Information Sciences Letters
An International Journal

http://dx.doi.org/10.18576/isl/110302

Towards A model for Citizens' Acceptance of E-Payment Systems for Public Sector Services in Jordan: Evidence from Crisis Era

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Received: 2 Dec. 2021, Revised: 22 Jan. 2022, Accepted: 15 Feb. 2022.
Published online:1 May 2022.

Abstract: E-payment systems (EPS) are an attractive trend in electronic services nowadays, and the public sector is not an exception. Earlier studies on e-payment services acceptance have paid attention to the use of web/mobile services during traditional common circumstances. However, given the distinguishing characteristics of the crisis-era (e.g., COVID-19 pandemic) and how this could lead to new business models based on online services and applications, more studies of EPS for e-government services, in particular, are warranted. This study explored an important issue related to the factors affecting citizens' acceptance of E-payment systems for public sector services in the Jordanian context in order to develop a conceptual framework. Studying the acceptance and use of e-payment systems (EPSs) is not a new research topic. However, investigating the factors affecting the acceptance of EPSs in public organizations is a topic of great importance. This study extends the Unified Theory of Acceptance and Use of Technology (UTAUT2) by integrating the theory original variables (i.e., Performance Expectancy (PE), Effort Expectancy (EE), Social influence (SI), and Facilitating Conditions (FC)) with contextual variables (i.e., Fear of COVID-19 (FoC), Trust (TR), Security concern (SEC), and Perceived Risks (PR)). The proposed conceptual model will offer a contribution to the literature in the field as well as practical implications, enhancing the understanding of E-payment services during crisis time.

Keywords: E-payment, Acceptance, Trust, Security, Perceived Risk, COVID-19, Public Sector, Jordan.

1 Introduction

E-payment technologies have developed into avital milestones in terms of information systems (ISs) advancements [1]. Fintech is an acronym widely used for financial technologies, this can be interpreted as a method of payment via information systems or information technology. It is perceived as the convergence of financial services and information technologies that offer innovative services to individuals. One of the most known Fintech solutions worldwide is Apple Pay, they have made a substantial investment in terms of e-payment development [1, 2]. At the current time, both governments and businesses have a commitment to deliver payment services on such innovative platforms with the aim of improving the quality of their mobile and online services [3, 4]. In its official "*National Digital Transformation Strategy & Implementation Plan 2021-2025"*, the government in Jordan declared the development of digital payment as one of its vital policies for the electronic government [5]. The scale of such policy is wider compared to other e-government applications due to its relation to the daily life of all residents/citizens the daily operations of all businesses.

In 2014, the Central Bank of Jordan issued a tender to find electronic solutions that would make payments easier, and at the same time contributes to reducing the amount of cash in circulation. MadfooatCom for electronic payment services won this bid, outperforming a prominent group of regional and international companies[6]. The mission of e-FAWATEERcom, which is an electronic system that provides the service of electronic payments and bill presentment, is to provide seamless global electronic payment services for businesses and individuals. In addition, the system enables businesses to focus on adding value to their clients, while providing individuals with innovative services that promote their lifestyles by simplifying their payment procedures. Therefore, e-FAWATEERcom in Jordan is a representative, good example of e-Payment services and applications.

E-payment was originated in developed countries [7]. Payments' amounts are determined, bills issued, transferred, and collected electronically through the web. They can be communicated between both business operators (service providers) and individual users, saving cost, reducing cash

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circulation, and improving operational effectiveness. E-payment system (EPS) allows institutions and individuals to go paperless, facilitating payment processes, increasing efficiency and effectiveness, enhancing electronic transactions, and protecting the environment [3]. Many countries worldwide, for example, the U.S, Finland, and Denmark have a commitment to promote this valuable technology. Jordan is one of the pioneers in the Middle East (ME) zone. E-payment has various advantages, but barriers involve trust, security concerns, and fraud risks.

