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FACTORS AFFECTING E-GOVERNMENT ADOPTION: A COMPARATIVE STUDY OF JORDAN AND HUNGARY

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The aim of this dissertation is to obtain a doctoral (PhD) degree in the scientific field of „Management and Business”

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DECLARATION

I undersigned **Nemer Aburumman**, date of birth 21/06/1987. declare under penalty of perjury and certify with my signature that the dissertation I submitted in order to obtain doctoral (PhD) degree is entirely my own work.

Furthermore, I declare the following:

- I examined the Code of the Károly Ihrig Doctoral School of Management and Business Administration and I acknowledge the points laid down in the code as mandatory;
- I handled the technical literature sources used in my dissertation fairly and I conformed to the provisions and stipulations related to the dissertation;
- I indicated the original source of other authors' unpublished thoughts and data in the references section in a complete and correct way in consideration of the prevailing copyright protection rules;
- No dissertation which is fully or partly identical to the present dissertation was submitted to any other university or doctoral school for the purpose of obtaining a PhD degree.

Debrecen, 31.08.2021

NEMER ABURUMAN

signature

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List Of Abbreviations

ATU	Attitude Toward Using
AVE	Average Variance Extracted
BI	Behavioural Intention
CR	Composite Reliability
CFA	Confirmatory Factor Analysis
CSM	Covariance Structure Model
DOI	Diffusion of Innovation
EE	Effort Expectancy
E-gov.	Electronic government
EXP.	Experience
EFA	Exploratory Factor Analysis
FC	Facilitating Conditions
H	Habit
HM	Hedonic motivation
ICT	Information and Communication Technology
IMF	International Monetary Fund
IS	Information System
IT	Information Technology
ITD	Innovation Diffusion Theory
M	The Mean
MM	Motivational Model
MoICT	Ministry of Information and Communication Technologies- Jordan
PEOU	Perceived Ease of Use
PV	Price value
PCA	Principal Component Analysis
PU	Perceived Usefulness
SD	Standard Deviation
SE	Standard Error
SEM	Structural Equation Modeling
SI	Social Impact
SRW	Standardized Regression Weights
SE	System Enjoyment
SF	System Flexibility
S.Inter	System Interactivity
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
Trust in gov.	Trust in the government
Trust in sys.	Trust in the system
UN	United Nations
URW	Unstandardized Regression Weights
UTAUT	Unified Theory of Acceptance and Use of Technology
VKN	Varimax with Kaiser Normalization

INTRODUCTION

The world and the countries, in general, are moving to change the form of government and public sector management from the traditional format that relies on providing services in-person to use the technology and employ it to provide various government services and communicate with citizens and companies entirely electronically.

Most of the countries in the world began to implement e-government and move from the traditional form of service provision to the electronic form since the beginning of the 21st century. With the current year's entry, the importance of e-government has increased dramatically due to the spread of the Coronavirus pandemic in the world and the urgent need to reduce any personal contact between people. However, despite these significant changes, e-government programs in many countries failed for many reasons, and the most important reason was the lack of acceptance for this system by the stockholders, so the rate of acceptance and use was one of the challenges troubling officials in the public sector.

Previous studies have developed many theories and models to explore the most critical factors that affect the acceptance and adoption of new technological systems such as e-government. However, the scholars often tested these theories in developed countries and, to a limited extent, more petite in developing countries like Jordan. One of the most important and best models is the UTAUT model, which brings together many previous models and explains the acceptance of technology greatly compared to previous models. However, this model is still tested in different environments and does not cover all the factors that may affect the users' decision to adopt a new system, especially in the public sector. In this research, the researcher has expanded the model with additional variables related to trust and some features of the system and awareness that were not present in the original model and may be influential in the two countries (Jordan and Hungary) to study and explore the most critical factors that affect the users' decision to adopt the e-government system.

The dissertation collected all the factors under three main factors are first Human E-government interaction: the factors related to the users' perceptions of the system such as effort expectancy (EE), performance expectancy, influence (SI), habit (H), awareness(AW). Second E-government Infrastructure: factors related to the system's infrastructure, such as facilitating conditions (FC), system flexibility (SF), system Interactivity (SI), system enjoyment (SE), and finally the factors related to trust, such as trust in the system and trust in the government that provides services.

The results showed some similar results in the two countries in two axes; the Human E-government interaction, and trust, On the other hand, the differences came in the

infrastructure axis, and the moderating variable. These differences in results were due to differences in the culture and level of awareness between the two countries' populations and other variables that could be discovered in future studies to expand this study.

