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Toward a Conceptual Model for Citizens' Adoption of Smart Mobile Government Services during the COVID-19 Pandemic in Jordan

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Abstract: With the accelerated evolution of smart mobile applications, more government organizations are putting forth efforts to motivate their citizens to utilize mobile government (m-gov) applications and services. Accordingly, the citizens' perspective is vital to improve the applications and promote their engagement in the public services. The current study explored an important issue related to the factors affecting citizens' adoption of smart m-gov services in the Jordanian context in order to develop a conceptual framework. Previous research on e-government adoption has paid attention to traditional web-based services. Yet, given the distinguishing characteristics of mobile technology and its application, more study of m-government is warranted. The current study expands the Unified Theory of Acceptance and Use of Technology (UTAUT) by integrating its original variables (i.e., Performance Expectancy PE, Effort Expectancy EE, Social influence SI, Facilitating Conditions FC) with contextual variables (i.e., Fear of COVID-19, Trust, Corruption Avoidance). The proposed model will contribute to academic literature and provide practical implications, advancing the understanding of mobile-based governmental services and applications during crisis time (e.g., COVID-19).
Keywords: Mobile-government, Acceptance, Trust, Corruption Avoidance, COVID-19, Public Sector, Jordan.

1 Introduction

The adoption of information communication technologies (ICTs) is an increasingly vital research area, due to the continued emergence of innovative technologies. With the IT advancements, and particularly mobile technologies, the delivery pattern of many governmental services has been transformed by means of mobile government (m-government) [1, 2]. M-government is referred to the evolution or extension of e-government, by which the transactions and services of citizens, businesses, employees, and other government organizations are handled in mobile environments using internet-enabled devices [3]. The m-government initiatives around the world led to many benefits for government entities, businesses, citizens, and economic development as such technology could result in improved communication, efficient government processes, expanded delivery of services, coordinated data, better information sharing, real-time access to services and information, personalized services, optimized cost, broader wireless networks, better transparency, improved accountability, less corruption, digital equality, and increased productivity and efficiency for the public sector staff [4-6].

The m-government adoption is still a nascent research field as the earlier studies have focused on the acceptance of e-government systems and ignored mobile technologies [6]. The factors investigated here may help to build a better understanding of users' acceptance and adoption as rigorous empirical research of m-gov acceptance behavior in developing countries is still limited [2]. The fact that the geographical location has its own characteristics (i.e., social, political, cultural, and economic) could be one of the related determinants that affect attaining a uniform electronic strategy, which principally shaped mobile government technology, technological institutions, and temporal context that solely affect the decision about adopting innovations.

The use of online technologies (e.g., m-government) in the context of the public sector assists to streamline the services delivery to public organizations, businesses, and citizens; most recently, it has been considered a life-sustaining tool to manage the crisis (i.e., COVID-19) as it is able to enhance the service delivery, collaborative efforts, and communications [7, 8]. Highlighting this issue,

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e-government /m-government initiatives are also debated to improve the transparency in the processes of the public sector, promote citizens' participation, and reduce the corruption risk [9]. According to Srivastava et al., (2016) corruption indicates "*the abuse of public office for personal or private advantage*"[10]. It is widely acknowledged as a noteworthy challenge to the success of e-government initiatives and the effectiveness of services delivery. In contrast, Corruption avoidance could serve as a driver to accept and adopt digital/smart m-gov applications [11].

Over the last decade, corruption has received growing attention among scholars in the e-government arena and has become a well-debated issue in the arena of information systems (IS). A host of studies have postulated that e-government technology has the ability to control corruption in the governmental context (i.e. public sector) by considering a number of challenges such as poor accountability, information asymmetry, service delay, and government inefficiency, e.g., [9, 10]. Given that the effectiveness of the e-government initiative relies on stakeholders' willingness to accept and adopt these services [12], limited studies investigated "*corruption avoidance*" as the main driving force of e-government acceptance and use, e.g., [11, 13, 14].

The current research is one of the leading empirical studies that focus on citizens' behavioral intentions towards m-gov applications in Jordan in the crisis time (i.e., COVID-19 pandemic) considering the role of corruption avoidance. As Jordan has achieved massive improvement in the development of m-gov applications recently [15], the current research has important implications for practitioners in the Middle East and developing nations, and for additional studies on an m-gov acceptance theoretical model that is robust and can be employed across cultures. Therefore, developing a conceptual framework to explain the factors influencing the adoption of m-gov applications (e.g., SANAD) in Jordan is crucial to understanding the potential of this IT in the developing nations, in general, and Jordan in particular.