The e-Fwateercom payment system operates on the services platform of Madfooatcom company (https://www.efawateercom.jo), under the supervision of the Central Bank of Jordan. The EPS offers a portal website for the business operator (service provider), consumers, social welfare organizations, external agencies, and government agencies. By offering integrated services to users (both individuals and businesses) and uniform payment transmission standards, people have the ability to manage their financial transactions while adhering to strict security and compliance standards. The business users of EPS can store receipts in the e-payment platform and at a subsequent time send out them to other pertinent clients. Throughout the payments' transmissions, security and privacy practices (e.g., digital signature and encryptions) are implemented to guarantee the security and confidentiality of such sensitive data.

1.2 Motivations of the study

Earlier studies on e-payment systems acceptance have focused on EPS use under normal conditions [1, 4, 8, 9]. However, given the distinguishing characteristics of the crisis-era (e.g., COVID-19 pandemic) (in which the use of IT becomes a trend and even mandatory), further research is required to explore whether earlier conclusions apply to these extraordinary circumstances. Thus, research on EPS acceptance is needed. This is the main motivation for the current research.

The Unified Theory of Acceptance and Use of Technology (UTAUT) [10] indicated that factors related to each research context need to be integrated when making an attempt to understand users' acceptance of information technology. The unique characteristics of e-payment services during crisis times propose the need for research exploring users' acceptance of EPS during the COVID-19 pandemic. Hence, the second motivation for the current research is the need to incorporate the UTAUT's original constructs with context constructs such as fear of COVID-19 (FoC), trust (TR), security concern (SEC), and perceived risks (PR).

Over the last few years, Jordan has established world-class e-services for the public sector. Although the United Nations E-Government Survey has reported that Jordan's-government services Jordan ranked 117 in 2020 "moderate level of development", the Jordanian government is expanding and improving its digital offerings to ensure the efficient delivery of high-quality inclusive public services [11, 12]. The Jordanian government has considered the development of e-government systems a crucial goal for the future of the country. E-payment systems are at the heart of such development. One main objective is the application of cashless payments. Understanding the lessons, experiences, challenges, and issues faced by the Jordanian people during this application could benefit e-government authorities and experts, particularly those in developing nations seeking to enhance e-government/e-payment services.

Finally, the current survey is based on earlier literature on IS acceptance and adoption (UTAUT) and incorporates context factors relevant to EPS during crisis times (fear of COVID-19, trust in the e-payment system, security concern regarding e-payment, and perceived risks). By exploring these important variables in the new context (COVID-19 pandemic), the researchers can improve their generalizability.

Therefore, the aim of the current research is to understand the significant variables of E-payment for e-government services in Jordan. The researchers identified the variables which are important to the acceptance of E-payment with aim of developing a relevant conceptual model. This research effort can be considered as a practical and academic reference.

2 Theoretical Backgrounds and Literature Review

2.1 E-Payment in COVID-19 Era

At the end of 2019, Coronavirus (COVID-19) has been declared a public health crisis worldwide by the World Health Organization (WHO). Later in March 2020, the WHO declared that COVID-19 can be described as an epidemic. Hence, of utmost critical to stopping any additional spread of the disease in healthcare and public environments [13]. Amongst the guidelines, recommendations, strategies, and measures that several governments have enforced are staying home, testing suspected cases, social distancing, keeping away from social gatherings, and treating patients [14]. Some governments are, however, conducted stricter measures and health protocols to contain the Coronavirus outbreak, for example, mass testing and lockdowns. Moreover, the WHO has notified that banknotes (i.e., paper money) may spread the virus. The WHO advised people to use contactless e-payments that are possible to contribute to controlling the pandemic. Coronavirus also undercut the utilization of cash by pushing a number of retailers to close down their stores and conduct the selling process exclusively using web orders to deliver commodities [15].

To ensure effective implementation of social distancing protocols, many health official bodies and government

entities are encouraging people to enjoy the benefits of web shopping as an alternative to traditional shopping patterns. E-payment systems allow individuals to access products and services while they are in social distancing or quarantine, so can lessen the likelihood of spreading coronavirus to other people through cash circulation. EPSs technology limits personal transactions, human interactions, and ensures that people purchase the essentials from their homes. Like other countries worldwide, the Jordanian banks started to encourage their clients to use e-banking or mobile banking services to prevent crowding at the branch and apply social distancing rules. This will help to ensure the well-being and safety of staff and clients while delivering the primary services with a reduced number of personnel.