1. INTRODUCTION OF THE TOPIC AND OBJECTIVES

Today, the internet has become one of the most essential success tools of any commercial or governmental institution. That is why it has become necessary for any private or governmental organization to use the Internet to provide the best services to stakeholders and citizens. The information and communications technology (ICT) revolution in the eighties and nineties changed all aspects of human life, and one of that is the characteristics of interaction between governments and citizens, and since the advent of the ICT, the public and private sectors have competed on the best ways to exploit new technologies to enhance the level of services provided and relationships with stakeholders. Generally, the private sector always showed tremendous enthusiasm and more use of ICT means in transactions and interactions, in contrast to the public sector, which initially showed a lot of caution and hesitation, but this caution and hesitation did not last for long. In the early decade of the twenty-first century, many governments began to adopt more ICT and launched what is called "e-government projects," as many experts point out that the beginning of the term "electronic government" appeared in the ’90s. However, the natural face of the spread of electronic governments began at the beginning of the twenty-first century.

With current trends, the shift is away from a governmental approach in favor of a citizen-centric model. To get the service, the citizen is vital. The citizen-centric approach to e-government has been extensively adopted in several nations, including the United States of America, Canada, England, Australia, Italy, South Korea, and Singapore. It has acted following the philosophy of prioritizing the development of e-government services. In general, user-centricity may be seen as the embodiment of a desire for more user-centeredness in technology. By putting the user and his requirements at the heart of technology design, he or she should gain more control and value. Rapid technical advancements, most notably the introduction of internet services, contributed to the paradigm shift toward a user-centric perspective. The internet's decentralized structure, distributed architectures, and the proliferation of online services added complexity, and additional user needs to deploy useable technologies and services in this setting, with user-centricity being critical. This is reflected in various fields, most notably in e-government (Kanda S., Tuamsuk K., and Wasu C.2015).

The application of any system is not considered helpful if users do not use it. Since the e-government emerged, there's always been a challenge to increase users’ acceptance of the services provided by these governments through their channels. Many factors may affect the level of acceptance of electronic services, some of which are related to users’ perceptions

about the system itself and some of them linked to the system infrastructure, and finally, the users' trust in the system or the government itself.

1.1 Problem Statement

All developed countries are interested in e-government to improve the performance and productivity of the public sector, and this interest has increased dramatically in recent times with the entry of the world under the influence of the Corona pandemic in early 2020, as many government transactions and activities in the world have turned to the electronic form. In the same context, developing countries such as Jordan have sought to improve the e-government program to improve performance, increase transparency and accountability, and reduce the high corruption rates in the country.

Many previous studies, especially United Nations reports, indicated that most e-government programs in developing countries have failed to achieve their goals, and Jordan is not an exception, as its project is still classified as a failure, and recent reports have emerged that 67% of people in Jordan do not know about the program or even the sites associated with it. In addition, another report showed that more than 85% of Jordanians have not logged into the e-government websites or even the websites related to it (UN DoESA, 2016). Moreover, it was reported that more than 85% of the Jordanian people never logged in to the e-government website or did not find any information. Moreover, a survey prepared by the National Committee for Women's Affairs and the International Labor Organization in 2020 for 2,454 participants in Jordan who used the electronic platforms showed that 54% of them still face problems using these platforms (Alghad, 2020). Thus, although the Jordanian government has set up lots of projects to develop the spread of e-government, the people in Jordan were still negligent of their availability (Al-Hujran, Al-dalahmeh, & Aloudat, 2011).

On the other side, Hungary is considered advanced compared to Jordan in this field, and this appears clearly in the United Nations survey of e-governments, where Hungary ranked 52 last year. However, according to the same classification, Hungary has regressed since 2010, where it was ranked 27th, and this decline confirms the presence of some challenges that the program faces, especially in citizens' acceptance of e-government services and participation.

Moreover, in 2017 European Commission report showed that only 44% of individuals downloaded forms electronically but approximately only 27% submitted these forms electronically to the public institutions' websites and In the latest report of the European Commission, showed that this percentage in the year 2020 increased to 38% (European Commission, 2020; European Union, 2017). However, in another study, only 17% of the respondents to the questionnaire indicated that they use the Internet to make government

transactions (Ariosz, 2013). In addition to that, the use of electronic services in Hungary depends on client gate registration, and a European Commission study has shown that only 22% of adults in Hungary have made this registration on the client gate until 2017 (EuropeanCommission, 2017).