This research study contributes to the academic knowledge on information systems: First, it developed a framework on the basis of the UTAUT to explore the factors influencing the user behavior towards m-gov applications in crisis times which is not widely addressed in the earlier literature. Second, it integrated two variables, (1) fear of COVID-19 and (2) corruption avoidance, into the UTAUT model, for a better understanding of the role of corruption avoidance on user behavioral intentions to accept and adopt m-gov during the time of the COVID-19 epidemic.

2 Theoretical Backgrounds and Literature Review

2.1 Overview of the Corruption and M-government Adoption

Institutions have a vital role in terms of inducing economical activities. Consequently, individuals tend to participate in activities that attain better economical returns. In a number of countries worldwide, such activities are in general described as giving kickbacks, illegal favors, and bribes that avail certain people causing negative implications to the society and economy [10]. Researchers proposed different definitions for corruption, and it is widely known to involve "*activities whereby a public office is used (abused) to satisfy the personal interests of a public officer, against the rules of the office and the interests of the country*"[16]. According to Shah and Schacter (2004), there are three types of corruption includes grand corruption, state capture, and petty corruption [17]. Transparency International, which is an international movement operating in over 100 nations aiming to end the injustice of corruption, explained the petty corruption as "*everyday abuse of entrusted power by public officials in their interactions with ordinary citizens, who often are trying to access basic goods, information or services in places like hospitals, schools, police departments, and other government agencies*"[18]. It is, therefore, highlights corrupt practices related to the low-level administrations of the public/governmental sector.

In many countries, corruption has become a notable and severe concern. This drives citizens to adopt and accept alternate channels to benefit from public services while avoiding bribes, approaching intermediaries, and using influence ... etc. [16]. In general, middlemen and agents are considered channels to pay bribes to the officials/staff in the public sector to get the transaction completed or to get it completed faster. Corruption avoidance has received considerable attention in innovative applications of ICTs by governments around the world [19]. M-government applications, for example, have the ability to control corruption, and citizens are glad to get rid of middlemen [20]. Relatively limited literature has focused on the role of corruption avoidance in users' adoption and acceptance of e-government systems. Neupane et al., (2014a) carried out primary research in Nepal, the researchers revealed that anti-corruption variables (e.g., the probable increase in accountability and transparency, reducing monopoly power, and information asymmetry) affected public sector officers' willingness to use e-procurement system. In the same year, another study by Neupane et al., (2014b) found that the same factors might influence bidders' willingness to use the e-procurement system to supply services and goods to the Nepal government. Qualitative research conducted by Kumar et al., (2018) found that transparency, fairness in the process, and corruption avoidance are

important factors affecting the adoption of e-government by Indian citizens. In this regard, Ingrams and Schachter (2019) found that the level of "social capital" integrated with the degree of perceived corruption influence the e-participation adoption in South Africa.

To conclude, the importance of e-government systems concerning "corruption control" was apparent in previous studies; yet the earlier research fell short of offering a thorough understanding and deep insights of the role of "corruption avoidance" in m-gov adoption from the citizens' perspective, particularly in crisis times (e.g., COVID-19 pandemic).

2.2 COVID-19 Pandemic and M-government Applications

COVID-19 or novel coronavirus is considered an unprecedented challenge regarding the enormous volume of information produced and published on the COVID-19 epidemic. Thus, a number of reports stated that the amount of information about the pandemic could create a position where it is hard for individuals to distinguish between the facts and rumors concerning the disease [21]. This position did not only influence the citizens' trust in the procedures to be taken but also their confidence in governments as well as in the crisis management and the information about the coronavirus epidemic [21]. It is significant to take into account though that the usage of IT has been contributed to the managing of coronavirus cases, including developing IS/IT to disseminate information, trace contacts, and also reduce any further spread of the disease using online government services [22, 23]. The use of ICT applications by governments to deliver services to its citizens is known as m-gov, which assists to make public services and information more available to government stakeholders. This resulted in enhanced efficiency and accountability [6, 12]. Such use of IT for government processes and transactions offers a channel for citizens to have the benefit of uninterrupted services, even in crisis times and quarantine (e.g., COVID-19 epidemic).