As stated by [16], the availability of different E-payment services and applications, for instance, mobile/e-banking, E-payment portals, and debit/debit cards has grown swiftly in the developing globe. Such technology forms the cornerstone of monetary inclusion initiatives in developing nations. In spite of the notable efforts to improve e-payments, the adoption levels continue modest, especially in low-income nations. Yet, the epidemic of coronavirus positively affects the adoption of e-payment solutions. A notable number of academic research have explored EPS technologies from both technical and users' adoption perspectives [1, 2, 4, 8]. Along with the research carried out, various key variables affecting the perceptions of e-payment services have been suggested. The most critical issue encountered by the providers of EPS services related to the reason for the slow adoption of E-payment. Thus, it is essential to investigate the critical variables affecting the adoption intentions of EPS.

Understanding and meeting users' expectations and requirements are critical factors to the success of e-payment. To enhance the adoption rates of e-payment services, the factors that influence users' adoption must be better managed [17]. The decision regarding which e-payment service to use is closely associated with the design features and ease of use. For any EPS application to be accepted, its design needs to satisfy the customers' requirements [17]. Moreover, studying the impact of clients' demographic characteristics is fundamental for service providers in the development of a proper marketing strategy. In addition, difficulties arising from the spread of coronavirus are expected to accelerate the utilization of extant and innovative IT.

Furthermore, as people go into lockdown and quarantines, large numbers of individuals worldwide are pushed to work out from their homes, so digital connectivity becomes a habit in daily life. For that reason, finding the key predicting variables that affect users' acceptance to use EPS during the COVID-19 epidemic would be beneficial for practitioners and also for service providers during the crisis time. Taking into account the limited related literature, making an attempt to explore users' intentions to adopt EPS during the COVID-19 outbreak is not widely offered to researchers and EPS practitioners.

2.2 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The acceptance of information technology literature addresses one of the most significant topics in the management information systems (MIS) area. Various competing theoretical frameworks have been suggested to understand different acceptance behaviors: the theory of reasoned action (TRA), the technology acceptance model (TAM), the theory of planned behavior (TPB), and so on [10, 18]. A comprehensive theoretical framework was needed to help in understanding users' acceptance of innovative technologies. [10] proposed the unified theory of acceptance and use of technology to put together the results of the earlier literature on this area. The UTAUT incorporates four critical constructs (performance expectancy PE, effort expectancy EE, social influences SI, and facilitating condition FC) which affect both behavioral intentions and actual usage behaviors. Gender, experiences, voluntariness, and age have been revealed to be moderators to the above-mentioned relationships [10]. These suggested relationships were also validated by [19] in the e-government context. Thus, the UTAUT is appropriate for understanding the adoption intentions of EPS for e-government services during the COVID-19 era.

3 Study Model and Proposed Hypotheses

3.1 Study Model

The current research uses UTAUT as the theoretical foundation for the proposed study model. The study context of the current research is EPS adoption behaviors. The previous literature revealed that security is a critical concern for users' adoption of innovative IT [4, 20-22]. [21] has also highlighted that although innovative technologies have many advantages, the key challenges are related to security concerns. Prior research has indicated that IS/IT security concerns have a relation with both perceived risk and trust [23]. E-government systems are no exception [24]. According to [25] fear appeal has a positive relationship with online purchase behavior during the COVID-19 pandemic.

Therefore, fear of COVID-19, trust in EPS, security concern concerning EPS, and perceived risks are used as context factors in the suggested research model. The proposed framework and associated hypotheses are demonstrated in Figure. 1.

