requires further investigation of the effect which awareness plays upon acceptance of m-government services.

The effect of demographics upon the behavior affecting acceptance of m-government services remained an area under explored (Ahmad & Khalid, 2017). This gives a reason to further investigation into the effects which demographics have upon acceptance of m-government services.

Researchers (Almuraqab & Jasimuddin, 2017; José Liébana-Cabanillas et al., 2014; Liébana-Cabanillas et al., 2014; Ohme, 2014) have investigated the effect of perceived risk upon acceptance of m-government services in a thorough fashion. Similarly, several authors (Hung et al., 2013; Youngseek Kim & Crowston, 2011; Ohme, 2014; Saxena, 2018) have investigated the effects of subjective norm upon acceptance behavior. Since there are no anomalies in the results provided by the researchers. So, there may not be need of investigating further effects of both perceived risk and subjective norms upon acceptance of m-government. After having through review of literature following factors were selected to be further investigated for their effect upon acceptance of m-government services.

Table-2-4: Factors to be investigated for their effect upon acceptance of m-government

S.No.	Factors
1	Perceived Usefulness
2	Perceived Ease of Use
3	Trust

4	Awareness
5	Demographics
6	Technology Readiness
7	Hedonic Motivation

Reviewing table2-4, first five factors are those for which some evidence of their effect upon user's acceptance of m-government services is available and has already been identified in the section above. However, the last two factors i.e. technology readiness and hedonic motivation, do not have much of a direct evidence for the effect which they may have on m-government acceptance. It is surprising to note that there is dearth of literature measuring effect of these factors upon acceptance of m-government services. Circumstantial evidence and literature both points towards the importance these factors have in the decision-making process of accepting m-government services. Following sections details each of the variable placed in table-2-4.

2.2. Perceived Usefulness

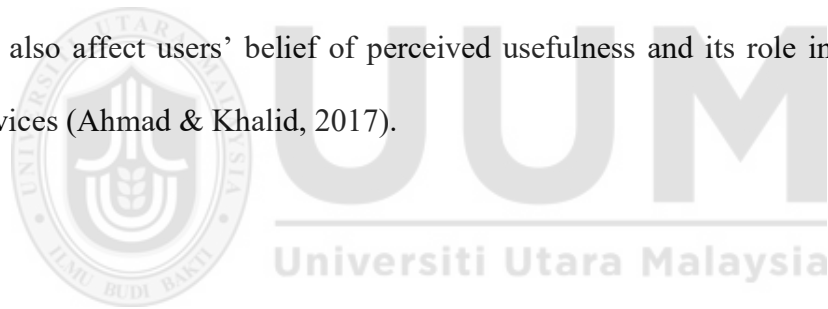
Perceived usefulness is one of the major constructs of the famous Technology Acceptance Model (TAM). Researchers while investigating acceptance of SMS based mobile government services have found significant influence of perceived usefulness upon acceptance of m-government services (E. Abu-Shanab & Haider, 2015). Davis (1985) defined perceived usefulness as "the degree to which an individual believes that using a particular system would enhance his or her job performance." Theory of TAM proposed that external variables affecting user's acceptance behavior is mediated through both perceived usefulness and perceived ease of use (Davis, 1985). While studying online shopping behavior authors argued that customers gauge their success while

shopping online in form of the advantages and the costs which they must borne while considering their convenience and time savings. The authors therefore measured perceived usefulness in terms of supporting comparison-shopping, reduction in time of shopping and accessing beneficial information (H.-F. Lin, 2007). Perceived usefulness has been proven to be a strong predictor of user's intentions of accepting a system. Venkatesh & Davis (2000) while proposing TAM 2 have worked upon identifying the determinants of perceived usefulness. They concluded three social influence process i.e. subjective norm, voluntariness and image as determinants of perceived usefulness. Additionally, four cognitive instrumental processes i.e. job relevance, output quality, result demonstrability and perceived ease of use were also identified as determinants of perceived usefulness (Venkatesh & Davis, 2000). Venkatesh & Bala (2008), after synthesizing research on TAM, identified four types of determinants of perceived usefulness. These were system characteristics, facilitating conditions, individual differences and social influences. The authors further proposed that experience moderates the relationship between 1. perceived ease of use and perceived usefulness 2. perceived ease of use and behavioral intentions and 3. computer anxiety and perceived ease of use. Researchers found out that both pre-implementation and post-implementation interventions influences determinants of perceived usefulness. Management support, incentive alignment and peer support effect all the determinants of perceived usefulness whereas user participation also influences all determinants except Image. Moreover, design characteristics, training and organizational support effects job relevance, output quality and result demonstrability (Venkatesh & Bala, 2008). Constructs similar to perceived usefulness are reported by authors which were used in theories explaining individual's technology acceptance behavior. Researchers argued that perceived usefulness from TAM is similar to behavioral beliefs in theory of reasoned actions (TRA) and theory of planned behavior (TPB), performance expectation in

unified theory of acceptance and usage of technology (UTAUT), relative advantage in diffusion of innovation theory (DoI) and outcome expectations in social cognitive theory (SCT). Authors maintained that perceived usefulness comes amongst the most critical cognitive reactions in technology adoption. Researchers argued that perceived usefulness plays vital role in accepting technology in individual projects by the scientists (Youngseek Kim & Crowston, 2011).

Researchers have identified perceived usefulness amongst key factors affecting user behavior in various fields ranging from e-banking to mobile internet. In the same way, authors have argued that perceived usefulness has direct effect upon users intentions of accepting m-government services (Almarashdeh & Alsmadi, 2017). Researchers while studying smart government acceptance behavior in UAE argued that the construct of perceived usefulness has proven its significance across many mobile based services including m-banking, m-commerce and m-marketing. The authors concluded that perceived usefulness has a positive effect upon intentions to use smart government services (Almuraqab & Jasimuddin, 2017). While studying security response system in Pakistan researchers have confirmed that PU has a positive relationship with m-government acceptance (Shahzad et al., 2018). This is in line with the findings of other researchers who have claimed that perceived usefulness is vital for acceptance of m-government services as well for other electronic platforms for government services (E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). Few of these researchers claimed presence of perceived ease of use helps generating perceived usefulness amongst users (Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016).

In contrast to the opinion of many other researchers, Muchran and Ahmar (2019) has shown insignificance of relationship between perceived usefulness and the acceptance of technology. The authors blamed the experience of the users for the reason. They were of the view that both the internet speed and the perception of the security of information while using the application were responsible for creating this inconsistency (Muchran & Ahmar, 2019). Similarly, Ahmad & Khalid (2017) contradicted relationship of perceived usefulness with the adoption of m-government services. They argued that awareness is required for making users understand usefulness of m-government services. Absence of the information regarding the advantages of adopting the m-government system especially at the initial stages of adoption leaves users uninformed about the benefits of the system. Moreover, the skepticism of users and their belief regarding incapability of the government also affect users' belief of perceived usefulness and its role in adoption of m-government services (Ahmad & Khalid, 2017).



2.3. Perceived Ease of Use

According to Davis (1985) perceived ease of use is "the degree to which an individual believes that using a particular system would be free of physical and mental effort." While studying online shopping behavior authors argued that perceived ease of use is the extent to which to which a user distinguishes a website easy to study, comprehend or operate. The better the interface is designed the more the consumer would consider shopping to be hassle free. (H.-F. Lin, 2007). David (1985)

identified construct of perceived ease of use affecting intention to use technology-based system in his famous technology acceptance model. Venkatesh & Davis (2000) while proposing TAM 2 have identified perceived ease of use as one of the determinants of perceived usefulness. (Venkatesh & Davis, 2000). Theories explaining individual's technology acceptance behavior have used constructs similar to perceived ease of use. Researchers argued that perceived ease of use as described in TAM is like the construct of effort expectancy in unified theory of acceptance and usage of technology (UTAUT), perceived behavior control (PBC) in theory of planned behavior (TPB), complexity in diffusion of innovation theory (DoI) and self-efficacy in social cognitive theory (SCT) (Youngseek Kim & Crowston, 2011).

While researching upon citizens acceptance of m-government in Saudi Arabia authors have argued that perceived ease of use affects the behavioral intentions to use m-government services (Almarashdeh & Alsmadi, 2017). Similarly, while studying m-government adoption in rural china authors have found significant and direct relationship of perceived ease of use with behavioral intentions to use m-government services (Y. Liu et al., 2014). These are in line with the findings of other researchers who have claimed that perceived ease of use is vital for acceptance of m-government services as well for other electronic platforms of government services (E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). Few of these researchers ranked PE as the most important factor in acceptance of electronic based government platforms including m-government services. It was also claimed by the same group of researchers that presence of PE helps generating PU amongst users (Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). In contrast to these claims, there are few other

researchers who have denied this importance of PE. Researchers, while discussing the effect of PE on perceived value of the m-government usage in China, have argued that perceived ease of use doesn't have any effect upon the perceived value. They further have claimed that reduction in the complication and increase in user friendliness of IT based products have made perceived ease of use no longer an important element of IT usage (Changlin Wang, 2014). Ahmad & Khalid (2017) also denied the role of perceived ease of use in acceptance of m-government services contradicting the popular view presented by Davis (1989) in the TAM which was widely endorsed by other researchers (E. Abu-Shanab & Haider, 2015; Almarashdeh & Alsmadi, 2017; Almuraqab & Jasimuddin, 2017; Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). Researchers concluded that the users were more concerned with the advantages of the facility irrespective of usability of application or user friendliness of the mobile interface. Moreover, they blamed the incompatibility of mobile operating system in aiding utilization of m-government services which resulted in absence of users belief of PE (Ahmad & Khalid, 2017).

2.4. Trust

Researchers has labelled trust as trusting attitude. It has also been explained as the readiness of an entity to be exposed to risky situations by the activities of another entity (Fuller et al., 2010). It has been argued that usage of e-government platforms is directly related with trust of users in both government and Technology. Researcher further has maintained that users age, gender and income don't effect trust in e-government services, though individual experience of using technology may have an effect upon it (Mpinganjira, 2015). According to Organization for Economic Cooperation & Development (OECD) the trust of citizens in the government is decreasing and only 43%

citizens have trust upon their governments. However, it argues that citizens trust public services more than the governments themselves (OECD, 2017). M-government is one of the government services and the statement of OECD provides an opposing view to the claims of Mpinganjira (2015). Use of mobiles to access governmental services is an innovation. M-government service are still in their infancy. Citizens get concerned while using m-government applications about the safety of their information and capability of their service provider. Trust in technology is the single most important factor influencing adoption of M-government by citizens (Almarashdeh & Alsmadi, 2017). Correlation was found between trust and acceptance of mobile internet voting while investigating perceptions of Australian public. (Zada et al., 2016). It is also argued that perceived fairness of m-government procedures improves the trust and satisfaction of users (Z.-J. Chen et al., 2016). Trustworthiness of information received through mobile phone to poor citizens is an antecedent of any mobile for development initiative (Ojo, Janowski, & Awotwi, 2013). Trust is the most important variable which affects acceptance of m-money while influencing perceived usefulness. Even an illiterate person is willing to adopt a difficult to use but trustworthy platform (Chauhan, 2015). M-government is still in its infancy yet the fast penetration and easy availability of mobile devices is going to make it a useful tool for government. Developing m-government systems providing safety and utility would not only help in adoption of m-government but would also develop Trust of citizens upon government (Changlin Wang, 2014).

Alzahrani et al (2017) discussed scarcity of research for identification of antecedents of trust affecting adoption of e-government services. They identified four dimensions of antecedents of trust vis-à-vis adoption of e-government service. These dimensions were technology factors, government agencies factor, citizens' aspects and risk factor. Service quality, System quality and

Information quality were three factors identified from the technological factors. Government agencies factors include reputation of agency and experience. Factors identified for individual citizen behavior were disposition to trust, internet experience and education. And finally, performance risk, time risk and privacy and security were identified for the risk factors (Alzahrani, Al-Karaghoul, & Weerakkody, 2017). However, few researchers (Xie, Song, Peng, & Shabbir, 2017) have identified trust as antecedent of perceived risk in contrast to the authors (Alzahrani et al., 2017) who found risk to be antecedent of trust. On the other hand, Liu & Carter (2018) identified privacy concerns as antecedent of trust. Researchers argued that the concern of privacy is inversely related to trust. They reasoned that the more the privacy concerns the lower would be the level of trust (D. Liu & Carter, 2018). Ahmad & Khalid (2017) have argued that user's privacy concerns and perceived security of their data influence the level of trust which they have in the system. Individual who perceive system to be secure have high trust in the system. The authors further maintained that the trust of an individual develop a positive attitude towards using m-government services (Ahmad & Khalid, 2017). While exploring acceptance of m-government services in Saudi Arabia, authors identified that Trust has significant effect upon m-government acceptance. Authors was of the view that the fear of surveillance, security and privacy of data may hinder upon user's adoption of m-government services. They concluded by suggesting increasing the level of trust of citizens upon m-government services is necessary to make users accept these services (Alrowili et al., 2015). On the other hand, Alkhalidi (2022) emphasized upon delving into trust as wider concept. The author suggested to consider upon dimensions of trust while considering it as major indicator of users' intentions towards online transactions. The researcher differentiated amongst the sub-dimensions of trust. He claimed that users' trust of governmental capabilities, trust upon information quality, and trust of mobile phones capabilities can have a

positive impact upon their intentions towards using m-government services. However, users' trust in the government's involvement, trust of m-government systems, trust of personal technical literacy; and trust upon help desk service quality do not have any impact upon their intentions towards accepting m-government services. He further argued that trust of users upon m-government systems can decrease their perception of risk (Alkhaldi, 2022). Li (2021) agrees to that by claiming that perceived risk has a negative relationship with citizens' acceptance of governmental initiatives using technological platforms. The author further argues about the negative moderating effect of perceived risk upon the relationship between trust on government and acceptance of governmental initiatives involving technological interventions (W. Li, 2021). Other authors also confirm that increasing trust removes hurdles in user's acceptance of m-government services (ElSherif et al., 2016).

2.5. Awareness

Awareness refers to having comprehensive knowledge of purpose and systems of m-government (Shahzad et al., 2018). Awareness of user, especially at the earlier stages of adoption, can significantly affect acceptance of m-government services (Ahmad & Khalid, 2017; ElSherif et al., 2016). It is indeed the first step towards adoption of m-government services (Shahzad et al., 2018). Researchers have argued that awareness helps improving the perception of quality of services which leads to satisfaction of users, increasing usage of m-government services (ElSherif et al., 2016). Researchers (Almuraqab & Jasimuddin, 2017) have blamed lack of awareness of the features which assist citizen, in using m-government services, for the low success rate of m-government services. Awareness is the first step towards usage and adoption of m-government

services (Yogesh K Dwivedi et al., 2018). Awareness not only removes concerns of users in initial stage of adoption of m-government services, but it does also help the users understanding in the ways these services ought to be used (ElSherif et al., 2016). Utilization of m-government services can only be made possible after giving due knowledge to the potential users, making them aware of the opportunities, the benefits and the costs, involved in using such a system (Almuraqab & Jasimuddin, 2017). Contrastingly, Ohme (2014) have argued that awareness of technology does not necessarily lead to acceptance of m-government services. He claimed that individuals who were not familiar with such communication channels were found to be more inclined towards using m-government services (Ohme, 2014). Ohme (2014) further explained that awareness combined with negative experiences of using technology may hold back potential users from adopting m-government services. Results from other researchers also confirmed that there is no significant relationship between awareness and acceptance towards m- government services (Mensah & Mwakapesa, 2022). They emphasized upon the need of conducting further research upon awareness in context of mobile government acceptance to completely understand its effect.

Mandari & Chong (2018) while appreciating the importance of awareness upon acceptance of m-government services in Tanzania, have examined the moderating effect of awareness upon factors affecting acceptance of m-government. The authors concluded that there is no moderating effect of awareness upon the relationship between relative advantage and behavioral intentions, ease of use and behavioral intentions, compatibility and behavioral intentions and finally between government support and behavioral intentions. The researchers resolved that awareness does not have any effect upon factors affecting acceptance of m-government services (Mandari & Chong, 2018). This is contrary to the findings of other researchers (Eastin et al., 2016; Mutahar et al.,

2018). Researchers, while examining the effect of awareness upon acceptance of mobile banking in Yemen, have concluded that awareness has significant effect upon perception of risk which is an important factor affecting m-government acceptance (Mutahar et al., 2018). Similarly, the authors argued that awareness helps improving perceived usefulness which leads to adoption of m-government services (Mutahar et al., 2018; Shahzad et al., 2018). In fact, researchers concluded that perceived usefulness mediates relationship between awareness and m-governments usage intentions (Shahzad et al., 2018). Researchers have (Mutahar et al., 2018) also found significant relationship between awareness and perceived ease of use. Likewise, Eastin et.al (2016) while evaluating the effects of privacy concerns on m-commerce, suggested that awareness of instances, where privacy of user might have been compromised, may influence perceived risk of m-commerce. However, it was also identified that people were ready to take the risk of sharing information while having awareness that there is a probability of misuse of their information. This according to the researchers shows that users are willing to take certain risk of losing their privacy considering it to be cost of doing business online. This ultimately calls for identifying the possibility of moderating effect of awareness (Eastin et al., 2016). Awareness of information privacy standards of an organization develops trust in the users which also helps in adoption of services (D. Liu & Carter, 2018). On the other hand, dearth of awareness increases uncertainty about the procedure and delivery of services making citizens question the authenticity of m-government services. This leads to loss of trust making usage of m-government services unattractive for the citizens (Shahzad et al., 2018).

2.6. Technology Readiness

Technology Readiness (TR) is tendency of a person's behavior towards acceptance of technology. It is a set of beliefs which kicks in while using new technology or innovation (Ferreira et al., 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, Wherton, Procter, Hinder, & Greenhalgh, 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 et al., 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). While evaluating technology

readiness of customers to adopt digital banking channels, researchers concluded that technology readiness has a positive impact upon acceptance of digital banking platforms (Musyaffi, Mulyani, Suraida, & Sukmadilaga, 2021).

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, Yousafzai, Javed, & Page, 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).