The development of e-government applications can be classified into 4 different phases: web presence, interactions, transaction, and transformation phases. The web presence is related to one-way communications as simple information of public services can be provided to the citizens, while in the interaction stage government provides different services (e.g., search engines, emails, and official form downloading) to the citizen aiming to facilitate government-citizens communication [24]. In the transactional stage, citizens are provided with enabled services (e.g., e-payment activities for taxes and license renewal), while the transformational aspects considered to be a mature stage indicates the reinvention of how government work is organized, managed and conceived [24]. The abovementioned development phases of e-government applications can give rise to two categories of online government services: informational and transactional (which are the focus of the current research). The informational aspects of e-government applications include the simple online presence and interactions which allow government agencies to offer information public services to their citizens, for example, the information concerning the coronavirus epidemic. In addition, the transactional governmental services, are comprised of the transformation and transaction phases, which enable and authorize the public sector to attain complete integration of its processes and to automate e-payment activities or financial transactions online, which could help to control the pandemic. Information is the most crucial element in the era of the digital economy especially during coronavirus outbreaks, to support strategic management. Even more crucial is the use of e-government applications (e.g., m-government) particularly adapted towards the management of the COVID-19 epidemic.

For the aim of the current study, the questions related to whether citizens are aware of the m-gov applications, what factors influence their adoption of such applications, how beneficial they are to their daily tasks, to what level do they really utilise mobile government and affect others within their social network to adopt it? need to be addressed, so the current research can develop a conceptual model to enrich the m-gov adoption studies as they are relevant to both the informational and transactional aspects of m-gov.

2.3 UTAUT

According to Venkatesh et al., (2003), the researchers developed many IT/IS acceptance models and theories: "Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), the Motivational Model (MM), Theory of Planned Behavior (TPB), combined TAM-TPB model, Model of Personal Computer Utilization (MPCU), Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT)" [25]. Among these theoretical models, the TAM is described to be the most parsimonious, robust, and influential in predicting the behavior of IS/IT adoption and use [26]. Additionally, the technology acceptance model (TAM) has received wide empirical research support via application, validation, and replication for its ability to predict IS/IT usage [26-28]. Yet, the general nature of this model fails to offer meaningful information on the user's perspective about a particular system. Moreover, the TAM postulate that IS usage is volitional, which means there are no challenges that would prohibit people from utilizing IS/IT [29]. To overcome TAM limitations, many scholars have endeavored to improve the model, e.g.,[30]. Even though the TAM models could overcome the weaknesses of the earlier TAM, scholars are confronted with the need to choose amongst a lot of theoretical models and find that they have to "*pick and choose*" factors across the previous frameworks and theories or select a "*favored model*" and mostly ignore the

contributions from other theoretical frameworks. In 2003, Venkatesh and his colleagues developed a new theoretical model known as the UTAUT model which contributes to overcoming the aforementioned weaknesses.

2.3.1 Research Model

The UTAUT theoretical model incorporates the earlier research and theories on individuals' acceptance of IT/IS into a unified theory that synthesizes the basic aspects of eight previous developed theoretical frameworks (i.e., TRA, the TAM, the MM, the TPB, combined TAM-TPB model, the MPCU, the IDT, and the SCT). The UTAUT has the ability to explain (0.70) of the variance in behavioral intention towards IT usage— a substantial improvement compared to the original eight theoretical models. Moreover, the UTAUT model was empirically analyzed to confirm its validity. The researchers concluded that the UTAUT model is a definitive theoretical framework that harmonizes what is known and offers a basis for future research efforts in the field of IT/IS acceptance from the users' perspective [25, 28]. By involving the joint explanatory power of the previous theoretical frameworks and fundamental moderating influences, the UTAUT model makes progress in terms of cumulative theory whilst sustaining a parsimonious theoretical structure. Venkatesh et al., (2003) identified four variables as key factors affecting users' acceptance and usage behaviors, namely PE, EE, SI, and FC.

Based on the above discussion, the current study developed a conceptual framework based on the UTAUT theoretical lens with three constructs added: corruption avoidance, trust, and fear of COVID-19 (See Figure 1). The integrated model aims to explore the factors affecting users' acceptance of the m-gov application (SANAD) in Jordan during the COVID-19 time. The variables of the proposed study model and the additional constructs are illustrated below.