3.2 Proposed Hypotheses

In the research of ISs, PE has served as one of the critical factors for users' adoption of new information technology [10]. [26] revealed that perceived usefulness will affect user's behavioral intention to use e-government systems. In

the current research, the researchers deem EPS for public services as innovative IT, thus this factor can be used to assist in understanding this issue. Users who perceive the usefulness of the EPS will be expected to accept and use it. [19] confirmed the significant role of PE in the adoption of e-government systems. [27] stated that expected advantages influence user's intentions to utilize technology. Thus, based on the provided discussion, the researchers proposed the following hypothesis

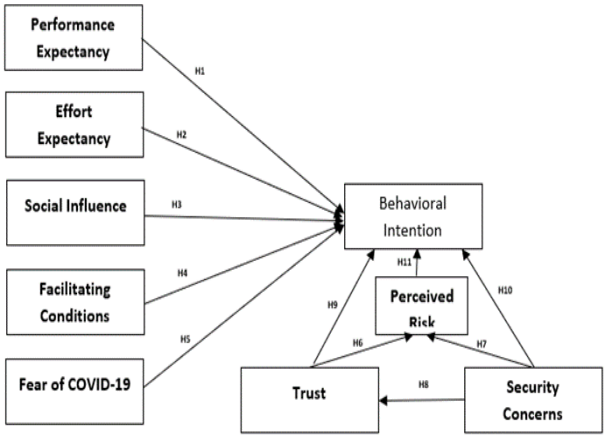

Fig. 1: Proposed Research Model.

H1. Performance expectancy (PE) will positively influence users' intention to use E-payment system for e-government services during the COVID-19 era.

Effort expectancy (EE) has also served as a crucial variable in the unified theory [10]. [19] confirmed its important role in the e-government setting. [26] confirmed that perceived complexity has a critical impact on user's intentions concerning e-government systems. [27] stated that expected switching cost has a negative influence on user's intentions to utilize innovative technology. Thus, this research hypothesizes that EPS which is considered easy to use will motivate citizen to utilize it. Thus, the researchers proposed the following hypothesis:

H2. Effort expectancy (EE) will positively influence users' intention to use E-payment system for e-government services during the COVID-19 era.

The UTATU framework highlighted the critical role of SI on adopting technology [10]. SI will also influence users' adoption of e-government systems [28]. [29] also highlighted the significance of SI in accepting e-government systems. [27, 30] confirmed that SI has a positive influence on user's intentions to utilize technology. In the current research, the researchers suggest that as more and more individuals utilize EPS for e-government services, the impact of peer influence will rise. Thus, the researchers proposed the following hypothesis:

H3. Social influence (SI) will positively influence users' intention to use E-payment system for e-government services during the COVID-19 era.

While the UTAUT framework suggested that FC has a direct influence on users' behavior instead of users' behavioral intentions [10], later empirical research revealed that FC also has a direct influence on behavioral intentions [28]. [31] also validated the critical impact of FC on the intentions to adopt e-government systems. Thus, the researchers suggest that FC will influence user's behavioral intentions concerning EPS for e-government services. Since the use of EPS for public services is relatively new and innovative, many citizens in Jordan might not be familiar with it. Thus, the better the FC available, the more possible users will be to utilize the EPS. Therefore, this research suggests the subsequent hypothesis:

H4. Facilitating conditions (FC) will positively influence users' intention to use E-payment system for e-government services during the COVID-19 era.

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 [32]. Fear appeal has a positive association with online purchase behaviour [25]. Another study shows that the fear of COVID-19 was a strong positive factor that affected the perception of telework [13]. In the current research, it is claimed that the higher the fear appeals concerning the COVID-19 virus, the higher the citizen's intention to use will be. As a result, the researchers inferred the following hypothesis:

H5. Fear of COVID-19 will positively influence users' intentions users' intention to use E-payment system for e-government services during the COVID-19 era.

Previous literature has revealed that security and trust concerns directly influence perceived risk [33, 34]. [35] found that citizen's trust in e-government services has a negative influence on their perception of the risks and, hence, influences their intentions towards e-government systems. [24] had similar results. [34] stated that, in the e-commerce technology setting, trust will influence perceived risk, and thus perceived risk will influence the users' intentions towards online shopping. [33] had similar conclusions concerning the above-mentioned relationships. In the current research, trust is identified as trust in EPS for public services [24]. According to the above discussion, the current research suggests trust as one of the key variables that will influence the perceived risk of utilizing EPS for public services.

H6. Trust (TR) will negatively influence perceived risks concerning the use of E-payment system for e-government services during the COVID-19 era.