2.6.1. 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). Other researchers have worked upon the impact of these variables upon adoption of big data in UAE. The results confirmed that all the four variables i.e. innovativeness, optimism, discomfort and insecurity directly have an impact while predicting acceptance of big data technology (Haddad et al., 2020). Each of these dimensions is discussed below.

2.6.1.1. 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 (I. 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 (I. 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 (Gökçearsan, 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 (K. Koivisto, Makkonen, Frank, & Riekkinen, 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 (K. Koivisto et al., 2016).

2.6.1.2. 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 (M.-F. 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 (M.-F. Chen, 2018). Similarly, other researchers (Rahman, Taghizadeh, Ramayah, & Alam, 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 et al., 2017) found insignificant relationship between optimism and perceived ease of use which was in contradiction with findings of other researchers (M.-F. Chen, 2018; Rahman et al., 2017).

2.6.1.3. 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 et al., 2007). Researchers (M.-F. 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 (M.-F. 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 et al., 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 et al., 2017).

2.6.1.4. 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 (M.-F. 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 et al., 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 (K. 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 (K. Koivisto et al., 2016).

2.7. Hedonic Motivation

Researchers have explained hedonic motivation as enjoyment or pleasure taken from use of technology (Brown et al., 2006; Venkatesh et al., 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 et al., 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 et al., 2006). Hedonic motivation is an important factor in explaining acceptance behavior of technology in domestic usage (X. 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 (H.-C. Kim, 2015). 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, Ryan, Prybutok, & Wen, 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 et al., 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 (Ali A 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 (Ali Abdallah Alalwan, Baabdullah, Rana, Tamilmani, & Dwivedi, 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 (Yogesh K Dwivedi et al., 2016). Hedonic motivation gained attention when Venkatesh et. al (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 (Ali Abdallah 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 (Ali Abdallah Alalwan et al., 2018; Tamilmani et al., 2019; Venkatesh et al., 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 et al (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 (Yogesh K. Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017; Tamilmani et al., 2019).

2.8. Demographics

Dividing users into strata based upon their demographic profiles can help better understanding m-government adoption behavior (Ahmad & Khalid, 2017). Comprehending demographic diversity gives an insight into the perception of general public regarding adoption of m-government services in performing tasks (Shareef et al., 2012). Success of ICT based transformational government initiatives is dependent upon bridging the digital divide. Researchers found both household income and education level help overcoming access barriers as well as influencing psychological perceptions like perceived ease of use (Sipior et al., 2011). This leads to making transformational government initiatives acceptable among citizens. While evaluating the effect of service quality dimensions and demographic upon e-government usage in Oman, researchers found significant relationship between demographic and e-government usage. They concluded that differences in both age and education affect user's behavior in acceptance of e-government services (Sharma, 2015).

Importance of demographics in psychological profiling of users regarding their adoption behavior 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 et al., 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 et al., 2012) used age and gender as moderating

variables however these still has ignored average monthly income which researchers (Sipior et al., 2011) have found significantly influencing adoption behavior in initiatives where technology was involved. Similarly, education was also not factored in while proposing theories explaining technology adoption behavior. Whereas, researchers (Sharma, 2015) identified education having significant effect upon technology acceptance behavior. Few authors(Sharma, 2015) have examined the direct relationship between demographic variables and adoption behavior whereas a majority of them have used these either while performing detailed data analysis(Y. Liu et al., 2014; Ohme, 2014) or as moderators(Ahmad & Khalid, 2017; Venkatesh et al., 2003; Venkatesh et al., 2012).

Paucity of work done in understanding effect of demographic profiles of citizens over acceptance of m-government services require detailed analysis of the effect of demographics upon acceptance behavior of citizens (Ahmad & Khalid, 2017).

What variables should constitute demographics for the purpose of this research was another challenge which required attention. Researchers while identifying consumers who face difficulty making buying decisions selecting from variety, chose only gender, age and education as demographic variables in customer profiling (Walsh & Mitchell, 2005). Mobile government is only one of the platform to access governmental services. The same services could be accessed using other mediums. Therefore while profiling the acceptance behavior of m-government services, selection of gender, age and education as demographic variable seemed the right choice. However, Creusen (2010), while evaluating upon aspects of the products considered important by consumers belonging to various demographical segments, used not only gender, age, education

but also included income as part of demographical variables. M-government services are products in itself. The product aspects of mobile applications representing m-governmental services should be captured in the same manner amongst the variety of population as was being evaluated by Creusen (2010). This means that not only gender, age and education but income also should be used as demographic variables while evaluating the acceptance behavior of the users (M. E. Creusen, 2010). The study of citizens' acceptance behavior on m-government acceptance in US by researches, helped confirmed the idea. The authors used demographic factors as controlled variables; while defining gender, age, education and income as demographic variables (Hou et al., 2020). It was therefore confirmed that the study would use gender, age, education and income as demographic variables.

2.8.1. 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 (Merhi, Hone, Tarhini, & Ameen, 2021). 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 than 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 et al., 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 et al., 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. These cultural differences further became evident, when contrasting evidence was found, while studying acceptance of mobile banking behavior. Researchers identified that gender moderated performance expectancy, effort expectancy, facilitating conditions, price value and perceived security amongst the Lebanese sample, however, the relationship was insignificant in the sample collected from British mobile banking consumers

(Merhi et al., 2021). This cultural difference was further highlighted by a research study conducted by ITU, which 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.

2.8.2. Age

The role of age which it plays either directly or as a moderating variable upon acceptance of technology is gaining attention among researchers (J. Kim, 2016; Merhi et al., 2021; Morris & Venkatesh, 2000; Sharma, 2015; Tarhini, Elyas, Akour, & Al-Salti, 2016; Venkatesh et al., 2003; Venkatesh et al., 2012). Morris and Venkatesh (2000), while evaluating theory of planned behavior for age differences in technology adoption, found that feelings towards technology greatly affects workers younger in age. Contrastingly, older workers, in the process of making decision towards adoption of technology, were found to be affected more by perceived behavior control and social

norms (Morris & Venkatesh, 2000). Sharma (2015) found that age has a direct relationship with the acceptance of e-government services. Researchers have used age as a moderating variable to better understand characters of individuals willing to adapt new technology (J. Kim, 2016). Venkatesh et. Al (2003) while developing unified theory of acceptance and usage of technology identified age as prominent relevant moderator. Researchers argued that the performance expectancy, facilitating condition and behavioral intention effect younger employees more while adopting technology. In contrast, older workers were influenced more by effort expectancy and social norms while making their decision of adapting technology (Venkatesh et al., 2003). Contrasting views are available between researchers regarding moderating effect of age (J. Kim, 2016). In a stark contrast to the findings of Venkatesh et al (2003a) researchers(J. Kim, 2016) found no moderating effects of age. On the other hand there are researchers who claimed that the presence of age as a moderator would increase the explanatory power of TAM (Chung, Park, Wang, Fulk,&McLaughlin, 2010). The researchers evaluated intention of using hotel tablets applications, while proposing perceived usefulness, perceived ease of use, perceived credibility social norms as determinants of behavioral intentions. They concluded that age does not have moderating effect between intention of using hotel tablets applications and any of the proposed determinants (J. Kim, 2016). Similarly, researchers, while evaluating behavior of the experienced online shopper, have concluded that age does not have any moderating effect upon their online shopping behavior (Hernández et al., 2011).

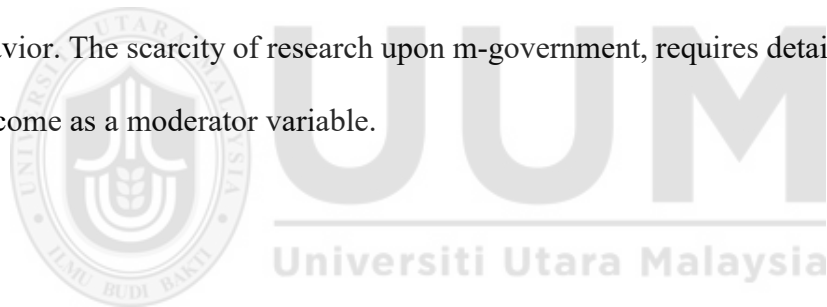
Importance of age in the contextual framework of technology acceptance is undeniable, despite the contradictions found in the literature regarding the direct or moderating effect of age on behavioral intentions of using technology (Tarhini et al., 2016). The ability to explain the

difference in m-government adoption behavior and benefits associated with it makes investigating the role of age on m-government adoption behavior unequivocally useful (Ahmad & Khalid, 2017).

2.8.3. Income

Low income could be a hindrance in adoption of m-government services due to non-availability of devices (Rojas-Méndez et al., 2017; UN, 2018b). However, many low-income countries have seen contrary to that by successfully implementing m-government programs (UN, 2018b). Researchers argued that income does not have moderating effect upon the online shopping behavior of experienced online shopper (Hernández et al., 2011). Similarly, researchers found that the difference between income level does not affect individuals willing to pay for safety features in connected vehicles (Shin, Callow, Dadvar, Lee, & Farkas, 2015). Ahmad & Khalid (2018) however, had an opposing point of view. They concluded that household income moderates the relationship between both trust and social influence and the behavioral intentions to use m-government services. Moreover, they argued that the relationship between trust and intentions to adopt m-government services was found to be robust in older males falling in higher income category. Similarly, in comparison to female users, richer and older males' decision to adapt m-government services was highly affected by social influence (Ahmad & Khalid, 2017). In line with findings of Ahmad & Khalid 2017, researchers concluded that higher level of disposable income was found affecting acceptance of mobile phone technology among older people in China (Ma, Chan, & Chen, 2016). Similarly, researchers (Khayyat & Heshmati, 2013) argued that income affects acceptance of mobile phone technology in Kurdistan. Researchers (Alghamdi & Beloff,

2014) also have proposed income to be the amongst the personal factors affecting intentions to use e-government services. While identifying factors affecting adoption of mobile payment technology in China, authors identified that variations in individual income levels affects inclination of individual to purchase using mobile payment technology (J. Li, Liu, & Ji, 2014). On the other hand, authors studying the behavioral intentions to use autonomous technology in automobile have not found any moderating effect of income between the independent variables on intention to use. The researchers argued that the effect of income upon the relationship between independent variables and acceptance of technology might be variable vis-a-vis the technology and the geographical location of the place where research is being conducted (Park, Hong, & Le, 2021). This calls for further research upon the moderating effect of income upon technology acceptance behavior. The scarcity of research upon m-government, requires detailed investigation of the role of income as a moderator variable.



2.8.4. Educational Level

United Nations, in the e-government survey 2014, identified education as one of the most important factors affecting acceptance of e-government services among masses. Online service delivery of government services requires education as a pre-requisite (UN, 2014). It has listed education as a challenge which the world needs to overcome in order to bridge the digital divide (UN, 2018b). Notwithstanding, the importance of education, the role level of education plays has not been explored well in acceptance of technology. And the studies undertaken to understand the role of education in acceptance of electronic platforms of government are even

scarcer (Sharma, 2015). Researchers while evaluating validity of technology readiness index across cultures concluded that the role of demographics is important in accepting new technologies where education was found to be the unswerving forecaster of adoption (Rojas-Méndez et al., 2017). While identifying factors affecting m-government adoption in India, researchers argued that there is a higher probability of m-government services acceptance for individuals having post graduate qualification (Saxena, 2018). This was in line with the findings of Sharma (2015). He argued that the higher the qualification of an individual the more would be the individual's willingness to adopt e-government services (Sharma, 2015). Similarly, researchers argued that higher education moderates the relationship between deprived parental neighborhood and individual neighborhood selection (de Vuijst, van Ham, & Kleinhans, 2017). Contrastingly, while investigating effects of demographics upon acceptance of e-government services, researchers (Mensah & Mi, 2018) identified that education does not moderate the effect between adoption of e-government services and both perceived usefulness and perceived ease of use. However, they recognized that education directly impact perceived ease of use which itself has a positive influence upon m-government adoption (Mensah & Mi, 2018). Ahmad & Khalid (2018) however, had an opposing point of view. They concluded that education has a moderating effect on the relationship between the behavioral intentions to use m-government services and both trust and social influence. (Ahmad & Khalid, 2017). Researchers (Shin et al., 2015) identified that higher the educational qualification an individual have the lesser the individual was willing to pay for connected vehicles. They found this relation counterintuitive and suggested that further research around the level of education and acceptance of technology may be required to understand this better (Shin et al., 2015). Higher levels of education were found leading to positive attitude towards acceptance of mobile phone technology among older people in China (Ma et al., 2016). Education

levels were found moderating behavioral intentions to adopt e-library services in Jordan. Researchers argued that undergraduate students were more anxious about efficiency of using services which affects their behavior of adoption of e-library services (Awwad & Al-Majali, 2015). Contrastingly, while studying adoption behavior of entrepreneurs in India, researchers concluded that educational qualification had no significant impact while adopting digital platforms (Chatterjee, Chaudhuri, Vrontis, & Thrassou, 2022). The contrasting results and scarcity of research about acceptance behavior of m-government services directs towards the need of working upon the role which income plays on the relationship between independent behavioral variables and acceptance of m-government services.

2.9. Behavioral intentions to accept m-government services

Fishbein & Ajzen, (2011) while discussing their reasoned action approach have declared behavioral intentions as the most important and immediate antecedents of behavior. The authors therefore argued the 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 et al., 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 et al., 2017) used intentions to adopt mobile banking as a proxy of adopting mobile banking services

in Pakistan. Fishbein & Ajzen (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; Egmond et al, 2005) 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 et al., 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 et al., 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).

2.10. Underlying theories

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

2.10.1. 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 & 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, Eds, 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).

2.10.2. Theory of planned behavior

Similar to TRA, Theory of Planned Behavior is a well-established social psychology theory that also states that specific salient beliefs influence behavioral intentions and subsequent behavior (Ajzen, 1991). TRA was designed to predict behaviors under volitional control believing that most of the behaviors of interest especially for psychologist studying social behavior come under this category. Yet it proved to be a limiting factor to the theory which was trying to predict social behaviors in variety of situations (Ajzen, 2012).

Theory of planned behavior states that there are three determinants which influence individual actions. These three factors are described as attitude, subjective norms and perceived behavior control. Attitudes are the individual beliefs regarding performing a behavior. These behavioral beliefs only kick in when individual regards these positively. The expected consequences of performing behavior also influences in formation of behavioral beliefs and attitude. Subjective norms are dependent upon normative beliefs. These beliefs are formed under influence and in

compliance to what significant other persons in an individual's life would expect from the individual while performing a behavior. TPB understands that all behavior could not fall under the volitional control. In fact, most of the behaviors fall in between somewhere total control and no control at all. Perceived behavioral control is the third determinant of behavioral intentions. It refers to the degree of control which one believes is under one's control in performing a behavior (Ajzen, 1991, 2012).

Theory of Planned Behavior (TPB) is an extension of theory of reasoned action (Sniehotta, Presseau, & Araújo-Soares, 2014). TPB introduced Perceived Behavioral Control (PBC) as an additional variable influencing behavioral intentions. PBC is defined as "one's perceptions of his/her ability to act out a given behavior easily" (Ajzen, 1991). PBC is based upon two features control belief and perceived power. It shows that one's motivation to performing a task is dependent upon one's perception regarding difficulty in adopting these behaviors. Moreover, the self believe about how well the task would be performed also influences one's motivation (Ajzen, 2012). Perceived behavior control would be high if a person believes that the circumstances favor the behavior. On the other hand the perception would be low if it is believed that the control required to perform behavior are lacking. This perception could be based upon past experiences or could be dependent upon expected future events(Ajzen, 1991). In fact, the higher the PBC is, the more the chances are of acting upon intentions (Hagger,2019)(Ajzen, 2012).

TPB remained theory of choice for researchers in identifying social behavior in a diversified array of subjects. Researchers have used it in understanding health behaviors (Hagger, Chan, Protogerou, & Chatzisarantis, 2016). On the other hand, researchers have also used it in forecasting

entrepreneurial intentions and actions (Kautonen et al., 2015). Many studies in ICT adoption and usage research have also used TPB as their theoretical framework (Gamal Aboelmaged, 2010). Moreover, studies related to adoption of electronic platforms for accessing government services have used theoretical framework provided by TPB to understand citizens adoption behavior (Emrah Kanat & Özkan, 2009). These studies found significant relationships between attitude, subjective norm, perceived behavioral control and behavioral intention verifying the validity of TPB.

Researchers reviewed effectiveness of TPB by identifying 237 prospective tests out of 206 articles. They concluded that physical activity and diet behavior were predicted well using TPB (McEachan, Conner, Taylor, & Lawton, 2011). Overall the model was found successful in determining 19.6% variation in behavior and 44.3% variance in intention. Moreover, it was identified that the model is better predictor of behavior when follow up time period is of short duration compared to predicting behavior over long duration. However, there are researchers (Sniehotta et al., 2014) who challenged the efficacy of the model even after noting these successes of the model. Researchers have questioned it for its over simplicity. They have claimed that while going for parsimony the validity of the model has been compromised (Sniehotta et al., 2014). Other researchers (Sheeran, Gollwitzer & Bargh, 2013) have questioned the extensive focus TPB places upon rational reasoning therefore ignoring factors unconsciously affecting an individual's behavior. Similarly, researchers (Conner, Gaston, Sheeran, & Germain, 2013) have also criticized TPB of ignoring role emotions play in forming behavioral intentions. Sniehotta et al (2014) while criticizing TPB have challenged its predictivity and utility. Though the authors did not deny the efficacy of the constructs of TPB yet they suggested to abandon any further usage of the theory

claiming that even the researchers using the theory have started using additional constructs. The authors suggest that such researchers rather indicate about the insufficiency of the theory. They claimed that this way the researchers using base of TPB shows the incapability of the theory to predicting human behavior (Sniehotta et al., 2014). On the other hands other researchers have defended the position of TPB. Responding to the criticism, Ajzen (2015) has claimed to the credit of TPB its ability to consistently predict behavior from intention. Moreover, he clarified that reasoned action approach doesn't mean that individuals would be sensible in making their choices rather it means that they are reasonable in making the decision performing behavior based upon their own thinking process, social norms, influences and personal experiences. The author further explained upon the misunderstandings of the critics and their limited understanding of TPB. Ajzen was of the view that poor planning and design of constructs missing reliability and validity ultimately results in variance between predicting intentions. Moreover, he explained that the capability of the theory to add variables, in order to improve predictability, should be considered its advantage rather than its weakness. The author pressed upon the importance of well-constructed research design. He concluded that TPB is still relevant and useful in grasping insights of human behavior (Ajzen, 2015).