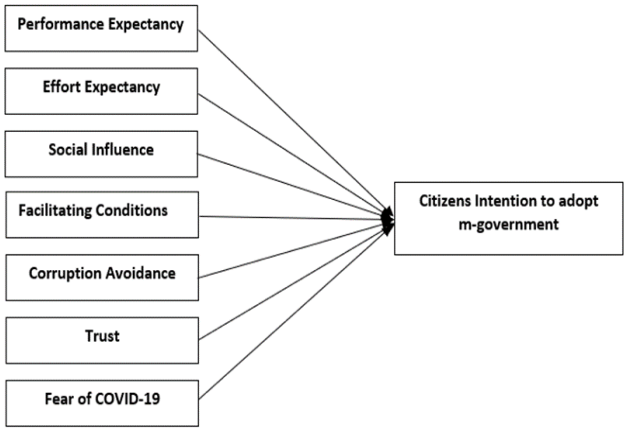

Fig.1: Proposed Research Model.

Performance Expectancy:

The decision to adopt and utilize the new IT/IS relies on the extent to which people feel that utilizing the IT/IS will enhance work performance [26]. According to [25], PE can be defined as "*the degree to which an individual believes that using the system will help him or her to attain gains in job performance*.". Perceived usefulness (PU) was confirmed to have a positive impact on users' attitudes to adopt m-gov services [1, 34]. The performance expectance (PE) was revealed to have a significant influence on the users' intentions towards using m-gov [3]. Individuals who perceive the usefulness and advantages of the mobile government applications and the value-added in crisis-era (e.g., coronavirus pandemic) will be likely to adopt it. The use of the m-government application (SANAD) to obtain useful COVID-19 information and complete government transactions is critical to the citizens' adoption of this application and its future recommendations. Individuals who feel that the SANAD application is useful, will in turn recommend it to their colleagues and friends.

Effort Expectancy:

Researchers have found a significant impact of perceived ease of use (PEoU) and users' behavioral intentions to adopt new IT/IS [1]. EE can be defined as "the degree of ease associated with the use of the system" [25]. Researchers confirmed EE's important role in the m-government context, e.g., [3]. SANAD is an information-based and transaction-based m-government application and is still relatively novel to many citizens in Jordan, it would be consequently critical to find out if they perceive m-gov applications as being easy to learn, or hard to utilize, and whether these perceptions will result in adoption decision. The provision of informational and transactional public services using m-government need to be delivered efficiently to make sure that citizens can make sucessful usage of such services without having to confront any practical/technological issues. The design of the application interfaces, easy upload, and download of information and documents, seamless navigation of content are significant details of ease of use that influence the adoption and use of the m-gov applications, particularly the adoption of SANAD application during the COVID-19 pandemic.

Social Influence:

In the early adoption stage where the users have little or no experience/knowledge in using ICT innovations, their beliefs would be significantly affected by opinions stated by reference cohorts [25, 31]. SI can be defined as "*the degree to which an individual perceives that important others believe he or she should use the new system*" [25]. In the context of IS, individuals' decisions to accept and utilize the new systems are influenced by others; expert opinions, family, colleagues, and/or friends [4, 32]. Since

the m-gov application (SANAD) is still at its infancy stages, the government-driven communications on mass media (e.g., internet, TV channels, social media, newspapers, and radio) might also have a thorough impact in shaping the individuals' behavior towards the usage of SANAD application, particularly in crisis times. Hung and his colleagues (2013) employed subjective norm (SN) to investigate m-gov adoption among Taiwanese citizens and revealed a significant relationship between SN and behavioral intention [33]. Also, it is expected that individuals who adopt m-gov will be more possible to become successful because of their familiarity with government policy. Hence, the success of other people in utilizing m-gov applications is believed as being likely to influence potential adopters concerning the long-term advantages of utilizing the application.

Facilitating Conditions:

Venkatesh and his colleagues (2003) highlighted the significant role of FC in the adoption of IT/IS. FC is defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system"[25]. Earlier IS research revealed that FC is a key determinant of users' behavioral intentions [32]. In addition, Al-Hujran & Migdadi (2013) revealed that FC has a significant influence on the individuals' decision towards the adoption of m-gov. In the context of the current research, FCs will be measured based on the citizens' perception concerning their ability to access the needed ICT resources that support the usage of mobile government in crisis times. Supportive facilities could consist of various resources, for example, training programs, materials accessible to promote individuals' skills, technical support, and m-gov applications' accessibility. Thus, the better the FC, the more likely citizens will be to adopt and utilize the m-gov.