In summary, a considerable study investigated the variables that directly affect citizens' acceptance of government-provided services electronically; however, it is not clear if these factors are user-related factors and the users' perceptions about the system or infrastructure-related factors or related to the trust. Therefore, the present study attempts to understand the factors that influence the users' adoption of e-government, especially in two different contexts.

1.2 Research Questions

This study is trying to answer three main questions:

1. What are the main factors affecting E-government acceptance in Jordan?
2. What are the main factors affecting E-government acceptance in Hungary?
3. What are the main differences or similarities factors in Jordan and Hungary?

1.3 Research Objectives

In general, this study aims to identify the main factors that affect users of the e-government program to adopt the use of services provided by the government in electronic form from various aspects (human perceptions, infrastructure, and trust) in Jordan and Hungary and to achieve this goal the research formulated four main objectives:

- Explore the factors that affect e-government acceptance in Jordan and Hungary.
- Explore the main factors related to human perceptions that affect e-government acceptance in Jordan and Hungary.
- Explore the main factors related to system infrastructure that affect the e-government acceptance in Jordan and Hungary.
- Explore the main factors related to trust that affect the e-government acceptance in Jordan and Hungary.
- Create a new framework for e-government acceptance for both countries.

1.4 Hypotheses

To achieve this study goal, the dissertation formulated four main hypotheses:

- H1: There is a significant relationship between Human-E government (*performance expectancy, effort expectancy, awareness of the system, social influence, Habit)* interaction and citizens' adoption of the e-government system in both countries.
- H2: Experience moderates the relationship between human-E government interaction and e-government adoption.
- H3: There is a significant relationship between E-government Infrastructure(*system enjoyment, flexibility, system interactivity, facilitating conditions)* and citizens' adoption of e-government systems in both countries.
- H4: There is a significant relationship between trust(*trust in the system, trust in government*) and the citizens' adoption of e-government in both countries.

Structure of processing the research topic

This research will be in five chapters (Figure 1.1). Chapter 1 presents an overview of the study. Chapter 2 discusses the array of studies and theories are related to e-government adoption. Chapter 3 introduces the research framework and pilot study. Chapter 4 states the main results and test the hypothesis. Chapter 5 discusses the findings and highlights the key managerial and theoretical implications of the study Chapter.6 states the main conclusion and the new results of the study and, finally, a summary and recommendations.

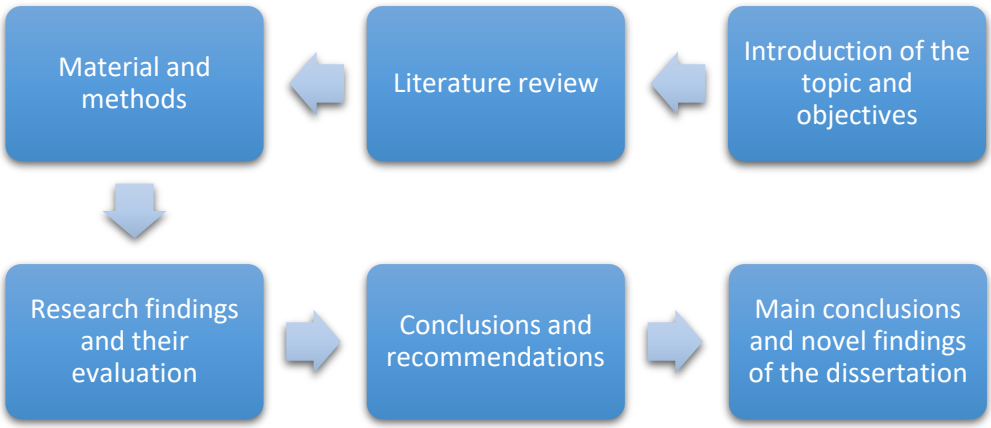


Figure 1.1: Research structure (own editing)

2. LITERATURE REVIEW

This chapter discusses the previous literature review. It discusses the array of studies that have investigated citizens' acceptance of technology and the factors that influence the adoption of technology. This chapter also explains the study's theoretical framework and reviews the overall trends of technology adoption to bring further insights into the processes of technology adoption in e-government applications**.**

2.1 E-Government

Previous studies have shown many definitions of e-government, but most of the definitions agreed that the public sector's use of technology and communication means providing services to stakeholders and citizens. In the following table, there is a review of the most prominent definitions found in previous studies (Table2.1). (United Nations, 2002).