2.11. Chapter Summary

This section gave back ground information of m-government concept and its application around the globe. The section also briefed about Pakistan where the study is proposed to be conducted. Literature was reviewed to identify the factors affecting user's acceptance of m-government services. Those factors which were missing from the literature but were felt necessary were also

reviewed. Next section would detail the conceptual framework of study, methodology and operationalization of the variables.



CHAPTER THREE - RESEARCH FRAMEWORK, HYPOTHESES DEVELOPMENT AND METHODOLOGY

3.0. Introduction

The chapter covers the research framework while developing hypothesis of the research proposal. Research methodology has been explained in this chapter which is followed by the research design. This is then trailed by research objectives, proposed time lines and unit of analysis.

3.1. Research Framework

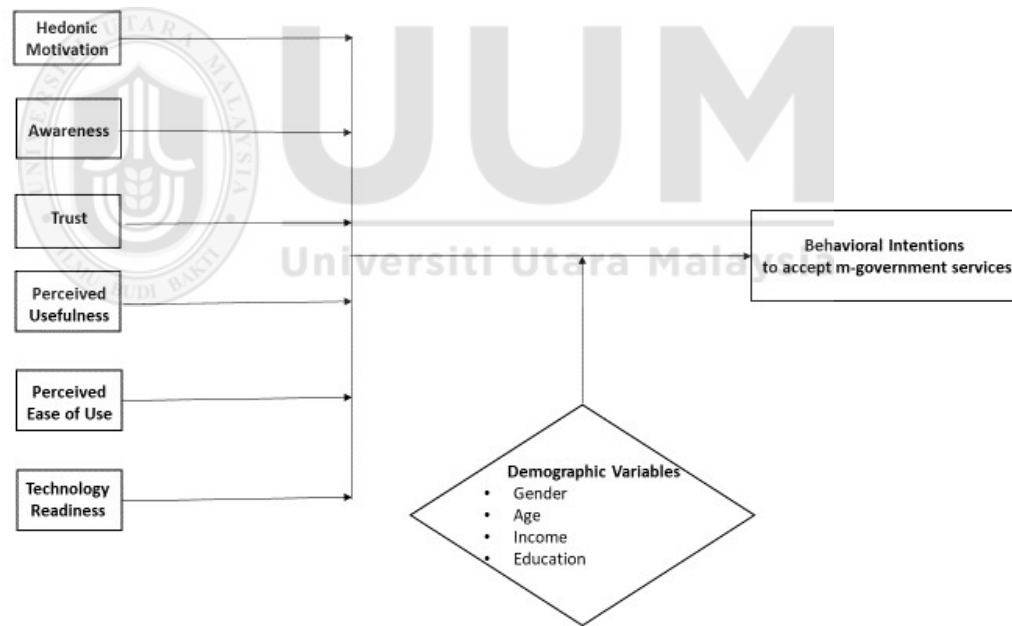


Figure 3.1- Research framework

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 et al., 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 TAM (Davis, 1985), TRA and TBP. Since m-government is a tool which governments are using to communicate with general public (WorldBank, 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 et al., 2012). The role of demographical variables as moderator, introduced in the original UTAUT (Venkatesh et al., 2003) was also kept in UTAUT2 (Venkatesh et al., 2012). The proposed model not only takes the variable of hedonic motivation from UTAUT2 but also have used demographical variables as moderators as was done both in UTAUT and UTAUT2. However, the proposed model is a step ahead since it uses income difference and number of years of education in addition to gender and age used by both UTAUT and UTAUT2.

A thorough review of literature helped in understanding the variables which effect m-government acceptance behavior. Constructs, similar in nature, were discarded while keeping only one item of a kind to develop a parsimonious model. These variables along with the construct of hedonic motivation was made part of the model to understand m-government acceptance behavior. Another variable, technology readiness, was included in the model since it has proven role in acceptance of technology (J.-S. C. Lin & Chang, 2011) especially where self-service technology like m-government applications have been used by consumers (Kumar et al., 2017). As depicted in the figure 3.1, the model proposes that Hedonic Motivations, Awareness, Trust, Perceived Usefulness, Perceived Ease of Use and Technology Readiness have a direct effect upon behavioral intentions to accept m-government services. The model further proposes that demographic variables gender, age, income and education moderate the relationship between each of the independent variable of Hedonic Motivations, Awareness, Trust, Perceived Usefulness, Perceived Ease of Use, Technology Readiness and Behavioral Intentions to accept m-government services.

3.2. Hypothesis development

M-government provides an opportunity to reach out at a time of convenience to a user, even to those who are located at otherwise far flung and un accessible location (Shah & Chattopadhyay, 2016). The ubiquity of mobile communication, and the opportunities it represented, pushed researchers to start investigating issue concerning the challenges which implementation of M-government poses. Researchers have argued about issues of technological challenges, network capabilities and service delivery etc. Carroll (2005) was amongst the first few researchers who raised the question of the acceptance of m-government by the citizens. She rightly pointed out that

success of m-government is dependent upon its acceptance by the users of governmental services (Carroll, 2005; Ohme, 2014). Even after passing of more than a decade, research on the subject is still in its infancy and need detailed investigation on the issues which effects users' acceptance of m-government. Not understanding requirements of users could be a reason that adoption rates of m-government even in the developed nations are low in contrast to their higher adaptation of e-government services (Ohme, 2014).

According to the UN E-Government survey (2016) Pakistan is ranked at 159th place amongst the UN member states in E-Government Development Index (EGDI). Bridging the digital divide is necessary to achieve reduce poverty and to remove disparities. Availability and capability of cheap smart phones and mobile broad band has introduced opportunities for government to access geographically and socially challenged citizens in innovative manner (UN, 2016). Pakistan is a developing nation striving to get benefit from the mobile revolution. In the recently revealed Digital Pakistan policy 2017, government of Pakistan has shown its resolve to bank upon the growth of smart phones. It has shown determination to provide m-government services especially in achieving sustainable development goals while explicitly naming areas like m-health, m-education, m-commerce and m-agriculture (MoIT, 2017). Researchers have highlighted users' acceptance and participation as one of the major obstacles in its diffusion. It is argued that understanding users behavior is necessary in order to make such initiatives popular (Haider et al., 2016).

Adoption of a system, based upon technology, is dependent upon user's perceived usefulness of the system. More the user believe in the benefits from the system, the higher would be chance of

its acceptance (Davis, 1985; Youngseek Kim & Crowston, 2011; H.-F. Lin, 2007; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). M-government is also a technology based system (E. Abu-Shanab & Haider, 2015; Mossey & Manoharan, 2017; Saadi et al., 2017; Watson et al., 2017). And like other technology dependent system m-government acceptance should be dependent upon the perceived usefulness. Based on the discussion, the following was hypothesized.

H1: There is positive relationship between perceived usefulness and acceptance of m-government services

Becoming aware of a service is a first step towards its adoption. Moreover, the more the consumer is aware of the functions of a service better would the customer become in getting utility from it (Mutahar et al., 2018). Henceforth, awareness, regarding the advantage a service provides and functions it performs, becomes important. This helps them not only creating their perception about the usefulness of the services but also moves the users towards acceptance of the service (Ahmad & Khalid, 2017). The discussion led to hypothesize the following

H2: There is a positive relationship between awareness and acceptance of m-government services

A technology which is easy to use is also convenient to adopt. Researchers have identified perceived ease of use amongst one of the most important factors affecting user's technology acceptance behavior (Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). Construct of perceived ease of use was also used by David (1985) in technology acceptance model (TAM) to explain user's technology acceptance behavior. Ease of use was also

highlighted as an important factor in unified theory of acceptance and usage of technology (UTAUT), theory of planned behavior (TPB), diffusion of innovation theory (DoI) and social cognitive theory (SCT) (Youngseek Kim & Crowston, 2011). These evidences therefore helped in hypothesizing the following

H3: There is a positive relationship between perceived ease of use and acceptance of m-government services

Having knowledge about technology readiness of the users helps designing services to the level of users understanding. Moreover, this helps in improving service delivery (Parasuraman & Colby, 2015). Furthermore, information about the technology readiness helps in designing the technology strategy while improving handling of the relation between users and the organization (V. S. Gupta & Garg, 2015). Personal characteristics of users have effect upon users behavior in technology acceptance (Parasuraman, 2000). Technology readiness is an individual characteristic. It has been argued that technology readiness effects upon acceptance of technology based solution amongst its users (Svendsen et al., 2013). Understanding the phenomena of technology acceptance might be necessary to make an informed decision while investing in Technology. Technology Readiness has already been noted as one amongst the important factors affecting user's acceptance behavior of m-government services (Al-Hadidi & Rezgui, 2010). Keeping in view the ongoing discussion, this study posited the following.

H4: There is a positive relationship between technology readiness and acceptance of m-government services

Mistrust of the citizens regarding the security of citizens private data is a barrier towards accepting m-governmental services (Christopher & Leonidas, 2014). User would trust the system only if they would believe in reliability of the offered services. This reliability leads to positive intentions towards use of mobile government. (Shareef, Kumar, et al., 2016). Public having either no or low literacy have been found willing to adapt even difficult to use but a trustworthy platform (Chauhan, 2015). Trustworthiness of information communicated to poor citizens through mobile phone has been argued as a requirement of a platform using mobile for development (Ojo et al., 2013). Based on discussed evidences this study further hypothesised the following

H5: There is a positive relationship between Trust and acceptance of m-government services

Hedonic motivation plays an important role in shaping household's technology acceptance behavior (X. Zhang & Maruping, 2008). This effect of hedonic motivation variates based upon cultural differences. (Yogesh K Dwivedi et al., 2016; X. Zhang & Maruping, 2008). Uniqueness of mobile governmental services in south east Asia, scarcity of gadgets playing role in routine matters along with the unique cultural environment make a combination where hedonic motivation could be presumed to be a cause of acceptance of m-government services (Yogesh K Dwivedi et al., 2016). Based on these arguments this study stated the following hypothesis.

H6: There is a positive relationship between hedonic motivations and acceptance of m-government services

Demographics can provide further explanation while evaluating differences in the decision individuals make regarding acceptance of technology (Ahmad & Khalid, 2017). Understanding demographics would help not only comprehending m-government acceptance behavior of general public but would also help in designing services adoptable for general users. (Shareef et al., 2012). Gender, age, education and income differences are demographic variables considered to be affecting decisions regarding acceptance of technology (Sharma, 2015; Sipior et al., 2011; Venkatesh et al., 2012).

The odds of a man owning a mobile phone in South East Asia is way higher than that of woman living within the same geographical location. (Burchell & Lopez, 2017). Researchers have reported behavioral differences due to gender (Francis et al., 2015; Goswami & Dutta, 2015; Macintosh & Krush, 2014; O'Fallon & Butterfield, 2005). Governments are responsible to design mechanisms which help curtailing gender differences so to bridge the digital divide. (UN, 2016). Comprehending the behaviour and role of gender is thus important viz. a viz. user acceptance of m- government services (Almuraqab & Mansoor, 2017).

The role of age has already been identified as a factor and a moderator affecting technology adoption behavior (Morris & Venkatesh, 2000). Comprehending the influence which age exerts upon the m-government acceptance behavior should provide further insights into the subject (Ahmad & Khalid, 2017).

Income is another factor which needs to be investigated for its role upon user's technology acceptance behavior (Morris & Venkatesh, 2000). Household income can have an impact upon

users behavior towards acceptance of m-governments services (Ahmad & Khalid, 2017; Rojas-Méndez et al., 2017; UN, 2018b). Similarly, education was another important factor identified by the United Nations affecting user's behavior related to acceptance of governmental initiatives based upon technology (UN, 2014). Studying the impacts which number of years of education have on the m-government acceptance behavior would provide further insights into the phenomenon.

User's acceptance of m-government services is affected by the user's perception regarding the usefulness of these services (Almarashdeh & Alsmadi, 2017). Contrastingly, perceived usefulness was also found having no effect upon m-government acceptance behavior on many occasions (Ahmad & Khalid, 2017). Effect of demographic variables upon the relationship between perceived usefulness and acceptance of technology is an area being keenly followed by researchers. Few authors claimed that demographics have moderating effect upon the relationship between perceived usefulness and acceptance of technology (J. Koivisto & Hamari, 2014). On the other hand, there are authors who have reported otherwise (J. W. Lee, 2010).

Researchers have also remained divided upon the role which perceived ease of use plays upon acceptance of technology. Some researchers have identified it as the most important variable affecting user's technology acceptance behavior (Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016). However, there are other researchers who have refuted any such relationship. They argued that perceived ease of use do not have any effect upon user's technology acceptance behavior (Ahmad & Khalid, 2017; Changlin Wang, 2014).

Similarly, contradicting point of view are reported in literature regarding the role which trust plays upon user's technology acceptance behavior (B. Ali et al., 2015). Researchers (Almarashdeh & Alsmadi, 2017; Chauhan, 2015; Zada et al., 2016) have reported significant relationship between trust and user's technology acceptance behavior in contrast to the result of other researchers who have found this relationship to be insignificant (M. I. Eid, 2011). Moreover, few authors have also argued that the trust requires presence of other factors to make relationship of trust with user's technology acceptance behavior significant (Yeolib Kim & Peterson, 2017; Yoon & Occeña, 2015).

Differences in geographical locations creates differences in the individual personality attributes affecting technology readiness of a user. This introduces variation in technology readiness of users from one country to another.(Ferreira et al., 2014). Researchers (Al-Hadidi & Rezgui, 2010; Parasuraman & Colby, 2015; Svendsen et al., 2013) have argued that there is a significant relationship between technology readiness and users acceptance of technology. On the contrary, there are researchers (Berndt et al., 2010; Summak et al., 2010) who have proven the relationship to be insignificant. Furthermore, demographics have also been argued having an effect upon technology readiness of users (Hassan, 2010; Summak et al., 2010).

Researchers have established opposing views regarding the effect of awareness upon acceptance of m-government services. Few researchers have claimed that there is positive relationship between awareness and acceptance of m-government services (Almuraqab & Jasimuddin, 2017; Eastin et al., 2016; Mutahar et al., 2018). Whereas as others have found no significant relationship between both (Mandari & Chong, 2018; Ohme, 2014). Researchers have also suggested to

investigate the moderating effect of awareness upon acceptance of mobile based services (Eastin et al., 2016).

Researchers formed conflicting opinion regarding the relationship between hedonic motivation and acceptance of mobile based services. A number of researchers identified significant relationship between hedonic motivation and acceptance of mobile based services (Ali A Alalwan et al., 2015; de Sena Abrahão et al., 2016). Contrastingly, other researchers found this relationship to be insignificant (Oliveira et al., 2016). Moreover, researchers, while observing relationship between hedonic motivation and acceptance of mobile based systems, confirmed the inconsistency in results in different geographical regions (Yogesh K Dwivedi et al., 2016).

Baron and Kenny (1986) have suggested introduction of moderator variables when there is inconsistent relationship between two variables. The literature has suggested inconsistent results, between perceived usefulness and acceptance of technology, between perceived ease of use and acceptance of technology, between trust and acceptance of technology and between technology readiness and acceptance of technology. This allows for introduction of moderators in between these variables (Baron & Kenny, 1986).

Based upon the evidences from literature produced above. This study hypothesized the following.

H7a: The relationship between perceived usefulness and acceptance of m-government services is moderated by gender

H7b: The relationship between perceived ease of use and acceptance of m-government services is moderated by gender

H7c: The relationship between technology readiness and acceptance of m-government services is moderated by gender

H7d: The relationship between trust and acceptance of m-government services is moderated by gender

H7e: The relationship between hedonic motivation and acceptance of m-government services is moderated by gender

H7f: The relationship between awareness and acceptance of m-government services is moderated by gender

H7g: The relationship between perceived usefulness and acceptance of m-government services is moderated by age

H7h: The relationship between perceived ease of use and acceptance of m-government services is moderated by age

H7i: The relationship between technology readiness and acceptance of m-government services is moderated by age

H7j: The relationship between trust and acceptance of m-government services is moderated by age

H7k: The relationship between hedonic motivation and acceptance of m-government services is moderated by age

H7l: The relationship between awareness and acceptance of m-government services is moderated by age

H7m: The relationship between perceived usefulness and acceptance of m-government services is moderated by income

H7n: The relationship between perceived ease of use and acceptance of m-government services is moderated by income

H7o: The relationship between technology readiness and acceptance of m-government services is moderated by income

H7p: The relationship between trust and acceptance of m-government services is moderated by income

H7q: The relationship between hedonic motivation and acceptance of m-government services is moderated by income

H7r: The relationship between awareness and acceptance of m-government services is moderated by income

H7s: The relationship between perceived usefulness and acceptance of m-government services is moderated by education

H7t: The relationship between perceived ease of use and acceptance of m-government services is moderated by education

H7u: The relationship between technology readiness and acceptance of m-government services is moderated by education

H7v: The relationship between trust and acceptance of m-government services is moderated by education

H7w: The relationship between hedonic motivation and acceptance of m-government services is moderated by education

H7x: The relationship between awareness and acceptance of m-government services is moderated by education

3.3. Research design

This study employed quantitative approach while using survey instruments. The result of survey is normally described in quantitative data (Walliman, 2017). Hair et al. (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 (J. 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 & Babin, 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 under discussion 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 (Yogesh K Dwivedi et al., 2018; Haider, Shah, & Chachar, 2017; Richard et al., 2017; Xie et al., 2017) in the area of acceptance of technology have adopted cross sectional technique vis-à-vis time frame of their research work.

Unit of analysis which some researchers refer to as sampling unit stems from the problem statement.