[36] also claimed that, in addition to trust the e-payment system for e-government services, security concern is one of the crucial barriers that affect the degree to which user adopt EPS for public services. The same results have also

been confirmed by [35]; [34] and [33]. Thus, security concerns concerning EPS for public services will influence the perceived risks concerning EPS for public services. Hence, the subsequent research hypothesis is inferred:

H7. Security concerns regarding EPS will positively influence perceived risk concerning the use of E-payment system for e-government services during the COVID-19 era.

When citizens have higher levels of security concern concerning IS/IT, they will have a lower level of trust toward the use of IT/IS. Likewise, when users have a security concern regarding IS, they will have a lesser degree of trust in e-commerce [37]. [38] confirmed that security concerns influence user's usage of EPS. Trust also has a mediating effect on the relationship between security concerns and IS usage. Thus, the researchers proposed the subsequent hypothesis:

H8. Security concerns regarding EPS for e-government services will negatively influence trust concerning the use of E-payment system for e-government services during the COVID-19 era.

Concerning the relationship between trust (TR) and the intentions to use EPS. [39] suggested that trust of the government and trust of the Internet will influence users' intentions to utilize e-government systems. Citizens these days are familiar with the web, thus trust in the web/Internet is not a crucial variable in the current research. [26] also validated the relationship between trust and the intentions to utilize e-government. Lastly, [38] revealed that perceived TR will influence user's behavior concerning the utilization of EPS. On the basis of the above discussion, the researchers inferred the subsequent hypothesis:

H9. Trust (TR) will positively influence users' intention to use E-payment system for e-government services during the COVID-19 era.

Earlier research revealed that SEC is the key concern for user's adopting IT [20, 21]. [23] also suggested that perceived SEC will influence the intentions to use new technology. From the perspective of financial e-services adoption, [40] noticed that perceived SEC is one of the important variables influencing user's intentions. Hence, the researchers inferred the subsequent hypothesis:

H10. Security concerns (SEC) will negatively influence users' intention to use E-payment system for e-government services during the COVID-19 era.

Along with being based on the users' acceptance viewpoint, the current research combines the characteristics of crisis times in the EPS environment for public services. Earlier literature has revealed that risk and security concerns are the most important matters in the delivery of online services based on cloud platforms [41]. E-government services are not an exception, as stated by [42]. [20] also highlighted the significance of securing and protecting public services. Consequently, perceived risks serve as one of the important determinants of users' behavioral intentions towards online services [43]. The current research also concludes that when citizens have higher degrees of security concern related to EPS for e-government service, perceived risks will be higher, and will have a negative effect on their intentions to adopt e-payment. Consequently, this study suggests the subsequent hypothesis.

H11. Perceived risk will negatively influence users' intentions users' intention to use E-payment system for e-government services during the COVID-19 era.

4 Discussions

This Paper introduced a conceptual model of users' intention to use e-payment systems for the e-government services in Jordan during crisis times (e.g., COVID-19 pandemic). The model integrates a set of critical factors affecting the behavioral intention to accept and use E-payment systems for the public sector with their relationship. The model was also developed based on the review of the literature in the field and addressed the knowledge gaps. In consequence, the proposed research model offers new insights: (1) the model addressed the unique characteristics of crisis-era while limited research efforts have been done on this context. (2) the research model included, in addition to UTAUT original factors, additional important factors: Fear of COVID-19 (FoC), Trust (TR), Security concerns (SEC), and Perceived Risk (PR). Also, the proposed model has both theoretical and practical implications.

5 Conclusions

This paper presented E-payment in the context of developing countries, Jordan in particular. The paper analysed and integrated the Unified Theory for Acceptance and Use of Technology (UTAUT) with an extension, in order to identify the factors influencing users' intention to utilize EPS for e-government services during the COVID-19 era. The new model offers a better understanding and richer insights related to E-payment adoption. The current study aimed to bridge the research gap due to the lack of research dealing with EPS uses for e-government services in Jordan, particularly in crisis times. The model would be further evaluated and modified if necessary, and the research findings would be reported as ongoing contributions to both industry and research.

Acknowledgment

The publication of this research was supported by a grant awarded from Mutah University. The authors would like to thank Mutah University and the Deanship of Scientific Research for encouraging and financial support to complete and publish this article.

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