Table 2.1: Definitions of E-government (own editing)

It is a system that uses communication technology and the Internet to provide government services to various entities.	(Qu, 2009)
It is a system applied by institutions in the public sector to transform the public sector from the traditional method of providing services to become more transparent, easy, and accountable, using communication and information technology.	(Alawadhi & Morris, 2008)
It is the process of using communication technology extensively in the public sector to provide government services electronically to increase effectiveness and efficiency and improve the values of democracy.	(Gil-García & Pardo, 2005)
It is the use by government institutions of communication and information technologies such as the Internet and local networks, which can change the interaction between the public sector and other sectors such as citizens, companies, and other government institutions. These technologies can lead to good results such as improving services provided to citizens, improving interaction with the business and industry sectors, and empowering All sectors to have better access to information, thus increasing government efficiency.	(Khan, Khan, & Zhang, 2010)
It is the process of government use of modern technology and information to allow easier access to information and raise the efficiency, effectiveness, and transparency of government, and thus raise the level of accountability to citizens.	(Qaisar & Khan, 2010)
The governments' use of modern technologies in the public sector to electronically transfer their services and thus improve these services provided to citizens, companies, or even employees, and use the Internet to provide these services and exchange information with all interested parties.	(Milovanovic, Bogicevic, Lazovic, Simic, & Starcevic, 2010)
It directs governments to adopt communication and information technology through various applications, the Internet, and electronic devices to strengthen the existing relationships with those dealing with the government in civil society and thus support good governance.	(Nikkhahan, Aghdam, & Sohrabi, 2009)
It is the reliance of governments on the means of technology in general and the Internet and local networks to improve the activities of government institutions in general and improve the level of effectiveness, efficiency, transparency, and	(Sang, Lee, & Lee, 2009)

accountability to achieve better governments.	
It is using means of communication and technology to provide government services to all users and beneficiaries such as companies, citizens, and employees, and improve government performance in providing these services.	(Heeks, 2003)

With many definitions of the term e-government, it is obvious that all definitions revolve around a central concept, as we mentioned earlier: ICT's use to provide public services. According to the definitions presented in Table 2.1, it seems that Nikkhahan, Aghdam, & Sohrabi, 2009 definition of e-government tends to be more suitable for the context of the present study.

E-Government Stages

The Four-Stage Model of the United Nations suggested that the governments go over four developmental stages to become electronic. This model is a criterion that determines the degree to which the governments implement the e-government system. Thus, for example, some governments applied the first stage only, while some others covered up all the four together. Interestingly, all these governments are considered e-governments, whether they implemented part of the implementation stages or all.

The first stage: the government's presence on the network is limited, to provide only some basic information and some limited options for users.

The second stage: the presence on the network is more developed so that the government works to update the existing information permanently and provide several services such as search engines, maps, and other limited services.

The third stage: the government's presence on the network develops to include some financial transactions. At this stage, the user can use the information to submit requests and conduct some financial transactions, and the government offers two-way communication between users and the governmental institution.

The fourth stage is the complete presence on the network, and in this stage, government institutions allow users to access all government services electronically and perform all financial and administrative operations and communicate in both directions. (Figure 2.1.)

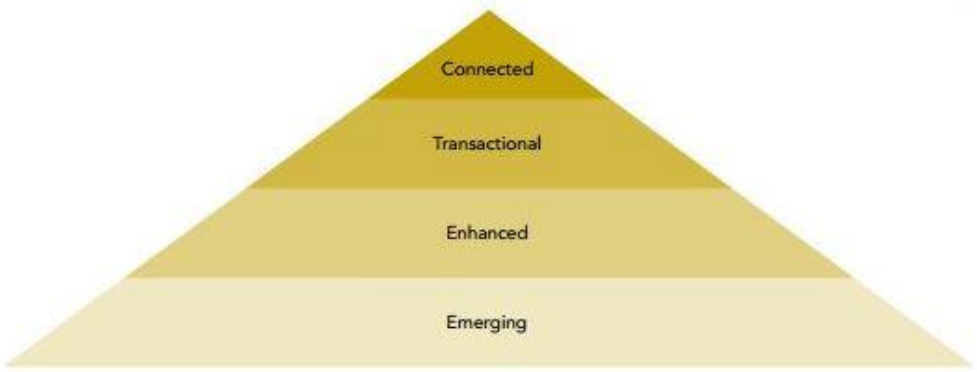


Figure 2.1: E-government Stages Source: (UN DoESA, 2016)

E-government Area of Services

The online-based government transactions might be available in different service areas through which the governments could interact with their stakeholders. Four main service areas are present in all the e-government projects (Figure 2.2.).