3.4. Operational Definitions



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

3.4.1. Perceived usefulness

Authors used five items five-points Likert scale to measure perceived usefulness of individuals while studying gender differences and online consumer's repurchase intentions (Amin et al., 2015). Davis (1993), on the other hand used a ten items and seven-points Likert scale while

measuring perceived usefulness of electronic mail services (Davis, 1993). Whereas, Shahzad et al (2018) used a five-item scale to measure perceived usefulness of security response system using m-government services. The construct used by authors is relevant to the proposed study since it was used to measure perceived usefulness of citizens to estimate the adoption intention of m-government services security response system (Shahzad et al., 2018). And the purpose of study is also to evaluate the adoption of m-government services. Moreover, the study was conducted in Pakistan, which is also targeted geographical location where the current study is being planned to be conducted. Therefore, for the purpose of this study, measurement scale of perceived usefulness used by Shahzad et al (2018) was adopted as is suggested in table 3-1

Table 3-1

Questions on perceived usefulness-adapted and modified from Shahzad et al (2018)

I think the m-govt services should enable me to complete interactions without harassment.
I am likely to use valuable m-govt services provided to me.
I think interaction with a mobile device is valuable.
Using the govt services through a mobile device is less expensive.
Using the m-govt services is time-saving and helps me to complete tasks more rapidly.

3.4.2. Perceived ease of use

Authors (E. Abu-Shanab & Haider, 2015) have used a three items five-point Likert scale to measure perceived ease of use (PE) while identifying factors influencing m-government services in Jordan. Davis (1993), on the other hand used a ten items and seven-points Likert scale while measuring perceived ease of use of electronic mail services (Davis, 1993). Other researchers adopted three items five-points Likert scale to measure perceived ease use while studying gender differences and online consumer's repurchase intentions (Amin et al., 2015). Whereas, Ahmad &

Khalid (2017) used five items and five-point Likert scale to measure PE. Since they worked upon measuring user's adoption behavior of m-government services which is related to the topic of this research. Therefore, it was found pertinent to adopt the measurement scale of PE as being used by Ahmad & Khalid (2017). The adopted measurement scale is reported in table 3-2.

Table 3-2

Questions on perceived ease of use -adapted and modified from Ahmad & Khalid (2017)

Learning to operate m-government is easy for me.
I found m-government is easy to get to do what I wanted to do.
My interaction with m-government is clear and understandable.
It is easy for me to be become skillful at using m-government.
I found m-government is easy to use

3.4.3. Awareness

This study considers awareness as the familiarity, information and knowledge the users have regarding m-government services. Researchers have argued about the importance of awareness in adoption of services based upon technological platforms (Hanafizadeh, Behboudi, Koshksaray, & Tabar, 2014) including mobile based platforms providing government services (Mandari & Chong, 2018). Researchers have further established that awareness plays a significant role in adoption of technological services (Hanafizadeh & Khedmatgozar, 2012). Knowledge about the technology and benefit provided by technological platforms are key factors considered necessary in making such technology-based systems successful (Mutahar et al., 2018). Researchers have used five items and five points Likert scale to measure awareness of m-government services amongst rural farmers in Tanzania. Whereas, other researchers have used just a one item scale to measure awareness of

e-government services while working upon factors influencing e-government adoption in Pakistan (Mariam, Vatcharaporn, & Muhammad, 2012). Authors (Mutahar et al., 2018) have measured awareness of mobile banking system using three items and seven points Likert scale. On the other hand authors have used a four items five points Likert scale to measure awareness of internet banking in Iran (Hanafizadeh & Khedmatgozar, 2012). For the purpose of this study, measurement scale of awareness used by (Mutahar et al., 2018) and (Hanafizadeh & Khedmatgozar, 2012) were adopted as is placed at table 3-3

Table 3-3

Questions on awareness-adapted and modified from Mutahar et al (2018) & (Hanafizadeh & Khedmatgozar, 2012)

In general, I know about m-government services.
I have received enough information about the benefits of using m-government services.
I think that when needed, I will get enough guidance from the government related to m-government services.
I have enough information about the ways of using m-government services.

3.4.4. 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 proposes to use the Technology readiness index 2.0 as proposed by Parasuraman, A., & Colby, C. L. (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 makes TRI 2.0 more relevant for adoption by this research as suggested in table 3-4 since the research framework in the study has many other variables to measure alongside technology readiness.



Table 3-4

Questions on Technology readiness-adapted and modified from Parasuraman, A., & Colby, C. L. (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

3.4.5. Trust

Hung et al (2013) has measured trust while identifying behavioral factors affecting acceptance of m-government services. The authors adapted the items used to measure trust from Gefen (2000). On the other hand, trust was being measured by other authors (W.-T. Wang, Wang, & Liu, 2016) differently using the measurement scale developed by (Gefen, Karahanna, & Straub, 2003). Similarly, researchers (Ali Abdallah Alalwan, Dwivedi, & Rana, 2017) while evaluating factors influencing adoption of mobile government services also have adopted the measurement scale of trust developed by Gefen et. al (2003). Though both articles (Gefen, 2000; Gefen et al., 2003) measure trust but Gefen (2000) is more concerned in trust in electronic service provider. This is more relatable to the concept of m-government. Since m-government services are mobile based services where government is electronic service provider like any other electronic service provider. The measurement model is also simpler and being already adapted by Hung (2013) for measuring trust in m-government services. Furthermore, the measurement scales later developed and used by authors (Bansal, Zahedi, & Gefen, 2010; Bansal, Zahedi, & Gefen, 2016) are also based upon what Gefen (2000) has developed. Therefore, the study adapted both Gefen (2000) and Bansal, Zahedi & Gefen (2016) as is reported in table 3-5

Table 3-5

Questions on trust-adapted and modified from Gefen (2000) and Bansal, Zahedi & Gefen (2016)

Even if not monitored, I would trust m-government services to do the job right
I trust m-government services
I believe m-government services are dependable
I believe m government services care about interest of its users all the time
I believe m-government provide good services

3.4.6. Hedonic motivations

(Ali A 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 (Ali Abdallah Alalwan et al., 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 et.al (2012), while proposing extension in unified theory of acceptance and use of technology, is easy to follow and being adopted by many authors (Ali Abdallah Alalwan et al., 2017; Ali A Alalwan et al., 2015). The three items and seven points Likert scale used by researchers (Venkatesh et al., 2012) was proposed to be adapted by this study. Moreover six items scale built on hedonic joy used by authors (Lowry, Gaskin, Twyman, Hammer, & Roberts, 2012) while proposing the hedonic motivation system adoption model was also adopted in this study. Table 3-6 explains the items to measure hedonic motivation

Table 3-6

Questions on hedonic motivation-adapted and modified from Venkatesh et.al (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

3.4.7. Behavioral intentions

Venkatesh et.al (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 et al., 2012). (Gamal 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 et al., 2018). On the other hand authors measuring mobile banking adoption intentions have used three items but seven-point Likert scale (Richard et al., 2017). Moreover other researchers (H.-F. Lin, 2007) measured behavioral intention while predicting intentions of consumers for online shopping. Since, the researchers (H.-F. Lin, 2007; Richard et al., 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 was adapted as is placed at table 3-7.

Table 3-7

Questions on behavioral intentions adapted and modified from-Richard et al (2017) & (H.-F. 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

3.5.Measurement of variables/ Instrumentation

A thorough literature review was conducted to understand the intricacies of the instrument development being done by the contemporary as well as senior researchers of the field. The measurements proposed to quantify constructs of this study are taken from other studies of same

context. So, to make the study relevant, at par, and comparable to other research from the same subject area. The research model consisted of seven constructs namely Hedonic Motivation, Awareness, Trust, Perceived usefulness, Perceived ease of use, Technology readiness, and Behavioral intentions to accept m-government services. Five-point Likert scale was used in the questionnaire to measure responses. Researchers (Revilla, Saris, & Krosnick, 2014; Weijters, Cabooter, & Schillewaert, 2010) have argued between the effectiveness and efficiency of five-point and seven-point Likert scale. However, the usage of five-point scale was recommended by authors (Revilla et al., 2014) claiming that the information quality doesn't increase with the increase in scale. Instead they argued that the quality decreases if the scale is increased more than five-points (Revilla et al., 2014). Moreover, researchers (Weijters et al., 2010) found information collected to be of higher quality when five-point scale is used especially when the study is concerned with general population. Few authors (Garland, 1991) have also questioned giving a mid-point or choice of giving neutral response to respondents thus making a case against the usage of an odd number of points in Likert scale. However, research has proven that quality of responses may decrease if the respondents are imposed to take side (BISHOP, 1987). Moreover, researchers have discussed upon the importance of labelling upon each point (Krosnick & Fabrigar, 1997; Revilla et al., 2014; Weijters et al., 2010). The researchers have further argued (Krosnick & Fabrigar, 1997) and proved that labelling each point helps increasing reliability of the questionnaire (Krosnick & Berent, 1993).

Table 3.10

Construct Summary

Construct	Source	Items
Hedonic Motivation	(Venkatesh et al., 2012)	3
Awareness	(Mutahar et al., 2018)	3
Trust	(Gefen, 2000)	3
Perceived usefulness	(Shahzad et al., 2018)	5
Perceived ease of use	(Ahmad & Khalid, 2017)	5
Technology readiness	(Parasuraman & Colby, 2015)	16
Behavioral intentions	(Richard et al., 2017)	3

The table above shows the variables and the number of items through which each construct would be measured. Moreover, reference against each variable is provided showing the study from which the construct was adapted. Hedonic Motivation shall be measured using 3 items, Awareness would also be measured having 3 items, Trust again through 3 items, Perceived usefulness through 5 items, Perceived ease of use again through 5 items, Technology readiness using 16 items and Behavioral intentions would be measured using 3 items.

A well-designed questionnaire is necessary to collect data which helps comprehending the predetermined fundamentals of an issue. On the other hand, a poorly structured questionnaire is a waste of resources. Such a questionnaire incurs loss while collecting data and leads to the selection of wrong action plan or intervention (J. Hair et al., 2003). Well-structured questions, pilot testing, clear explanation of the purpose of questionnaire, nicely presented questionnaire and well administered execution plan are the steps which increase not only the response rate but also quality

of the collected data. And this is quality of data which make results valid and reliable (Saunders, Lewis, & Thornhill, 2009).

Authors (Saunders et al., 2009; Walliman, 2017) have recommended usage of questionnaires for collecting both qualitative and quantitative data. Authors have highlighted that a well-designed questionnaire helps asking embarrassing questions easier fetching more answers than any other method. Moreover, it is cheap and easily replicable at different geographical locations (Walliman, 2017). Furthermore, when using questionnaires having close ended questions makes drawing statistical inferences way easier since responses generated through questionnaires are easy to code, tabulate and analyze (Dawson, 2002; Sekaran & Bougie, 2016). The research therefore used close ended questions providing measurement options using Likert scale to the respondents. When all items in a questionnaire use Likert scale, it is considered close ended (Sekaran & Bougie, 2016).

Self-administration of the questionnaire helps in collecting responses in short period of time. It further supports in clarifying confusions regarding questions if any arises. Moreover, it provides the opportunity to explain the research topic to the respondents helping them understanding the purpose of research which results in generating better responses. The research therefore was personally administered since it was most probably the best way to administer the questionnaires (Sekaran & Bougie, 2016)

Though it is not possible to achieve perfect validity and reliability (Neuman & Robson, 2014) yet achieving maximum of validity and reliability is the desire of this study. This study has used

constructs which were already used by other researchers. According to the researchers using the constructs already used by other researchers increases reliability (Neuman & Robson, 2014).

3.6.Sampling

Selecting a small manageable part of population of interest to include in research is sampling (Dawson, 2002; Sekaran & Bougie, 2016). Sampling techniques help making selection of the sample possible from the population (Saunders et al., 2009).

3.6.1. Target Population

The process of sampling begins with identification of target population coming under scope of the respective study (Sekaran & Bougie, 2016). Citizens of Pakistan who own mobile phone and own an active mobile connection are target population in this study. A mobile connection can only be obtained in Pakistan after submitting copy of national identity card along with bio-metric verification of the customer (GSMA, 2016). Whereas a person is required to be of 18 years of age to get the national identity card (NADRA, 2019). This means that the targeted population consists of adult citizens which may under circumstances require to use governmental services. Pakistan has a subscription base of more than 150 million mobile subscribers (PTA, 2019). Table 3-11 details service provider wise data of total mobile subscribers as on April 2019.

Table-3-11

Total number of mobile subscriber-April 2019

Total	PMCL (Jazz)	CM Pak (Zong)	PTML Ufone	Telenor
161,014,397	59,205,360	34,409,973	22,560,683	44,838,381
Market Share	36.77	21.37	14.01	27.85

Source:(PBS, 2019)

All these mobile subscribers are adult citizens of Pakistan. All of them may need to interact with government from time to time. And the availability of mobile connection provides an opportunity to them for accessing government services through their mobile phone provided such services becomes available to them.

3.6.2. Unit of Analysis

Neuman & Robson (2014) described unit of analysis as an individual case that is being studied for measurement and analysis. Whereas, Sekaran & Bougie (2016) have explained unit of analysis as the level of combination of data while analyzing it.

Unit of analysis in the case of proposed research is an individual mobile subscriber in Pakistan. Acceptance of technology is an area of interest for researchers. The motivation and behavioral processes of an individual are studied by researchers to study the acceptance of technological innovations. And individual users remained unit of analysis in most of these studies. Unit of analysis in most of these studies was individual users, and their usage of technology was based mainly on individual motivations and individual decision-making processes (Dadayan & Ferro,

2005). While studying factors that affects acceptance of new technologies in workplace, authors (Wong et al., 2018) took individual academic and administrative staff members of two universities as unit of analysis. Researchers, while investigating effects of perceived usefulness and awareness upon acceptance of mobile banking in Yemen, had selected individuals not utilizing m-banking services although having a mobile phone and a bank account in a bank providing m-banking services, as unit of analysis (Mutahar et al., 2018). Similarly, individuals were selected by researchers as unit of analysis for examining awareness, acceptance and usage of m-government services in India (Yogesh K Dwivedi et al., 2018). Moreover, researchers took individual m-government user as unit of analysis while examining role of perceived risk in adoption of m-government services in India (Saxena, 2018). Considering preceding discussion, unit of analysis in the proposed research is an individual mobile subscriber in Pakistan.

3.6.3. Sample size

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 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. This research is proposed to evaluate 9 variables. Hence, according to the suggestion of Roscoe (1975), sample size of 90 might be enough. 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 3-12 describes the sample size with reference to the size of population.

Table-3-12

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 should hover around 384 for population having size of more than one million. 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.

3.7.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 3-13 explains the administrative unit wise population of Pakistan

Table 3-13

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 should be collected from all the heterogeneous groups existing 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 3-14 which represented the proportion of samples to be collected from each region. This proportion was calculated by dividing the population of each region by total population.

Table 3-14

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

As explained above there are four service providers in Pakistan. In order to collect a sample representing customers from all telecom service providers. Sample was collected proportionately representing all the service providers from each administrative unit. 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). Researchers have used the mall intercept method in variety of areas. Few researchers (Moon & Attiq, 2018) have used this technique in investigating compulsive buying behavior whereas others (Khare, 2015) have used it to examine buying behavior of environmentally conscious consumers. Help of research assistants were taken while collecting data for efficient and timely collection of data.

Table 3-15 explains number of samples required to be collected from each city for each telecom operator. Number of samples required for each organization in each city were calculated by multiplying the total number of sample size of that cluster to proportion of the market share of

service provider. Sample sizes for each cluster when calculated for each service provider was rounded to the nearest whole number.

Table 3-15

Cluster base sample size

	Cluster/ (City)	KPK/ (Peshawar)	Punjab/ (Lahore)	Karachi/ (Sind)	Balochistan/ (Quetta)	Islamabad/ (Islamabad)
Population	207,774,520	35,525,047	110,012,442	47,886,051	12,344,408	2,006,572
Sample Proportion	100.00	17.10	52.95	23.05	5.94	0.97
Total Sample Size	385	65.83	203.85	88.73	22.87	3.72
City wise samples to be collected from customer care center of each service provider	PMCL (Jazz)	24	75	33	8	1
	CM Pak (Zong)	14	44	19	5	1
	PTML (Ufone)	9	29	12	3	1
	Telenor	18	57	25	6	1

Source: Author

This rounding off has resulted in an increase in total sample size. Thus, using the cluster-based sampling technique, the total proposed sample size was 386.

The researcher himself collected data from Islamabad and Karachi however services of enumerators were used for collecting data from Lahore, Peshawar and Quetta. The enumerator were trained beforehand about the way they were expected to approach the users and to interview and fill in the questionnaire. They were also asked to get few extra questionnaires filled in from each strata so to ensure that the required number of samples get collected. Table 3-16 explains the number of questionnaire filled in from each strata. A total of 434 samples were collected.

Table 3-16

Sample Collected from Each Strata

	Cluster/ (City)	KPK/ (Peshawar)	Punjab/ (Lahore)	Karachi/ (Sind)	Balochistan/ (Quetta)	Islamabad/ (Islamabad)
City wise samples to be collected from customer care center of each service provider	PMCL (Jazz)	27	77	36	11	2
	CM Pak (Zong)	16	47	22	8	2
	PTML (Ufone)	12	32	15	6	2
	Telenor	21	59	28	9	2

3.8. Techniques of data analysis

Researchers cautiously scrutinize empirical observations, build reasoning, simplify complexities and infer conclusions based upon abstract data. Data analysis techniques are employed to reach conclusions (Neuman & Robson, 2014). Forming conclusion is the crux of data analysis. This is the stage where a researcher answers the questions asked at the start of the research and identify the reason of the identified relationships while providing reasoning (Sekaran & Bougie, 2016). In fact, researchers apply methods of data analysis to identify recurring designs in data. A pattern, once identified, is understood with reference to a social theory (Neuman & Robson, 2014).

Authors have argued that trends start emerging in the eyes of researchers soon after they start coding data therefore coding might be considered the first step in process of analyzing data (Neuman & Robson, 2014). After assigning the code this study used statistical package for social sciences (SPSS) as data base for initial data entry and data analysis (Sekaran & Bougie, 2016).

After the data entry, missing value and outliers were identified. Missing data and outliers were excluded from the analysis (Saunders et al., 2009). Descriptive statistics were calculated to help understanding the data by quantification of characteristics of the data (Walliman, 2017). This provided understanding regarding how the data is dispersed around one central value while providing understanding about the general preferences of respondents (Sekaran & Bougie, 2016).