Trust:

Trust (TR) has been commonly examined in earlier research on e-government services [32, 34]. TR is defined as "the willingness of individuals to accept vulnerability based on positive expectations concerning the intentions behavior or intentions of another in a setting characterized by risk and interdependence" [35]. Shareef et al. (2011) confirmed that perceived TR has a positive influence on the adoption of the e-government system from the Canadian citizens' viewpoint. Also, Hung and his colleagues (2013) revealed that TR has a significant relationship with the intentions to utilize m-gov among Taiwanese users. The interest in the TR factor could be associated with four dimensions: privacy and security, credibility, socio-communicative style between the government and the citizen, and application designs [36]. Citizens who trust m-gov would be more inclined to accept and adopt the m-gov application (SANAD) during the crisis-era if they believe such application utilized offers sufficient safeguards against online risk. Thus, the integration of the TR variable will complement the original constructs of the UTAUT, and it is expected to have a significant influence on users' behavioral intentions to adopt m-gov.

Corruption Avoidance:

In the public sector context, corruption is considered a critical challenge worldwide, and this is a more common phenomenon in developing countries (Neupane, Soar, & Vaidya, 2014). To avoid bribes, approaching intermediaries, and using influence people tend to adopt e-channels (Khan et al., 2021; Neupane, Soar, Vaidya, et al., 2014). Middlemen are channels through which bribes are paid to the officers in the government agencies for getting services conducted or getting it conducted faster. In this regard, Neupane, Soar & Vaidya, (2012) stated that "*government officers have monopoly power over the provision of goods and services that are crucial for explaining the incidence of corruption without theft*" [37]. To avoid such issues, e-government/m-government systems can be an efficient tool to mitigate the corruption held by officers in government organizations [11, 20]. E-government applications can contribute to a reduction of the corruption risk by supplying advantages, for example, real-time information, auditing, and automation controls, fixed fees for transactions, reduced payment errors, and reliable efficient services. All users can view the documents and status of public services through m-government that offers greater transparency. Previous literature has shown the relationship between "corruption avoidance" construct and e-government accaptance and use [11, 13, 14, 38]. In the context of the current study, a higher level of perceptions of the potential of m-gov application to mitigate corruption is directly associated with the citizens' willingness towards m-gov adoption during the COVID-19 epidemic.

Fear of COVID-19:

Fear appeals are persuasion messages that are intended to either convey truths or intimidate people by resenting or exaggerating the horrible consequences of disregarding a particular caution [39]. Fear appeal has a positive association with online purchase behavior [40]. Another study shows that the fear of COVID-19 was a strong positive variable that affected the perception of telework [41]. Most recently, Aji et. al., (2020) study supported the impact of perceived COVID-19 risks on customers' intention to adopt e-wallets during coronavirus outbreaks [42]. In this study, it is argued that the higher the fear appeals concerning the COVID-19 virus, the higher the citizens' intentions to use m-government.

3 Discussions

The current paper introduced a conceptual model of citizens' intentions to adopt m-gov for the public information and services in Jordan during crisis era (e.g., COVID-19 pandemic). The model integrates a set of significant factors affecting the users' behavioral intentions

to accept and use the m-gov application (SANAD) with their relationship. The model was also built on the basis of a literature review in the research area and addressed the knowledge gaps. Consequently, the proposed research framework presents new insights: (1) the model addressed the unique characteristics of the technology during the crisis-era while limited research efforts have been done in this context. (2) the research model included, in addition to UTAUT original factors, additional important factors: Fear of COVID-19 (FoC), Trust (TR), Corruption Avoidance (CA). Also, the proposed model has both theoretical and practical implications.

4 Conclusions

This paper presented m-government in the context of developing nations, Jordan in particular. The study analyzed and integrated the UTAUT model with an extension, in order to identify the factors affecting users' intentions to adopt m-gov applications for public information and services during the COVID-19 era. The new model offers a better understanding and richer insights related to m-government adoption. The current research aimed to bridge the research gap due to the lack of research dealing with the use of m-government during the crisis time in Jordan. The model would be further evaluated and modified if necessary, and the research findings would be reported as ongoing contributions to both the public sector and research.

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Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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