Government-to-Government (G2G): The interaction in this area inside the government itself between the governmental institutions, departments, or organizations at the local and national levels, and through this interaction, these agencies share data, information, and services and that improve the communications and the access to the information.

Government-to-Citizen (G2C): The interaction in this area is between the governmental institutions and citizens, and through this interaction, the government provides services and information using ICT in an effective, easier, and faster manner, and the services provided, such as registering births and deaths, registering the marriage, issuing certificates, and more other services.

Government-to-Business (G2B): This interaction occurs between the government and the commercial sector. It includes purchasing/procurement, regulations of business activity, dissemination of policies, memos, government rules and regulations, application forms, license registration or renewal, and tax payments.

Government-to-Employee (G2E): It refers to all the interactions between the government and its employees. It includes salary, superannuation, welfare schemes, housing, online conference for the employees, online training, and employee information (Jeong, 2007).

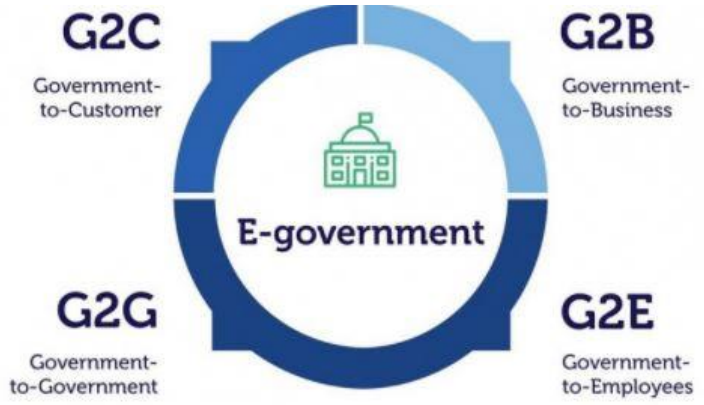


Figure 2.2: E-government Area of Services (United Nations survey, 2004)

Benefits of E-Government

Most governments across the world have recently realized that there are numerous advantages to e-government. They have tried to achieve a full-scale function for the e-government to maximize their benefits. Some findings reported that the e-government benefits are very similar in developed and developing countries (Omar Al Hujran, Anas Aloudat, 2013). Additionally, e-governments have allowed their businesses, government employees, and citizens to access the government portal seven days a week and 24 hours a day. There was a conclusion that both the government and people can advantage from implementing the e-government. According to Almarabeh & Abuali (2010), these benefits are summarized as in the following:

- Understand the user's needs more and thus provide him with better and easier services over the Internet.
- Services are always available to users 24/7.
- It contributes to enhancing trust between governments and their clients by involving them in the decision-making process, accessing information, and enhancing the transparency and accountability of the government.
- It contributes to fighting corruption and promotes equality among citizens by accessing information and services.
- E-government enables users to obtain services and access information easily anywhere.

Alsaif, (2014) suggested that most of the advantages associated with the e-government systems are decreasing administration corruption and increasing transparency, which are considered a good potential to enhance the overall effectiveness and efficiency of government services. He concluded that enhancing the government's service delivery is one of the most fundamental factors for improving the performance of public services. Similarly, Alharbi, et

al. (2017) mentioned that there would be a significant improvement in efficiency if the costs and human errors are reduced and if the internal processes are streamlined. There could also be similar improvements in the content, accessibility, and transactions of the service delivery.

Future Of E-Government

The development of e-government programs has developed significantly in the past years, especially with new technology in communications.

The shift in e-government will become more "open government", which means more communication with stakeholders and new technologies in providing services such as Blockchain, big data, artificial intelligence, and the Internet of things. This will make it difficult for the government alone to take this transformation, and it will have to partner with the private sector to achieve tangible results.

Artificial intelligence has provided many solutions in different fields and has become widely present in many sectors, but nevertheless, its spread in the public sector and e-government applications is still limited and faces many challenges. Csótó, M et al. (2021) pointed out the importance of artificial intelligence (AI) usage in the public sector, and entering AI into the public sector is a fundamental challenge, especially in the aspects related to the organization of work, legal and ethical framework, and the implementation of technology in the sector. The study explored the uses of AI in the public sector in Hungary, which actually turned to this use in 2018, but the authors point out that the acceptance of users on the ground is still uneven and different between cases and users, and this usage still needs legal regulations and controls for administrative procedures for these uses. Moreover, Al-Mushayt, O. S. (2019), in his paper, addressed the challenges of e-government systems and propose a framework that utilizes AI technologies to automate and facilitate e-government services. And found the effect of AI in minimizing processing times, reducing costs, and improving citizens' satisfaction, but also mentioned some challenges regarding using AI in e-government, such as the lack of experts, computational resources, trust, and AI interpretability.