Structural equation modeling (SEM) was used to further analyze the data. SEM is popular method for identifying the relationship between variables which leads to modeling via analyzing path using various measures for each variable (Creswell & Creswell, 2017). Kline (2015) refers to SEM as a group of related techniques. Models analyzed using SEM are based upon “probabilistic causality” rather than “deterministic causality” (Kline, 2015).

SEM is a popular technique amongst researcher. It is used in variety of social science and business and research areas (Henseler, Hubona, & Ray, 2016) including marketing (Martínez-López, Gázquez-Abad, & Sousa, 2013), human resource management (Christian M Ringle, Sarstedt, Mitchell, & Gudergan, 2018), Psychology (Finlay-Jones, Rees, & Kane, 2015), management accounting (Nitzl, 2016), and Technology (Henseler et al., 2016). Authors (Ahmad & Khalid, 2017; Almarashdeh & Alsmadi, 2017; Shareef, Dwivedi, et al., 2016) have also used SEM to analyze data in the adoption of m-government services which is the area of interest for this study. The popularity, usability and adoption of SEM in the similar studies justifies usage of SEM for this study as well.

3.9.Chapter Summary

This chapter has explained the research methodology by proposing the research design, theoretical framework and relationship in between the variables. Hypothesis development has been discussed in details and operationalization of each latent variable has been explained. Sampling philosophy has been explained vis-à-vis target population and selection of sample from each stratum. Reasons to collect samples from all the four provincial capital along with the federal capital city were discussed at length. Usage of SPSS was discussed for calculating descriptive statistics. And finally plans for using structural equation modeling, for analyzing the data, were explained.



CHAPTER FOUR – RESULTS AND DISCUSSION

4.0. Introduction

This chapter includes the presentation of data analysis and its interpretation. Data analysis procedures in a critical part of the research in which used processes, sequences, and approaches will affect the final output and the reliability of the research findings. Data analysis is a complex process influenced by several rules, values, and standards. Thus, a detailed discussion of the data analysis process is provided in this chapter in the sequence it was performed.

4.1. Response Rate

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% (290/467) for the survey conducted physically whereas it was reduced to 36% (144/400) when survey questionnaire were distributed using technology; whereas the overall response rate was 50% (434/867). The difference in response rates got remained in line with the research done by other researchers (Blumenberg & Barros, 2018){Altmann, 2020 #471} who have concluded that web based survey methods have lower response rates in comparison to other methods.

4.2. Data Screening and Preliminary Analysis

Researchers (Joseph F. Hair, Money, Samouel, & Page, 2007) have emphasized upon the importance of initial data screening in multi variate analysis. According to the researchers, data screening helps researchers in identification of variation from the necessary assumptions required to the application of multivariate data analysis. Moreover, this helps the researchers in understanding the data better by exploring various dimensions of the data at the basic level.

This 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 these questionnaires 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 outliers might result in missing a unique insight into the characteristics of the population parameter. However, on the other hand, keeping these outliers may skew the data providing inaccurate picture of the population. Therefore it is essential to handle outliers in an objective manner (Hair, Black, Babin, & Anderson, 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).

4.3. Participants demographic characteristics

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. Cross-tabulation of the gender by their age categories, educational qualification and monthly income is presented in Table 4.1.

It can be observed by a glance on the table 4.1 that the respondents were from varied age groups, educational backgrounds, and income levels. Evaluating age one identifies that 80.7% of the males were amongst the 18-30 age group whereas 32.9% of the females were from the same age group. Whereas 29.3% of the male sample was above the age of 30 years in contrast to 67.1% of the female sample for those above 30 years of age. Population of Pakistan has a youth bulge. A majority of young people being part of the sample is in fact a representation of the reality. However, low participation of the women from the same age group typically reflects culture of Pakistan, where young women do not like to be approached by the unknown individuals. On the other hand cultural standards provide the required confidence older women

to interact with strangers which might be the reason that there are more women in the above 30 years of age category.

Likewise, the findings exhibit that male and female respondents having formal education up to 12 years were 32.5% and 46.4% respectively. Whereas, 67.5% of male and 53.6% of female respondents had formal education of more than 12 years. Again this reflects the norms of Pakistani society where families invest more in higher education of their male wards than the female members. Lastly, the sample selected had no male having a salary up to PKR 50,000 whereas around 97.1% of females had a salary up to PKR 50,000. Moreover, all of the male respondents had reported salary above PKR 50,000 and whereas only 2.9% of the female respondents had chosen the same category (see Table 4.1).

Table 4.1

Participants' Gender by Demographic Characteristics

Variable	Category	Gender				Total	
		Male		Female			
		Freq.	%	Freq.	%	Freq.	%
Age (years)	18-30	171	80.7	68	32.9	239	57.0
	Above 30	41	19.3	139	67.1	180	43.0
Formal Education (years)	Up to 12	69	32.5	96	46.4	165	39.4
	Above 12	143	67.5	111	53.6	254	60.6
Monthly Income	Up to 50,000	0	0.0	201	97.1	201	48.0
	Above 50,000	212	100.0	6	2.9	218	52.0
Total		212	100	207	100	419	100

Source: Author

4.4 Measurement Model

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 (≥ 0.70) in order to be considered suitable for the linked construct (Hair, Risher, Sarstedt, & Ringle, 2019). Whereas, other researchers Hair 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 such as for awareness (0.787-0.877), behavioral intentions (0.761-0.831), hedonic motivation (0.809-0.868), and perceived ease of use (0.803-0.865), technology readiness (0.709-0.805), and trust (0.716-0.834).

Table 4.2

Outer loadings of the Factors and VIF

Item	AW	BI	HM	PE	PU	TR	TT	VIF
AW1	0.844							2.292
AW2	0.877							2.620
AW3	0.787							1.820
AW4	0.866							2.156
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
PE1				0.816				2.041
PE2				0.826				2.227
PE3				0.865				2.686
PE4				0.835				2.258
PE5				0.803				1.961
PU1					0.906			3.730
PU2					0.909			3.674
PU3					0.905			3.729
PU4					0.882			3.091
PU5					0.909			3.778
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
TT1	0.716	1.470
TT2	0.834	2.040
TT3	0.751	1.663
TT4	0.774	1.791
TT5	0.809	1.915

Note: VIF=Variance Inflation Factor

VIF is an assessment of the level of multicollinearity in the regression assessment. Multicollinearity is said to be present when there is correlation among the several independent variables in a multiple regression framework. This could negatively influence the regression outcomes. Therefore, the VIF estimates the level of variance of a regression coefficient which is inflated because of multicollinearity. Past studies have suggested that the VIF value should be $3.30 \geq \text{VIF}$ (Hair 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 (see Table 4.2 and Figure 4.1).

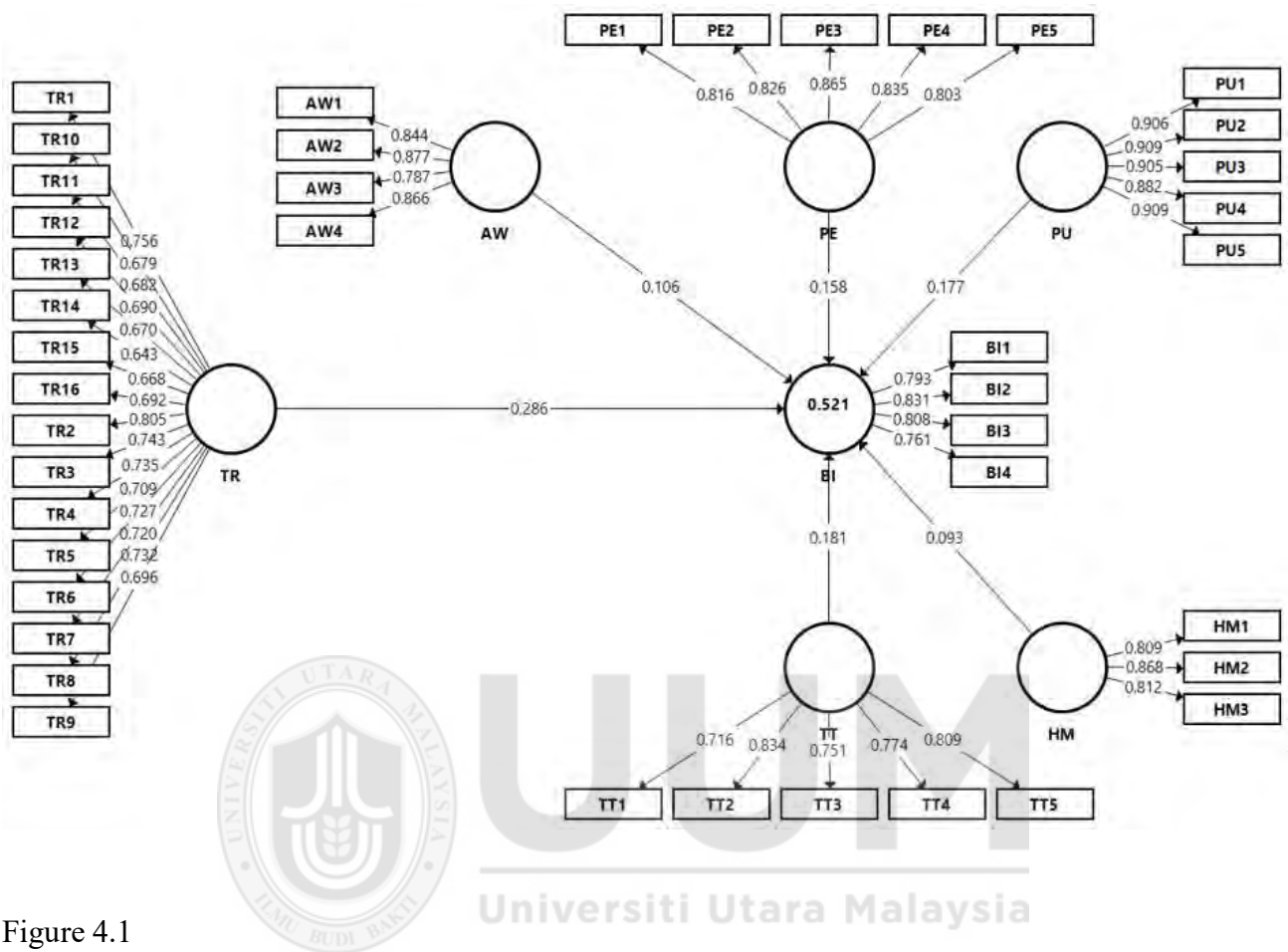


Figure 4.1
Outer Loadings

4.5. Reliability and Validity

Cronbach's alpha assesses the internal consistency or reliability of a set of variable items. This study used this test to decide whether the set of items for each construct consistently measured the same construct. It quantifies the level of agreement on a scale of standard 0-1 scale. The higher values show higher consistency between the items. Authors have suggested the minimum acceptable level of the alpha 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 4.3).

Table 4.3

Reliability and Validity

Variable	Cronbach's Alpha	rho_A	Composite Reliability (CR)	Average Variance Extracted (AVE)
AW	0.865	0.872	0.908	0.713
BI	0.811	0.811	0.876	0.638
HM	0.775	0.782	0.869	0.689
PE	0.886	0.888	0.917	0.688
PU	0.943	0.944	0.956	0.814
TR	0.935	0.940	0.942	0.505
TT	0.836	0.839	0.884	0.605

Note: AW=Awareness; BI=Behavioral Intentions, HM=Hedonic Motivation, PE=Perceived Ease of Use, PU=Perceived Usefulness, TR=Technology Readiness, TT=Trust

Composite Reliability (CR) is another way to assess the internal consistency of the set of items for a construct. Authors have agreed that CR must be at least 0.70. However, authors have further

described a higher CR is a good sign showing consistent measurement of the construct using the selected items (Moslehpour et al., 2022). The results in Table 4.3 exhibit that CR for variables ranges from 0.869-0.942 which is more than 0.70 clearly indicating that all the items consistently measure the linked constructs. Convergent reliability denotes the level to which an item assesses its construct and was tested through the AVE. Value of AVE above 0.5 is considered acceptable by the authors (Hair et al., 2019). The values of the AVE in this study for all the variables is in the range between 0.605-0.713, which is above the suggested threshold of ≥ 0.50 .

4.6. Discriminant Validity - HTMT

The heterotrait-monotrait (HTMT) ratio of correlations was proposed by Henseler, Ringle, and Sarstedt (2015) to check discriminant validity based on the multitrait-multimethod matrix. The scholars criticized the method of identifying discriminant validity by using Fornell-Larker criterion along with evaluation of cross-loadings. The authors suggested to use HTMT for the purpose and proved the superiority of HTMT by using a Monte Carlo simulation assessment. They further concluded that a calculated value of HTMT less than 0.90 shows discriminant validity. In this study, the HTMT values are less than 0.90 (see Table 4.4); which confirms the discriminant validity.

Table 4.4

Discriminant Validity - HTMT

Variable	AW	BI	HM	PE	PU	TR	TT
AW	1						
BI	0.574	1					
HM	0.427	0.505	1				
PE	0.511	0.619	0.383	1			
PU	0.445	0.509	0.217	0.431	1		
TR	0.473	0.670	0.443	0.531	0.329	1	
TT	0.500	0.655	0.541	0.517	0.344	0.586	1

Note: HTMT = heterotrait-monotrait; AW=Awareness; BI=Behavioral Intentions, HM=Hedonic Motivation, PE=Perceived Ease of Use , PU=Perceived Usefulness, TR=Technology Readiness, TT=Trust

4.7. Descriptive Statistics

Descriptive statistics shows features and characteristics of the distribution. Table 4.5 shows the descriptive statistics including sum, mean and standard deviation of the study construct. The perceived usefulness has the highest mean score, showing that the appreciation of the general public towards usability of the mobile based government services. Awareness (3.723) mean score is showing the knowledge of mobile government services amongst the mobile users. Similarly, the mean of Behavioral Intentions (3.884) shows the higher acceptability of m-government services.

Perceived Ease of Use (3.986) shows that the respondents are comfortable using the m-government services. Similarly higher mean value of Perceived Usefulness (4.041) shows that the respondents believe in the value which the m-government services can provide them. A higher mean value of Trust shows believe which people have in the government backed services. Whereas, the higher

mean value of Technology Readiness shows that the users are tech savvy and are willing to use technology for their endeavors.

Standard deviation explains the dispersion of data in a set of values. It confirms that how the data is spread around the mean value. A lower value of standard deviation shows that majority of the values in a distribution are located around the mean, while a higher value of Standard deviation shows that the distribution is scattered widely around the mean. The findings of the current study show Awareness has the highest value of the Standard deviation (0.922) whereas Technology Readiness has the lowest standard deviation (0.583) amongst all the variables observed under the study (see Table 4.5).

Table 4.5

Descriptive Statistics

Variable	Sum	Mean	Std. Deviation
AW	1560.0	3.723	0.922
BI	1627.5	3.884	0.825
HM	1446.7	3.453	0.853
PE	1670.0	3.986	0.780
PU	1693.2	4.041	0.888
TR	1593.6	3.803	0.583
TT	1604.0	3.828	0.746

Note: AW=Awareness; BI=Behavioral Intentions, HM=Hedonic Motivation, PE=Perceived Ease of Use , PU=Perceived Usefulness, TR=Technology Readiness, TT=Trust

4.8. Hypothesis Testing – Direct Relationships

This is the second stage of the PLS-SEM analysis using the bootstrapping method. Bootstrapping is a statistical method that resamples only datasets to develop several simulated samples. This procedure permits the researcher to assess standard errors, develop confidence intervals, and perform hypothesis testing using several types of sample stats. Bootstrap is a process that is an alternative method to traditional hypothesis testing approaches and is a sound method due to its easy understanding and validity for more situations. Bootstrapping and traditional processes use the samples to develop inferences about populations. To achieve this aim, these processes handle the single sample that a study gains as only one of several random samples that the researcher could have gathered C. M Ringle, Wende, and Becker (2015).

In the bootstrapping process, the following practices were followed considering the past literature. The maximum iterations were decided to be 300 (C. M Ringle et al., 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).

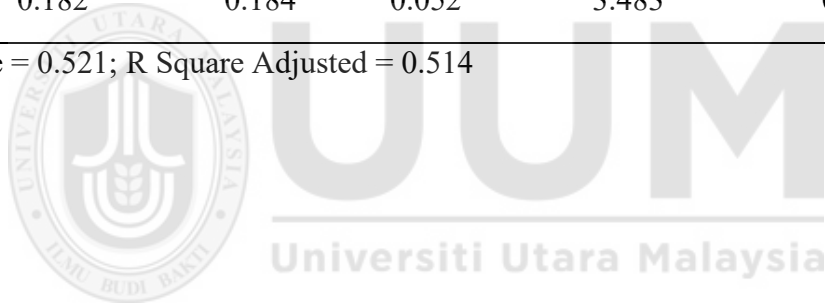
The findings of this study revealed there was a positive relationship between awareness and behavioral intentions ($O = 0.106$, $t = 2.906$). Hedonic motivation positively and significantly affects behavioral intentions ($O = 0.093$, $t = 2.217$). Also, the perceived ease of use, perceived usefulness, technology readiness, and trust are positively and significantly related to the behavioral intentions (t -value ranges from 3.805 – 6.517) (see Table 4.6). Hence, H1 to H6 was accepted. Likewise, the Figure below shows the path coefficient between all the direct hypotheses (0.106-0.291).

Table 4.6

Path Coefficients of the Direct Paths (H1 to H6)

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P-Values
AW → BI	0.106	0.106	0.036	2.906	0.004
HM → BI	0.093	0.092	0.042	2.217	0.027
PE → BI	0.158	0.157	0.042	3.805	0.000
PU → BI	0.177	0.171	0.046	3.88	0.000
TR → BI	0.286	0.291	0.044	6.517	0.000
TT → BI	0.182	0.184	0.052	3.483	0.001

Note: R Square = 0.521; R Square Adjusted = 0.514



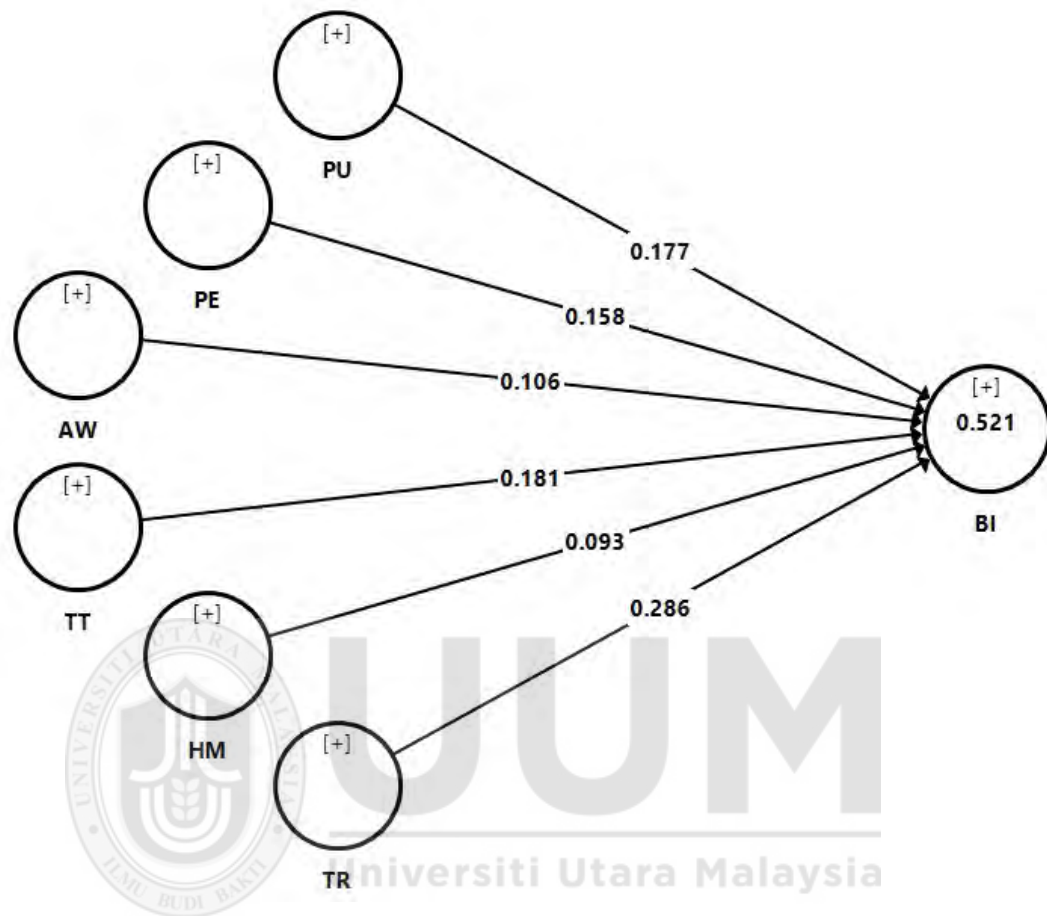


Figure 4.2
Direct Relationships

4.9. Hypothesis Testing – Moderation of Gender (H7a to H7f)

Multigroup analysis (MGA) or between-group assessment is a way to assess predefined data sets to decide the prevalence of the significant variations amongst the group-oriented parameter predictions such as outer loadings, weights, and path coefficients (J. F Hair, Hult, Ringle, & Sarstedt, 2017). MGA allows researchers to examine variations between several groups in two similar models when the teams are understood. The capability to recognize the existence or lack of Multigroup variations anchored with the PLS methods. As per J. F 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 4.7, results are significant for the group difference based on gender for PE, PU, TT and TR where all values of p are less than 0.05 whereas the results are insignificant for AW and HM where the p-values are of 0.662 and 0.058 respectively both of which are more than the 5% threshold. Hence, H7e and H7f were rejected while H7a- H7d were accepted (see Table 4.7). Similarly, the group difference based on the gender using parametric approach was also assessed using the outer loadings, t-value and p-value. Table 4.8 (see Appendix A) shows the results in the acceptable range.

Table 4.7

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))
AW → BI	-0.031	0.662
HM → BI	0.156	0.058
PE → BI	-0.200	0.016
PU → BI	0.234	0.009
TR → BI	0.247	0.003
TT → BI	-0.215	0.024

Note: male = 1; female = 2

4.10. Hypothesis Testing – Moderation of Age (H7g to H7l)

This study also checked the group difference moderation effects considering age of the respondents. The results were examined using the 5% probability of error. The finding exhibits that age moderates the relationship between AW, PE, PU and BI with p-values of 0.023, 0.001 and 0.001 respectively whereas age does not moderate the relationship between HM, TR, TT and BI since the p-values are higher than the acceptable value of 0.05. Thus, H7g, H7h and H7l were accepted while H7i, H7j and H7k was rejected. Table 4.10 shows the parametric approach and outer loadings (see Appendix B).

Table 4.9

Group Difference – Age

Path	Path Coefficients-diff (GROUP_Age(1.0) – GROUP_Age(2.0))	p-Value new (GROUP_Age(1.0) vs GROUP_Age(2.0))
AW → BI	0.163	0.023
HM → BI	0.134	0.089
PE → BI	-0.252	0.001
PU → BI	-0.270	0.001
TR → BI	0.165	0.053
TT → BI	0.097	0.317

Note: up to 30 years = 1; above 30 years = 2

4.11. Hypothesis Testing – Moderation of Income (H7m to H7r)

As per the income group difference (up to 50000 and above 50000 rupees) the moderation was tested using 5% probability of error. The findings in following table shows that the relationship of both AW and HM with behavioral intentions is not being moderated by Income since the p-value from the income difference group is greater than 0.05. Whereas the relationship of BI with all other variables i.e. PE, PU, TR and TT, is being moderated by the income since the p-values of the income difference groups were within the acceptable range. Therefore, H7m to H7p were rejected while H7q and H7r were rejected (see Table 4.11). Table 4.12 (see Appendix C) shows the parametric outcomes of the income group differences which were significant.

Table 4.11

Group Difference – Income

Path	Path Coefficients-diff (GROUP_Income(1.0) – GROUP_Income(2.0))	p-Value new (GROUP_Income(1.0) vs GROUP_Income(2.0))
AW → BI	0.018	0.792
HM → BI	-0.136	0.110
PE → BI	0.212	0.011
PU → BI	-0.214	0.014
TR → BI	-0.256	0.002
TT → BI	0.237	0.017

Note: up to 50000 rupees = 1; above 50000 rupees = 2

4.12. Hypothesis Testing – Moderation of Education (H7s to H7x)

Finally, the study also examined the moderation effects of education groups on the behavioral intentions at the 5% probability of error. The findings in Table 4.13 shows that education does not moderate the relationship between AW and BI. Whereas, income does moderate the relationship of BI with HM, PE, PU, TR and TT. Thus, H7x was rejected and H7s to H7w were accepted in this case. Here Table 4.12 shows the parametric loadings in the education group which were significant (see Appendix D).

Table 4.12

Group Difference – Education

Path	Path Coefficients-diff (GROUP_Education(1.0) – GROUP_Education(2.0))	p-Value new (GROUP_Education(1.0) vs GROUP_Education(2.0))
AW → BI	0.118	0.123
HM → BI	0.177	0.026
PE → BI	-0.183	0.026
PU → BI	0.212	0.017
TR → BI	-0.162	0.062
TT → BI	-0.190	0.067

Note: up to 12 years = 1; above 12 years = 2

CHAPTER FIVE – CONCLUSION AND RECOMMENDATION

5.0. Introduction

This chapter provides the concluding review of the study. Aim of the chapter is to discuss the study in light with the results obtained in the preceding chapter. The chapter discusses and highlights the results in line with the results of similar study around the globe. Moreover the shortcomings of the study are discussed while identifying future pathways for research in the same subject. This chapter also discusses both the theoretical as well practical implication of the study. In the end the researcher has provided concluding remarks on the study based upon the entire research work undertaken.

5.1. Overview of the Study

The study was being designed to understand the moderating effect of demographic variable upon the relationship between behavioral factors and user behavioral intention to accept m-government services. Standing on the theoretical basis of theory of reasoned action and theory of planned behavior the study has identified the behavioral factors effecting acceptance of m-government factors. The study later proved that demographic factors moderates the relationship between the behavioral factors and acceptance of m-government services. Electronic platforms especially introduction of mobile technologies have made a change at the fundamental level in the way governments are being run (UN, 2003). Mobile technologies and their abundant availability have provided an alternative medium to governments for serving the public. It provides a platform well understood, affordable, accessible and socially acceptable by all segments of society. Therefore, a number of governmental organizations, taking benefit of the opportunities offered by mobile networks, presented mobile based solutions for accessing their services (G.A. Sandy & McMillan, 2005). The recent successful

usage of m-government services in the fight against Covid-19 has proven to be of utmost importance. Government have used mobile networks from dissemination of information (D. Lee & Lee, 2020) to location-based contact tracing services (Chan et al., 2020; D. Lee & Lee, 2020). The m-governmental services provides an opportunities for developing countries like Pakistan to serve their public in a cost effective manner. Yet the opportunities presented by mobile government initiatives can only become successful provided these initiatives are being accepted by users of such services (Carroll, 2005; Ohme, 2014).

The idea of this study goes back to year 2014 when UNICEF decided to launch a study looking into possibilities of designing a mobile based birth reporting and registration system in Pakistan. The author being lead of the selected consultants for the assignment remained involved in the project from the day of conceptualization to design of the applications. The project proved successful when piloted with the help of provincial governments of Punjab and Sind (Telenor, 2018; UNICEF, 2016). The project is now being scaled up by government to district level to reap further benefits of mobile technologies. However, at the time the project were designed and the application for birth registration was developed for citizens as well as for the government officials and the gatekeepers. There aroused many questions about the response and acceptability of those involved. Unfortunately, the literature review at that time could not provide comprehensive answers to the problems at hand due to the scarcity of the research at that time viz-a-viz acceptance behavior of m-government systems especially with reference to a developing country like Pakistan. At that time the researcher decided upon exploring the body of knowledge providing understanding of the acceptance behavior of the users of m-government services.

Understanding user's behavior to accept m-governmental services has been the primary topic of this research work. Definition of m-government services was evaluated in detail. Differences between e-government and m-government services were enumerated. Literature was evaluated thoroughly and the factors which could affect user's behavioral intention to accept m-governmental services were identified through literature survey. A total of 38 variables were identified which can effect users behavior of accepting the m-governmental services. After taking all the similarities and repetitions into account, while ignoring factors which did not require further investigation, only 5 factors namely perceived usefulness, perceived ease of use, trust, awareness and demographics were identified as those affecting users' behavioral intentions to accept m-governmental services. Moreover Technology readiness and Hedonic Motivations in line with UTAUT were also identified as possible factors affecting user's behavior intention of accepting m-government services.

Survey was conducted in Pakistan from the consumer of mobile phone services. PLS-SEM was used to achieve the desired objectives of the research. The results confirmed the direct relationship between the behavioral factors and user's behavioral intentions of accepting m-government services. Moreover it was further confirmed that demographics moderate the relationship between behavioral factors and user's behavioral intention of accepting m-government services.

5.2. Discussion of the findings

The section discussed in detail findings of the study. It provides the explanation of the results obtained while providing reasoning of these results. The commentary of the research outcomes are provided in line with the theories. Moreover, research work of other authors has been compared to evaluate whether the results obtained through this research are in line with the

researchers working in the related field. For the purpose of consistency results has been explained in the same order as those of objectives.

5.2.1. Positive relationship between hedonic motivation and behavioral intention to accept m-government services.

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 4.6, 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 (Ali A Alalwan et al., 2015; de Sena Abrahão et al., 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 (Yogesh K Dwivedi et al., 2016). Demographics could be another reason. Researchers (Yogesh K 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. Moreover Hedonic Motivations are about seeking positivity while avoiding negativity. Pakistan is a large country with insufficient physical infrastructure for the current size of population. The idea of going out to a government

office, facing harsh weather, going through the hassle of travelling through choked roads, standing in long ques, with a cost attached to all this, adds negative vibes. On the other hand circumventing the whole process by just feeding information in a mobile system with the expectations of receiving the same results without facing all that hassle adds to the positivity about the experience. This also coincides with the fact that Pakistan always perform quite well in world happiness index with respect to its position in Human Development Index. People in Pakistan look at the opportunities through which they seek happiness. They want to enjoy life. They want to be happy. The general public desires to adopt a life style which helps them connecting with their relatives and friends, spending time in socializing rather than taking activities consuming time. This desire of getting happier have an effect upon accepting technology to avoid negativity and to increase their happiness. 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 ground realities in Pakistan.

5.2.2. Positive relationship between awareness and behavioral intentions to accept m-government services.

The study has concluded that there is significantly positive relationship between awareness and behavioral intentions to accept m-governmental services. The value of the t-statistics in between these two variables is 2.906 which is greater than 1.645. This proves the relationship to be significant; where p value is also at 0.004 which is within the required range of less than 0.01. This is in line with the conclusions made by other researchers (Almuraqab & Jasimuddin, 2017; Eastin et al., 2016; Mutahar et al., 2018) while evaluating acceptance of m-government

services. On the other hand this is in contrast to the findings of other researchers whom (Mandari & Chong, 2018; Ohme, 2014) have rejected these claims.

Research findings here not only confirms the theoretical framework developed in the study but these also falls in line with the ground realities of Pakistan. With comparatively low literacy rates (Tanveer, Balz, Sumari, Shan, & Tanweer, 2020) combined with higher penetration and usability of cellular devices (ITU, 2017), users are required to be made aware regarding the opportunities mobile government services present. Moreover, with a deteriorating law and order situation, cybercrimes and the fear of loss of personal information may also negatively affect users' (Ohme, 2014) willingness to use m-governmental services. Creating awareness while making the users comfortable with the features offered by the m-government services can help in wide spread acceptability of m-government services amongst the users. Pakistan has amongst the highest population growth rate. This increase in population has placed lot of pressure upon resources and governmental services. Availing the required government services while physically visiting government offices takes time and incur cost due to travelling, non-availability of staff and long ques at public offices. Providing awareness to the public regarding the procedures through which they can avail such services through cellular networks using mobile phones is indeed a great solution. In fact individuals are tend to take the risk, like loss of personal information etc., provided they are being educated thoroughly about all such risks. As explained by theory of reasoned action, individuals make decision based upon all the available information making a decision after evaluating all available information. When the awareness is made available, users compare cost of services with the expected benefits and then decide to avail the service provided the benefits weigh higher than the costs. Pakistan is a large country having a diverse population. This diversity stems from both demographical

characters and geographical differences. Reaching out to all the diversified groups remains a challenge. Urdu is considered to be national language of Pakistan yet it is spoken by only 7% of the population in Pakistan (S. N. Khan, Khan, & Khan, 2020). Providing awareness to the targeted population for m-government service becomes a challenge since the promotional material is mostly designed in national language which becomes difficult understanding majority of population. The budgetary constraints also creates hindrances in designing promotional material in the regional languages. Creating awareness is quite expensive designing such promotional campaign which can provide the required message to the targeted public. Yet the research emphasizes upon the importance of the awareness. It suggests that the government officials entrusted with the design of m-government programs should undertake innovative and cost effective measures to creating the awareness. Creating only m-government channel for delivering m-governments services might not be enough. Designing awareness campaign along with the m-government service itself and then allocating budget for the same should be considered necessary. However, this comes with a reputational risk for the incumbent since spending money on media even for the purpose of required advocacy is criticized by opposition parties. The researcher would here suggest using creativity here by engaging the civil society, adopting medium of creating awareness which may not require popular media, Rather awareness should be created using the channels involving civil society, which don't cost much and which are already in place. Mobile birth registration initiative of UNICEF in sponsorship from Telenor could be a good example where Nikah Registrars and Lady health visitors were used for creating awareness and providing assistance in getting births reported and registered (Telenor, 2018; UNICEF, 2016). The results of the current research verifies what was observed from the practice. The study has confirmed that users' intend to

take advantages of m-government services provided they are made fully aware of such services.

5.2.3. Positive relationship between trust and behavioral intention to accept m-government services.

The next objective of the study was to confirm the relationship between trust and behavioral intention to accept m-governmental services. Theoretical model developed based upon the theory of reasoned action through literature review had shown that there exists the relationship between trust and behavioral intention to accept m-government services. Later analyzing data collected through survey methodology using PLS-SEM has proved that there exists a positive relationship between trust and behavioral intention to accept m-government services. The t-statistic of the relationship was calculated at 3.483 with $p < 0.01$ has proven the significance of the relationship between trust and behavioral intentions to accept m-government services. The results are in line with the similar studies conducted by authors (Almarashdeh & Alsmadi, 2017; Chauhan, 2015; Zada et al., 2016) reporting positive relationship between Trust and acceptance of technology. However there are others (M. I. Eid, 2011) who have found insignificant relationship of trust with users acceptance of technological interventions.

Trust is no doubt one of the most important factor affecting users behavioral intentions (Chauhan, 2015) to accept m-government services. The results has shown that the trust building is an essential step government should be undertaking to convince users start using m-governmental services. In line with the theory of reasoned actions, users have positive intentions towards accepting m-government services provided users have trust in the system and they have their believe that they would achieve the desired outcome.

Pakistan is a country where traditionally people had lot of trust in the government. However, the society is evolving in response to the way respective governments have practiced and behaved. Long periods of dictatorships and presence of non-political actors in decision making have impacted the governance in a manner which has reduced trust of the public in government agencies. Weak judicial system and absence of judicious implementation of the writ of the government has further added fuel to the fire. Moreover, people have started questioning competency of government officials and their ability to work with technology, safeguarding interests of individuals while ensuring privacy of individual data. This actually have negative connotation upon the trust of citizen on any such alternative technological intervention which governments in fact places for the convenience of the public. Promoting alternative service delivery methods including m-government systems needs trust between the service provider that is government and the user of the service which are citizens. It is suggested that before launching such programs for the consumption of general public, the governments need to undertake confidence building measures. Interestingly, it is not only central or provincial government which uses m-government as an alternative channel of service delivery. But these are also local governments and other autonomous including the regulatory bodies which either are using such m-government services or aspire to use this medium. It is advised that all such organizations should not only arrange awareness session but also should ensure procedures promoting transparency with respect to the systems, information and outcome of services request. There should be also a transparent complaint management system in place. The system should have pre-defined SOPs with timelines to provide not only confidence to the users of system but also to understand the weaknesses of the system by analyzing the nature and type

of the complaints. As this research has also proven that higher would be the trust amongst the users of m-government services the more there would be its acceptance.