Blockchain technology, with its new technologies such as peer-to-peer networks, consensus, and confirmation mechanisms, is considered as a factor that can develop the public sector and make government operations more dynamic and effective by improving service delivery and increasing trust in the public sector after It has achieved great success in the private sector. (Aburumman, N; Fraij, J ; Szilágyi, R. 2020).

Hou, H. (2017) In his study in one of the Chinese provinces that started applying blockchain technology in offering their services in 2016, they found that the use of blockchain in e-

government has many benefits, such as improving the quality and quantity of services provided, increasing the level of transparency and access to information, and finally helping to facilitate the exchange of information between different parties and reduce Bureaucracy. However, the researchers warned of several challenges related to information security, cost, and reliability. The authors confirmed the importance of adopting blockchain because it is the future but taking into account the unification of the administration responsible for the management, implementation, and follow-up to the application.

With these great developments, great challenges also emerge represented in trusting and controlling the system, especially in the public sector, which deals with sensitive information for users, which can ultimately affect their level of acceptance of services (Millard, J., 2020).

E-government in the pandemic

Despite the significant negative effects imposed by the Covid-19 epidemic crisis, it carried a positive aspect represented in accelerating digital transformation. According to the recently released United Nations report - based on a survey of more than 190 countries globally - on e-government for 2020, it appears that COVID-19 is pushing governments to provide more services online. The report showed that 65% of the member countries had reached a high or very high level in the e-government development index (EGDI)(United Nations, 2020).

In the European Union, the question has emerged early from the start of the COVID-19 pandemic: How will e-government help and provide services to citizens and businesses since March 2020, and this is shown by the European Commission's statement that when face-to-face interaction is impossible (due to government recommendations to maintain social distancing) e-Government solutions become necessary and citizens must stay in their homes and interact with public administrations remotely.

In addition, in response to this pandemic, the Organization for Economic Co-operation and Development (OECD) announced in April 2020 that it had launched an affiliated digital governance and data unit, in addition to GovLab, and also called for the use of Open Government Data (OGD) by beneficiaries such as businessmen, researchers, organizations and public sector media.

Burlaco, S et al. (2021) The researchers used secondary data to explore how governments used technology during the epidemic period, and researchers found that the epidemic has helped push governments to use technology more and faster, and this adoption of technology has become the primary solution for governments to continue economic activities, and

technology and social media have also helped decision-makers to take Decisions regarding the spread of the virus and reduce its spread and transmission quickly.

2.2 Background

The two countries are located on two different continents, and the two countries share many characteristics and many differences, this section shows the most basic and important information about the two countries, such as the political system, the economy, and communication technology, this section is useful for readers from both countries.

2.2.1 Jordan

Jordan is in the Middle East bordering Iraq, Syria, Saudi Arabia, and the West Bank (Palestine)/Israel (Figure 2.3) with a land area of 89,342 sq. km. and it is considered within the relatively small-populated countries in the world with a population 10.7 million. The capital, Amman, is considered the most populous city with more than 40% of the total population live in it, as well as the country's economic, political, and cultural center. Jordan is mainly inhabited by Arabs and the dominant religion is Islam. Arabic is the official language, and the currency is Jordanian Dinar. Jordan is classified as a country with a middle-income economy and an attraction to investors. Nonetheless, the lack of natural resources and the large influx of refugees from the neighboring regions have crippled its economic growth(Department Of Statistics, 2020).

Figure 2.3 Jordan Map (Department Of Statistics, 2020)

- **Political Situation**

Jordan was ruled by the British Monarchy for about 25 years and became independent in 1946. Jordan is a constitutional monarchy, and it is divided into 12 governorates. The

authority in Jordan is managed by three parties the Council of Ministers the Parliament of Jordan, which consists of two chambers: the upper senate, which constitutes the Legislative Power of the government, and the lower House of Representatives. The Judicial Power is independent of the government (Jordanian Parliament, 2016). Jordan has experienced many challenges in the last few years, particularly after the Arabic Spring that took place in the neighboring countries in 2010. The large flow of refugees and the potential threats posed by ISIS and the Israeli/Palestinian conflict are all factors that threaten the stability of the country (worldbank, 2020).