5.2.4. Positive relationship between perceived usefulness and behavioral intention to accept m-government services.

Another objective of the study was to explore the relationship between perceived usefulness and behavioral intentions to accept m-governmental services. Accordingly the hypothesis developed was of the view that that there exist a positive relationship between perceived usefulness and behavioral intentions to accept m-government services. PLS-SEM analysis performed on the data collected proved that the relationship is significant between perceived usefulness and behavioral intentions to accept m-government services. The t-statistic calculated was 3.88 with a p value less than 0.01 proves the significance of this relationship. These results were in line with the results of authors (Almarashdeh & Alsmadi, 2017) working in the similar field. However, contrary to the findings of the study there are researchers who found that perceived usefulness has no effect upon m-government acceptance (Ahmad & Khalid, 2017). Technology Acceptance Model (TAM) also have used the construct of Perceived usefulness in defining the acceptance of technology. Perceived usefulness is the benefit which a user many think as an outcome of a process in line with the theory of reasoned action. With a lower literacy rate in Pakistan from where the data was collected, learning about usage of m-government services may require some motivation. It must have been the perceived usefulness and advantage which had to be the reason to put in the required extra effort. Pakistan is a resilient nation. People at Pakistan are known to be innovative in finding solution. People here are always at a hunt for finding cheap hacks to the challenges in their lives. They call the

process as “Jugaad”, which is a local term, well known in the world and even being recognized by the Collins dictionary. This concept of “Jugaad” shows the obsession of the people in those things which could be useful to them. It is about finding useful alternatives to existing resources available. It is identifying cheap solutions to otherwise expensive problems. This matches with the idea of perceived usefulness of m-government services. A lot of users consider this as a “Jugaad” since it provides cheap solution to the problem of reaching out to the governmental services with an existing available resource of a mobile phone. The idea that the m-government service may lead to help them accessing essential governmental services makes it comparable to the concept of “Jugaad” in the mind of natives. The anticipation and behavioral acceptance for accepting such “Jugaad” is a social norm. The results are in line with the local culture. One may say that the local culture already have affinity with the solutions which can provide ingenious solutions to their problems and they are ready to accept all such solution. M-government acceptance might have few risk and challenges attached to it but the expectations of the outcome pushes the users to accept the m-government solution.

5.2.5. Positive relationship of perceived ease of use with behavioral intention to accept m-government services.

The study hypothesized a positive relationship between perceived ease of use and behavioral intentions to accept m-government services. The t-statistic of the relationship between perceived ease of use and behavioral intentions, calculated from the data collected, was 3.805 with p values of less than zero. This confirmed the significance of the relationship between both the variables. These results were in line with the finding of authors (Alrowili et al., 2015; Asmi et al., 2016; Husin et al., 2017; Shareef, Dwivedi, et al., 2016) worked in the similar area

of study. However, it contradicts findings of researchers (Ahmad & Khalid, 2017; Changlin Wang, 2014), who found that such a relationship doesn't exist.

Pakistan is a developing nation having 5th largest population in the world. Higher population combined with higher population growth rate has resulted in lot of pressure upon infrastructure. Accessing essential governmental services many a time requires putting in additional effort. Whereas, accessing the same service through mobile phone can save one from all the hassle. Moreover, Pakistan is facing a lot of inflationary pressure since quite a time now. People living in Pakistan takes all measures to reduce cost. Paying cost to access services is becoming difficult. The consumption of otherwise inelastic goods like fuel and electricity is on decline due to the increasing inflationary pressure. At this point, any alternative medium which provides relief in cost is considered easier for its adoption. Public take such thing as a relief from the otherwise expensive way of getting things done. When an individual asses governmental services in traditional way. The individual has to bear the cost of travelling to the government office. Moreover, the opportunity cost of losing work hours is also borne by the aspirant. Whereas, standing in lines and sometime facing humiliation are other costs which the individual has to pay. M-government services removes these costs and make life easier for the user. There may be an additional task of learning the application and procedure through which the m-government service is to be approached. Yet, the benefit outweighs the difficulties or costs which helps developing a perception of easier to use. It is easier in relative terms since it adds more ease then it adds difficulties. The public is Pakistan therefore thinks that approaching governmental services using cellular technology is relatively an easier feat which positively affects the individual's acceptance of using m-governmental services. Moreover, being a younger nation, affinity of young with technology might have been another reason

which have had helped the individual user perceive ease of usage of the mobile government solution as an advantage, leading to its positive impact upon user's acceptance of m-governments services.

5.2.6. Positive relationship between technology readiness and behavioral intention to accept m-government services.

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 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 et al., 2010; Summak et al., 2010) who have shown insignificant relationship between technology readiness and users' acceptance of technological interventions similar to m-government services. The study was conducted in Pakistan, which is a young nation. Results confirm that young people at Pakistan desire to accept technological interventions. It reflects the desire of the general public to add convenience to life through the usage of technology. This also indicates that the government should undertake more steps towards serving citizens with the help of digital technologies. Goodness of fit of the proposed model has infact proved that its technology readiness of the user along with other behavioral factors which can help determining whether people are going to accept the technological intervention or not. People of Pakistan are not that an educated in

general. In fact, as a percentage of governmental expenditure, Pakistan spent the least in south Asia in the year 2021 (Ortiz-Ospina & Roser, 2023). Researchers have declared Pakistan's literacy rate amongst the lowest in the world (Khalid & Tadesse, 2024). Yet not only there is technology readiness present amongst the general public but also they are willing to accept technology based governance mechanism. It may be noted that the prevalence of mobile devices and ubiquity of mobile networks have made this journey easy for the public. The higher tele density of Pakistan, due to the liberalization of telecommunication policies, have made people using mobile as a medium to access many services. This further has improved their technology readiness especially around those interventions designed around mobile technology. Pakistan right now is passing through a phase of economic challenges which it has never faced before since its independence. The effect of commodity super cycle along with the political instability along with the impact of global warming has largely effected Pakistan. While working towards another IMF programs, increasing governmental revenue and reducing costs is the only solution for making the country a viable economic entity. Technology has the power to help leap frog government in reaching all its target. It can help not only reducing costs but also helps government in finding new avenues of generating revenue. Technology readiness of users and their willingness to adopt m-government systems, provide a great opportunity for the government. Utilizing this opportunity the government can provide the public quality services at a nominal cost in comparison to the expenditures which the government have to borne in case of physical delivery of service. Moreover, the technology readiness of the users also opens up a plethora of opportunities for private entrepreneurs. The relationship of technology readiness and acceptance of m-government services shows the resolve and resilience of the people of Pakistan to find innovative mediums and ways to solve

the challenges which they are facing. It shows that people accepts the reality of the challenges being faced by Pakistan and they are ready to adapt with the changing times.

5.2.7. To evaluate the moderating role of demographic variables between hedonic motivation, awareness, trust, perceived usefulness, perceived ease of use, technology readiness and users' behavioral intentions to accept m-government services.

Four demographic variables, namely gender, age, income and education were evaluated for moderating effect of these variables upon the relationship between behavioral factors and the behavioral intentions to accept m-governmental services.

The study has proven that the gender differences effects the relationship between trust, perceived usefulness, perceived ease of use, 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 et al., 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. Moreover, the study indicates that gender does not moderate the relationship between awareness and users'

behavioral intentions to accept m-governmental services. This clarifies that gender does not make any difference in the relationship between awareness and acceptance of decision making of gender. 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. Creating awareness may have an impact. But this awareness is shared in the family. Since it is a norm that decisions regarding availing governmental services are discussed in the family ahead of availing such services. Therefore, creating awareness would have effect upon the users' acceptance of m-governmental services but that impact would be independent of gender-based differences.

The results further supported the hypothesis that age moderates the relationship between awareness, perceived usefulness, perceived ease of use, technology readiness and behavioral intentions of users in acceptance of m-government services. The results were in line with the claims of the authors (Chung, Park, Wang, Fulk & McLaughlin, 2010) who suggested that the presence of age as a moderator would increase the explanatory power of relationship between behavioral factors and intention to use technology. However these finding are in contradiction of other researches (J. Kim, 2016) whom have concluded that age does not have a moderating effect between the behavioral factors and the acceptance of technology. However, researchers (J. Kim, 2016) findings are in support of the results where the study have rejected presence of moderating effect of age upon the relationship between hedonic motivation, Technology readiness, Trust and the behavioral intentions. It seems that the age moderates relationship between behavioral intentions and few behavioral factors while not having the same effects between few others. At, first this seems to be self-contradictory, however delving deep into these results while keeping the local culture along with demographical spread of Pakistan in

mind would help understanding the results better. The study has produced results is in line with the general environment in Pakistan where younger generation is considered to be tech savvy, which is evident by the fact that age is moderating the relationship between perceived usefulness, perceived ease of use, awareness and behavioral intention to accept m-government services. However, when it comes to trust, technology readiness and hedonic motivation, age have not shown any moderating effect because receiving government services is a serious issue for the general public. These services could be ranging from as simple as knowing about one's polling station for polling the votes to more complex one like birth registration services or those like Benazir Income Support Program (BISP) where individual citizen receive information and details about receiving the financial support from governmental coffers. Individuals takes all this very serious business, even discussing such matters with all the family before making any decision. This is the reason that age does not bring any change on the relationship between Trust, Technology readiness, Hedonic motivation and behavioral intentions. No matter what age an individual might be of, Individual's trust, technology readiness and hedonic motivation have the same impact upon the behavioral intentions. Whereas when awareness is created, an old man may have a higher level of behavioral intentions accepting the m-government services since a senior person might have found it more challenging travelling to the government office for the services which can be availed through mobile phone. Similarly, older people may find it more useful using the m-government services in comparison to their younger counterparts, due to their higher commitments and stringent job commitments. It is well established fact that younger people find it easier communicating using mobile technology, the same has been proven true here where the younger person's perception about the perceived ease of use is more than older individuals.

The study further has proven that income moderates the relationship between Trust, perceived usefulness, perceived ease of use, technology readiness and users' behavioral intentions to accept m-government services. This is in line with the finding of authors (Ahmad & Khalid, 2017) whom have identified the moderating effect of income upon the relationship between behavioral factors and acceptance of technological innovations whereas it contradicts other researchers (Hernández et al., 2011). However the study has found no proof of moderating effect of income upon the relationship between awareness, hedonic motivation and behavioral intentions to accept m-government services. This result is again in line with the ground realities in Pakistan. Accessing the required governmental services is an important issue for citizens. Once they get awareness regarding the availability of such a service they would like to access that no matter to what income strata they would belong to. This further proves that the efficacy of accessing government services through mobile devices. It can be inferred that once the required information and knowledge is being provided to an individual, the individual finds it convenient to utilize the mobile based governmental services irrespective of their earning capability. This is probably due to cost effectiveness and time saving ability of the mobile government services that makes such services attractive for the users.

Moreover the relationship between hedonic motivation and behavioral intentions to accept m-governmental services was also found to not to be moderated by income. This goes in line with the ground reality in Pakistan. Indeed this further confirms that accessing necessary governmental services costs less than what these services might have cost otherwise. It shows that earnings do not matter to that individual who want to access the governmental services because the individual is taking pride in having the knowledge and capability of using the technological solution. And since accessing governmental services through mobile are more

convenient and cheaper in Pakistan therefore income differences does not effect upon the relationship between hedonic motivation and behavioral intentions to accept m-governmental services.

The study has confirmed that education moderates the relationship between hedonic motivation, trust, perceived usefulness, perceived ease of use, technology readiness and users' behavioral intentions to accept m-government services. This is in line with the findings of researchers (Ahmad & Khalid, 2017) whereas it differs from the findings of other authors (Mensah & Mi, 2018). However the study found that the education does not moderate the relationship between awareness and users' behavioral intentions to accept m-government services. This again explains the effectiveness of the m-government services. It proves that users have a tendency towards behavioral intention to accept m-government services when the users are fully aware of the m-government services irrespective of their educational qualifications. Accessing government services is quite a task in Pakistan. Mobile government services provide the opportunity to get these services directly without paying any extra cost. The results therefore are in line with the ground reality existing in Pakistan.

5.3. Theoretical contribution

M-governmental services provide an opportunity to serve the public at their doorstep incurring a fraction of a cost. A reasonable number of studies have been undertaken to identify issues coming in the way of behavioral intentions to accept m-governmental services. Yet most of these were piecemeal efforts. However, this study is unique since it comprehensively has evaluated the work done by researchers in the area of acceptance of mobile government services and the behavioral factors affecting this acceptance. It has identified gaps in the work so far being done by the researchers' world over. The study accordingly have explored those

behavioral factors, which required further understanding viz-a-viz their effects upon intentions to accept m-governmental services. The study has identified variables which were similar in nature thus paving way for future researchers to remain more targeted in developing models while studying acceptance of technology. Moreover the study has evaluated the moderating effect of demographic variables i.e. gender, age, education and income between hedonic motivation, awareness, perceived usefulness, perceived ease of use, trust, technology readiness and users' behavioral intentions to accept m-government initiatives especially with a context of a developing country i.e. Pakistan. This is a unique study not only in the area of acceptance of mobile government services but also since it has paved way for future researchers to observe the moderating effect of demographical variables upon the relationship between technology acceptance and behavioral factors.

Moreover this study has introduced a model to help understand the m-government acceptance behavior thus opening ways for follow researchers to understand the mechanics which behavior have upon acceptance of m-government services.

This study has also explored the definition of m-government services. It has tried expanding horizon of m-government services by providing alternative views upon m-government research. Expanding the horizon of disruptive innovation, the current study has presented m-government services as disruptive innovation. This changes not only the scope of research on the subject but also provides entirely new avenues for the growth of the subject area.

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 demographics 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, income, education and age play on user's behavioral intentions to accept technological platforms especially with reference to m-government.

5.4. Practical Contribution

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 stakeholders 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.

Using the research, policy makers will be able to focus upon the functional areas of m-government platforms which help citizens accepting the m-government initiatives. Moreover, this would be able to deliver such services which are gender neutral, suitable for use across all

age groups, easily accessible for people having different level of educational back ground and suitable for varied income groups. Additionally the results will help designing mobile based governmental services focusing on the necessary dimensions. This would help reducing unnecessary features and saving budget.

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.

The study will help policy makers understand the importance of adding features which may increase the hedonic motivation of the service adoption therefore raising the chances of acceptance of m-government services.

Similarly, the need of features acceptable to the various classes of the group with reference to their age, gender, income and education would be highlighted which would also help in providing guidelines for the developers of such initiatives.

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.

The study has highlighted the requirement of creating awareness and the way awareness interacts with the important antecedents of m-government acceptance. Thus, making it possible to design awareness programs necessary to target the behavior which is required to appeal to the target user group for adoption of the m-government services. This will further ensure that the public gets complete value for the money spent upon the m-government initiatives.

COVID-19 largely disturbed the economic cycle of the entire world. Developing nations like Pakistan got affected way more than those countries considered as developed nations. Pakistan, due to its unique demographical, geographical and economical positioning got affected even more amongst its peers. Government right now is working upon finding solutions for reducing its cost. However, it is normally considered that reducing budget of public sector development programs may reduce quality of the services for the general public. This research has provided an insight into user behavior of m-government acceptance. Using these results governmental agencies can plan reducing cost by offering m-governmental services for delivering existing governmental services. Moreover it could go further by providing innovative governmental services through mobile technology using the results at a fraction of the cost of offering same services through traditional mediums. This can help reducing overall expenditure of the government as is the need of the time. Providing a very practical and acceptable solution to the economic challenges of Pakistan.

Understanding the m-government acceptance behavior can help government launching digital services which can help the government reduce its carbon footprint. This can not only help reducing the negative effects of climate change but also offers the opportunity of earning carbon credits and then selling it to the market. Thus this can assist the government in the reduction of cost, but also would simultaneously help in increasing the revenue. Whereas it can also positively effect upon the climate change.

5.5. Limitation of the Study

The study was meant to identify the moderating effect of demographic variable upon the relationship between behavioral factors and behavioral intentions to accept m-government services. There are many limitation of the study which are discussed briefly below to provide an overview of the 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 decided 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.

5.6. Recommendations on Future research

The study focused on the moderating effects which the demographic variables 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 these demographic variables 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 four demographic variables were evaluated for their moderating effect upon relationship between behavioral factors and behavioral intentions to accept m-governmental services. Additional demographic variables like 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.

Digital is the future of humanity. This research has paved way towards understanding human behavior while using technological interventions in governmental services. Further work can be done to understand the effects upon societal values and traditions due to acceptance of m-government services. Anthropological changes due to behavior shift can be evaluated and their effect upon the economic activities can also be measured.

Similarly, new economic opportunities arising from acceptance of m-government services can be identified whereas those professions which may get redundant, due to the shift, can also be

highlighted. It offers a great opportunity to predict and understand the socio, economic change which acceptance of m-government services can trigger.

The author in this research has worked upon proving the fact that m-governmental service is a disruptive technology. Further work can be done identifying the societal, political, economic and anthropological effects of the disruptions which the acceptance of these services would bring in.

The world in general and Pakistan in particular is facing the challenges of the climate change. Pakistan is considered to be amongst the countries which are going to be the most affected by these climate changes. The acceptance of m-governmental services can reduce the carbon footprint of providing governmental services. Research can be done to measure the effect of these changes on the environment provided the acceptance of m-government services becomes a norm in the country. Moreover the effect could be measured on a geographical basis for individual nations as well as for the entire world. In addition to the economic effect of the positive changes brought in by the reduction in the carbon footprint of the governmental services could also be measured by the researchers.

Similarly researchers can work upon calculating the carbon credits which can be generated by the governments while switching over to the m-governmental services. The total impact of cost reduction combined with the revenue earned from selling carbon credits could be measured to understand that effect which have upon the economic, social and environmental wellbeing of the society.

5.7. Concluding Remarks

This study is the first of its kind study undertaken to evaluate the moderating effect of demographic variables upon the relationship between behavioral factors and the behavioral intentions to accept m-government services. The study evaluated the differences between e-government services and m-government services. It expanded the existing research by evaluating the differences between these both services. Furthermore, built on the established facts published by researchers, the present study provided a comprehensive definition of the m-government services, differentiating between m-government and e-government services. It helped devising a route at which researchers could tread while fully understanding the mobile based governmental initiatives and services. Moreover, this has added to the debate about characteristics of e-government and m-government. The study clarifies that the m-government systems has more to offer than the e-government systems. 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. To start with, the study removed similar variables measuring the behavioral factors. From the remaining list, only those factors producing inconsistent results regarding relationship with behavioral intentions were selected. The idea was to identify the explanation between the differences in results from various researches around the globe. Demographics variables were identified and examined for the moderating effect which these variables have 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. This was only education which could moderated the relationship. It seems that no other demographic factor could change the effect of the hedonic motivations. 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. It has further identified that convincing younger people to adopt m-government services may require giving them more knowledge regarding the services which m-government services could provide.

Technology is the future of this world. Authors like Yuavel Noah Harerri are proponents of human evolution to a digital age; whereas other researchers are also discussing digital anthropology (Muhtar & Zailani, 2024). The idea is to take the challenge of digitization as an

opportunity to help the human race get into the next level of growth. Technology should be considered to be used as a catalyst of growth rather than a hurdle to be avoided. Yet it is human behavior which is most important in letting the technology take its role. Understanding the human behavior in accepting, adopting and using technology is of critical importance in helping the human race move forward.

The research provides a great opportunity to Pakistan to meet the economic challenges it is facing. The acceptance of m-government services shows the resolve of public to accept technology as a medium of service delivery. It further shows the possibility of adopting m-government services which are a cheaper alternative to the otherwise expensive medium of delivering governmental services. The mounting sovereign debt is a challenge for government of Pakistan. All the creditors are pressing hard the government of Pakistan to reduce its expenditure. Adopting to the m-government services may help in reducing the expenditure. Developing m-government systems could not only help overcome the inefficiencies present in the traditional system but also would cost less. This is also the requirement of international credit agencies for the government to reduce cost and increase efficiency of the system.

The research was focused upon the mobile based governmental systems developed to make public goods and services delivery efficient and effective. However there are governance systems present in the private sector organizations. Utilizing the findings of the research in the context of entrepreneurial ventures offers another opportunity. It is clear that the average citizen of Pakistan is technology ready to adopt mobile governance systems. The technology readiness could be utilized by the private entrepreneurs by expanding their business reach and utilizing technology while communicating with their customers. Similarly, developing mobile based technology platforms to maintain supply chain systems could be another place where

these results can be applied. The research provides behavioral insights for the users of m-government systems. However, these users are also consumers of private goods and services. The demographic based results can further be utilized by private entities to help better understand their customers' behavior.

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.



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APPENDICES

Appendix-I Research Questionnaire

I am a student of PhD at University Utara Malaysia (UUM). I am working in the field of m-government. And am researching upon moderating effect of demographic variables upon behavioral factors affecting m-government acceptance in Pakistan. M-government is a way of government where mobile services are used to provide government services one example is that of mobile service of Election Commission of Pakistan (ECP) where ECP in collaboration with NADRA provides SMS service for the public to facilitate the eligible voters to check their registration status. The public can get the information by entering CNIC number and sending the text message to the number 8300. An automated response is received in this regard with the name of the electoral area, block code and serial number. This is an example of mobile government service provided by the government of Pakistan providing an excellent service to the public using mobile networks. It also saves a lot of time and effort on the part of citizens while providing cost-saving and effectiveness on the part of government. The following are a few more examples of m-government services so to clarify further, the concept of m-government services.

- a. Verification of numbers of Sims operating in one's name through text message
- b. Checking one's name on active tax payer's list through text message
- c. Pakistan citizen portal App. It is a grievance redressal system for citizens both at the federal and provincial levels.
- d. Mobile birth registration App; where government nominated agents use mobile application to register birth at the request of the citizen.
- e. Tasdeeq App; through which citizens can not only verify the whereabouts of their domestic employees but can also verify information about tenants. Moreover, it satisfies the legal requirement of reporting about the domestic worker and tenant, without visiting the police station.

As you might have noted from the above examples that using the mobile handset to access government services is an m-government service. One can access the same government service through a variety of mediums, but whenever one uses a mobile handset to access these services, it is m-government services. There are government services that are extremely convenient using mobile handset than any other medium; as you may observe about all the examples cited above. Hence the procedure of access, the front end of the mobile app, and the way the mobile app is designed become important. And on the top, it is important to understand how the citizens feel about introduction of such services so as to invest public money in the right manner and at the right place.

Your cooperation in completing the questionnaire would help not only achieving my research objective but may also assist in paving the way to an m-government system convenient and acceptable to the general public. Please be sure that all the information collected would remain strictly confidential. The purpose of this information is only research and this would not be used for any other purpose. I am highly obliged for showing your consent to participate in this research.

PART-1
Demographics

Please select (✓) one option as appropriate

Gender

- ① Male
- ② Female

Age

- ① 18-30 years
- ② Above 30 years

Education

- ① Up to 12 years of education
- ② Above 12 years of education

Monthly Income

- ① Up to PKR 50,000
- ② Above PKR50,000



PART-II

Perceived usefulness

PU1	I think the m-govt services should enable me to complete interactions without harassment.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PU2	I am likely to use valuable m-govt services provided to me.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PU3	I think interaction with a mobile device is valuable.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PU4	Using the govt services through a mobile device is less expensive.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PU5	Using the m-govt services is time-saving and helps me to complete tasks more rapidly.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Perceived ease of use

PE1	Learning to operate m-government is easy for me.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PE2	I found m-government is easy to get to do what I wanted to do.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PE3	My interaction with m-government is clear and understandable.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PE4	It is easy for me to be become skillful at using m-government.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
PE5	I found m-government is easy to use
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Awareness

AW1	In general, I know about m-government services.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
AW2	I have received enough information about the benefits of using m-government services.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
AW3	I think that when needed, I will get enough guidance from the government related to m- government services.
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Technology readiness

Optimism	
OP1	New technologies contribute to a better quality of life
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
OP2	Technology gives me more freedom of mobility
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
OP3	Technology gives people more control over their daily lives
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
OP4	Technology makes me more productive in my personal life
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
Innovativeness	
INN1	Other people come to me for advice on new technologies
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
INN2	In general, I am among the first in my circle of friends to acquire new technology when it appears
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
INN3	I can usually figure out new high-tech products and services without help from others
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
INN4	I keep up with the latest technological developments in my areas of interest
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
Discomfort	
DIS1	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
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
DIS2	Technical support lines are not helpful because they don't explain things in terms, I understand
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
DIS3	Sometimes, I think that technology systems are not designed for use by ordinary people
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
DIS4	There is no such thing as a manual, for a high-tech product or service that's written in plain language
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
Insecurity	
INS1	People are too dependent on technology to do things for them
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
INS2	Too much technology distracts people to a point that is harmful
Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐	
INS3	Technology lowers the quality of relationships by reducing personal interaction

	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
INS4	I do not feel confident doing business with a place that can only be reached online
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Trust

TT1	Even if not monitored, I would trust m-government services to do the job right
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
TT2	I trust m-government services
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
TT3	I believe m-government services are trustworthy
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Hedonic Motivation

HM1	Using mobile government services is fun
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
HM2	Using mobile government services is enjoyable
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
HM3	Using mobile government services is very entertaining
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Behavioral Intention

BI1	I would use m-government services for my needs of interacting with government
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
BI2	Using m-government services for having transactions with government is something I intend to do
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐
BI3	I can see myself using m-government services for handling my transactions with government
	Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐

Appendix A: Group Difference – Gender (Outerloading-Parametric Approach)

Path	Outer Loadings-diff (GROUP_Gender(1.0) – GROUP_Gender(2.0))	t-Value (GROUP_Gender(1.0) vs GROUP_Gender(2.0))	p-Value (GROUP_Gender(1.0) vs GROUP_Gender(2.0))
AW1 <- AW	0.060	1.412	0.159
AW2 <- AW	0.061	1.364	0.173
AW3 <- AW	0.181	2.240	0.026
AW4 <- AW	0.102	2.192	0.029
BI1 <- BI	0.082	1.695	0.091
BI2 <- BI	0.018	0.355	0.722
BI3 <- BI	0.016	0.322	0.748
BI4 <- BI	0.020	0.345	0.730
HM1 <- HM	-0.115	1.680	0.094
HM2 <- HM	-0.023	0.445	0.657
HM3 <- HM	-0.007	0.094	0.925
PE1 <- PE	-0.007	0.176	0.861
PE2 <- PE	0.066	1.425	0.155
PE3 <- PE	-0.015	0.460	0.645
PE4 <- PE	0.084	2.058	0.040
PE5 <- PE	0.043	0.935	0.350
PU1 <- PU	-0.018	0.172	0.864
PU2 <- PU	-0.024	0.208	0.835
PU3 <- PU	0.007	0.064	0.949
PU4 <- PU	0.000	0.002	0.998
PU5 <- PU	-0.049	0.415	0.679
TR1 <- TR	0.027	0.464	0.643
TR10 <- TR	0.135	2.033	0.043
TR11 <- TR	0.100	1.398	0.163
TR12 <- TR	0.048	0.711	0.478
TR13 <- TR	0.213	2.431	0.015
TR14 <- TR	0.165	1.912	0.057
TR15 <- TR	0.109	1.377	0.169
TR16 <- TR	0.190	2.468	0.014
TR2 <- TR	0.044	1.186	0.236
TR3 <- TR	0.146	2.569	0.011
TR4 <- TR	0.072	1.196	0.232
TR5 <- TR	0.037	0.646	0.519
TR6 <- TR	0.085	1.587	0.113
TR7 <- TR	0.061	1.039	0.299

TR8 <- TR	0.133	2.844	0.005
TR9 <- TR	0.118	1.761	0.079
TT1 <- TT	0.174	2.247	0.025
TT2 <- TT	0.048	1.368	0.172
TT3 <- TT	-0.010	0.160	0.873
TT4 <- TT	-0.090	1.736	0.083
TT5 <- TT	0.038	0.909	0.364

Note: male = 1; female = 2

Appendix B: Group Difference – Age (Outerloading-Parametric Approach)

Path	Outer Loadings-diff (GROUP_Age(1.0) – GROUP_Age(2.0))	t-Value (GROUP_Age(1.0) vs GROUP_Age(2.0))	p-Value (GROUP_Age(1.0) vs GROUP_Age(2.0))
AW1 <- AW	0.014	0.333	0.739
AW2 <- AW	0.027	0.740	0.459
AW3 <- AW	-0.040	0.613	0.540
AW4 <- AW	0.002	0.043	0.966
BI1 <- BI	-0.022	0.434	0.665
BI2 <- BI	-0.006	0.113	0.910
BI3 <- BI	0.004	0.077	0.939
BI4 <- BI	0.054	0.872	0.384
HM1 <- HM	-0.060	0.719	0.472
HM2 <- HM	-0.081	1.604	0.110
HM3 <- HM	0.024	0.335	0.738
PE1 <- PE	-0.012	0.281	0.779
PE2 <- PE	0.021	0.492	0.623
PE3 <- PE	-0.002	0.071	0.944
PE4 <- PE	-0.003	0.069	0.945
PE5 <- PE	-0.067	1.405	0.161
PU1 <- PU	-0.028	1.277	0.202
PU2 <- PU	-0.028	1.366	0.173
PU3 <- PU	-0.019	0.788	0.431
PU4 <- PU	-0.057	1.912	0.057
PU5 <- PU	-0.073	2.791	0.006
TR1 <- TR	-0.111	2.006	0.046
TR10 <- TR	0.024	0.387	0.699
TR11 <- TR	-0.077	1.164	0.245
TR12 <- TR	-0.097	1.488	0.138
TR13 <- TR	0.050	0.684	0.494

TR14 <- TR	-0.118	1.472	0.142
TR15 <- TR	-0.073	1.072	0.285
TR16 <- TR	-0.034	0.501	0.617
TR2 <- TR	-0.034	0.922	0.357
TR3 <- TR	-0.021	0.427	0.670
TR4 <- TR	-0.033	0.582	0.561
TR5 <- TR	0.016	0.285	0.776
TR6 <- TR	0.044	0.835	0.404
TR7 <- TR	-0.074	1.367	0.172
TR8 <- TR	-0.004	0.078	0.938
TR9 <- TR	0.077	1.282	0.201
TT1 <- TT	0.105	1.402	0.162
TT2 <- TT	0.002	0.041	0.967
TT3 <- TT	0.037	0.569	0.570
TT4 <- TT	0.012	0.197	0.844
TT5 <- TT	0.013	0.282	0.778

Note: age is up to 30 years = 1; above 30 years = 2

Appendix C: Group Difference – Income (Outerloading-Parametric Approach)

Path	Outer Loadings-diff (GROUP_Income(1.0) – GROUP_Income(2.0))	t-Value (GROUP_Income(1.0) vs GROUP_Income(2.0))	p-Value (GROUP_Income(1.0) vs GROUP_Income(2.0))
AW1 <- AW	-0.059	1.403	0.161
AW2 <- AW	-0.058	1.422	0.156
AW3 <- AW	-0.136	1.765	0.078
AW4 <- AW	-0.074	1.830	0.068
BI1 <- BI	-0.053	1.103	0.271
BI2 <- BI	-0.002	0.048	0.962
BI3 <- BI	-0.007	0.145	0.885
BI4 <- BI	-0.024	0.424	0.672
HM1 <- HM	0.092	1.325	0.186
HM2 <- HM	0.008	0.160	0.873
HM3 <- HM	-0.010	0.151	0.880
PE1 <- PE	0.003	0.079	0.937
PE2 <- PE	-0.055	1.286	0.199
PE3 <- PE	0.017	0.538	0.591
PE4 <- PE	-0.058	1.470	0.142
PE5 <- PE	-0.037	0.835	0.404
PU1 <- PU	0.020	0.304	0.761

PU2 <- PU	0.025	0.473	0.637
PU3 <- PU	-0.005	0.069	0.945
PU4 <- PU	0.002	0.037	0.970
PU5 <- PU	0.050	0.858	0.392
TR1 <- TR	-0.025	0.430	0.667
TR10 <- TR	-0.138	2.099	0.036
TR11 <- TR	-0.109	1.496	0.136
TR12 <- TR	-0.061	0.888	0.375
TR13 <- TR	-0.221	2.545	0.011
TR14 <- TR	-0.161	1.792	0.074
TR15 <- TR	-0.120	1.520	0.129
TR16 <- TR	-0.193	2.334	0.020
TR2 <- TR	-0.045	1.204	0.229
TR3 <- TR	-0.154	2.790	0.006
TR4 <- TR	-0.074	1.308	0.192
TR5 <- TR	-0.043	0.746	0.456
TR6 <- TR	-0.102	1.802	0.072
TR7 <- TR	-0.060	1.008	0.314
TR8 <- TR	-0.141	2.874	0.004
TR9 <- TR	-0.120	1.701	0.090
TT1 <- TT	-0.158	2.127	0.034
TT2 <- TT	-0.050	1.489	0.137
TT3 <- TT	0.037	0.591	0.555
TT4 <- TT	0.087	1.819	0.070
TT5 <- TT	-0.029	0.697	0.486

Note: monthly income is up to 50000 rupees = 1; above 50000 rupees = 2

Appendix D: Group Difference – Education (Outerloading-Parametric Approach)

Path	Outer Loadings-diff (GROUP_Education(1.0) – GROUP_Education(2.0))	t-Value (GROUP_Education(1.0) vs GROUP_Education(2.0))	p-Value (GROUP_Education(1.0) vs GROUP_Education(2.0))
AW1 <- AW	-0.012	0.284	0.777
AW2 <- AW	0.015	0.439	0.661
AW3 <- AW	-0.002	0.024	0.981
AW4 <- AW	-0.026	0.664	0.507
BI1 <- BI	-0.061	1.136	0.257
BI2 <- BI	0.083	1.365	0.173
BI3 <- BI	-0.074	1.413	0.158

BI4 <- BI	-0.009	0.168	0.866
HM1 <- HM	0.170	1.862	0.063
HM2 <- HM	0.070	1.367	0.172
HM3 <- HM	-0.014	0.219	0.827
PE1 <- PE	0.063	1.395	0.164
PE2 <- PE	0.054	1.246	0.214
PE3 <- PE	0.078	2.185	0.029
PE4 <- PE	0.084	1.921	0.055
PE5 <- PE	0.048	0.944	0.346
PU1 <- PU	0.004	0.173	0.863
PU2 <- PU	0.013	0.586	0.558
PU3 <- PU	0.005	0.211	0.833
PU4 <- PU	0.022	0.780	0.436
PU5 <- PU	0.020	0.838	0.403
TR1 <- TR	0.103	1.924	0.055
TR10 <- TR	0.016	0.271	0.787
TR11 <- TR	-0.019	0.262	0.794
TR12 <- TR	0.057	0.858	0.391
TR13 <- TR	0.058	0.806	0.421
TR14 <- TR	0.045	0.597	0.551
TR15 <- TR	0.032	0.464	0.643
TR16 <- TR	0.001	0.020	0.984
TR2 <- TR	0.006	0.169	0.866
TR3 <- TR	-0.047	0.968	0.334
TR4 <- TR	0.054	0.929	0.353
TR5 <- TR	0.022	0.350	0.726
TR6 <- TR	0.033	0.546	0.585
TR7 <- TR	0.029	0.549	0.583
TR8 <- TR	-0.016	0.280	0.780
TR9 <- TR	0.043	0.668	0.505
TT1 <- TT	-0.150	1.931	0.054
TT2 <- TT	0.009	0.231	0.818
TT3 <- TT	0.062	0.952	0.342
TT4 <- TT	-0.007	0.116	0.907
TT5 <- TT	-0.007	0.152	0.879

Note: formal education up to 12 years = 1; above 12 years = 2