- **Overview of Economy**

The Jordanian economy has made significant progress toward its economic reform program that the government planned since 1989, but It is worth mentioning that the Jordanian economic growth has declined in the last few years. The real GDP growth was at its lowest pace in the last four years (1.9%) in 2018 (Figure 2.4). On the other hand, the percentage of unemployment dramatically increased from 11.9% in 2014 to 19.3 % in 2020. This deterioration was primarily attributed to the turmoil caused by the Arab Spring in 2011 that has impacted Jordan's trade, industry, construction, and tourism. Jordan's finances have also been severely strained by the high military expenditure to protect the borders and keeping civil security and the failure of trading with Syria and Iraq, the expenses caused by hosting more than 1.3 million refugees from Syrian, and accumulated interests from loans. According to the World Bank, Jordan's public debt reached 94% of its GDP in 2018. Moreover COVID-19 pandemic at the beginning of 2020 increased the challenges that the Jordanian economy faces and the economic growth in Jordan are expected to decline significantly to -3.5% in 2020 (Figure 2.4); this economic collapse has obliged Jordan to seek foreign aids for a small part of these costs (worldbank, 2020).

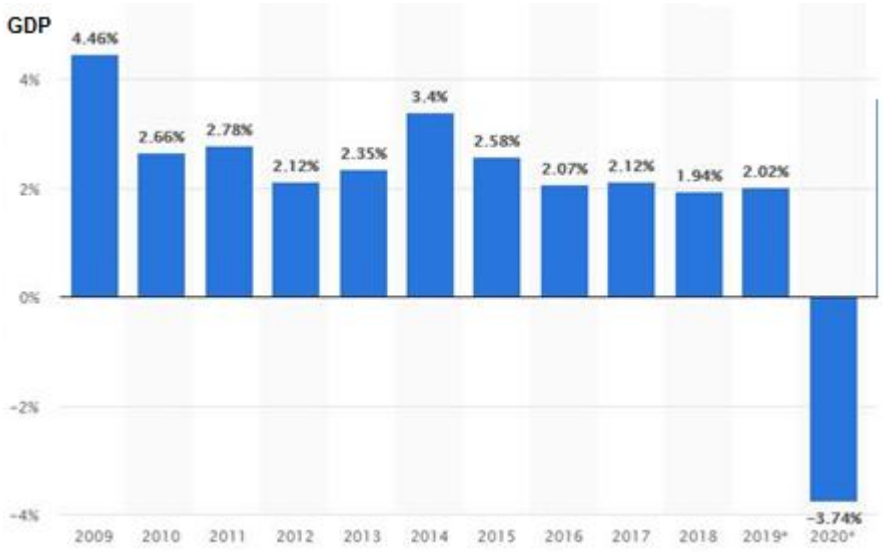


Figure 2.4 Growth rate of the real gross domestic product (GDP) from 2009-2021 (worldbank, 2020)

- **Overview of ICT**

Jordan has witnessed increased development in the field of education. There was a rapid spread in the educational centers in remote areas. The government has also established a legal environment to support this progress. The ICT field is considered an opportunity for Jordan to increase its competitive advantages over the other countries in the region. Jordan has taken very serious steps to launch its major ICT initiatives to develop the ICT sector.

ICT in Jordan consider as one of the most developed sectors in the area. Mobile Subscriptions rose from 3.13 million users/inhabitants in 2005 to 10.1 million users in 2020 (98% of inhabitants), and the households' internet access at home reached 88.6% of inhabitants in 2018 (Table 2.2). There was a notable shift from personal computers and voice/SMS-centric mobile services to the data-driven mobile broadband market, with a rapid increase to 4G services since their launch. The government’s support for the IT sector was compelling; it backed up the ICT industry by reducing the investment requirements, enhancing ICT education, and enacting legislation that protects the intellectual. Table 2.2 Distribution of Households by the ICT Indicators, 2014 -2018 (Percentage).

Table 2.2 ICT Indicators in Jordan, /100 inhabitants (Department Of Statistics, 2019)

Indicator	2014*	2015*	2016*	2017*	2018*
Fixed phone	12.2%	5.7%	12.7%	10.2%	4.0%
Mobile	98.8%	98.7%	98.4%	98.4%	98.9%
PC or Laptop	45.5%	32.7%	31.3%	32.8%	28.5%
Internet	68.9%	69.2%	80.0%	88.8%	88.6%

* % of total inhabitants

Nonetheless, the level of the ICT sector kept lower than it was globally expected, which was mainly due to some socioeconomic factors (Al-Hujran, Al-Debei, Chatfield, & Migdadi, 2015).

2.2.2 Hungary

Hungary is in central-eastern Europe and is one of the medium-sized countries concerning Europe (Figure 2.5). Its population is about 10 million people, with 93,000 km, and its capital is Budapest. It has land borders with Slovakia, Romania, Ukraine, Serbia, Croatia, Slovenia, and Austria. The official language of Hungary is the Hungarian language, and the most important cities in Hungary after Budapest, the capital, are Debrecen, Szeged, Győr, Miskolc, and Pécs (Hungarian, Government, 2019).

Figure 2.5 Hungary Map (countrycodeguide, 2019)

- **Political situation**

Hungary is a republic, and the largest authority in the country is the government, which is the head of the country's administrative sector and is responsible for implementing the regulations and laws enacted by Parliament.

The government is formed by the party that obtains the majority in the elections. The government is composed of a prime minister elected by parliament after being nominated by the president of the republic and ministers whom the president of the republic appoints after their nomination by the prime minister. Then, the government presents its program to

parliament, which monitors and grants it Confidence in this program or withdraw confidence from it to form another government(Hungarian, Government, 2019).

- **Overview of economy**

After decades of socialist central planning, Hungary became a market-driven economy. And now the Hungarian economy is a high-income mixed economy, with a skilled workforce and a high human development index according to the World Bank, and in terms of size, it ranks 57th out of 188 countries according to the International Monetary Fund (IMF). The biggest sector in the economy services, and then the industry Agriculture comes with only 3.5% of GDP.

The Hungarian economy has been growing at an accelerating pace since the economic crisis, increasing by 4 percent each year since 2014 and reached 4.9% in 2019. However, this growth slowed down and declined significantly at the beginning of 2020, affected by multiple factors, most notably the Corona epidemic.

This negative impact will include many sectors, such as government capital spending and a significant decline in exports and the tourism sector, as the country was forced to repeatedly close its borders during the pandemic (European, Commission, 2020a).

- **Overview of ICT**

In Hungary, the ICT sector is among the sectors with the greatest added value. A large number of creative businesses have sprouted up in recent years and the share of fast-growing software and services exports shows that the industry is in constant and dynamic growth. Since 2014, the European Commission has used the Digital Economy and Society Index (DESI) reports to track Member States' digital development. Both nation profiles and topic chapters are included in the DESI reports. In addition, each Member State's report includes a comprehensive telecommunication chapter. The present COVID-19 pandemic has shown how critical digital assets have become to any economy and how networks, connectivity, and AI, as well as fundamental and advanced computing, have all played a role by enabling work to continue, monitoring the spread of the virus, and speeding up the hunt for treatments and vaccinations, improved digital capabilities help to keep economies and societies afloat.

In the Digital Economy and Society Index (DESI) 2020, Hungary is ranked 21st out of 28 EU Member States. Its score has improved in line with the EU average during the previous several years. Hungary ranked first in terms of broadband connectivity prior to the outbreak, with around 88% of households with internet access (Eurostat ,2020). It is a leader in the adoption of at least 100 Mbps internet and 5G readiness and overall fixed broadband adoption. However, it still falls behind in terms of digital public services and digital

technology integration in enterprises. Despite significant improvements in all indices in this area, the country ranks 24th in digital public services. Most businesses are underutilizing digital technology such as cloud computing and big data, and just a small percentage of them sell online. More than half of the population lacks fundamental digital and technical capabilities (European Commission,2020a).

Hungary has been working on various initiatives since 2017 all these initiatives under one umbrella which is the Digital Success Programme (DSP), including digital education, digital start-ups, digital exports, 5G deployment, artificial intelligence (AI), digitalization in agriculture, fintech, and e-health. It is now working on a digital strategy for the food and beverage industry and digitization elements for several sectoral plans, including construction, tourism, and logistics. Many initiatives have been adopted to put the policies into action, many of which are co-financed by the EU. The goal of the Superfast Internet Program is to provide high-capacity fiber internet to underserved communities.

In June 2020, the National Digitization Strategy 2021-2030 was launched. It intends to connect 95 percent of homes to gigabit networks and emphasizes the population's growing digital skills, digitalization of commercial operations, and increased usage of e-government services. Finally, Hungary designed and executed a nationally “Gigabit Hungary 2030” network development program, which will be linked to 5G, to have Internet connections with speeds of at least 1 Gbps accessible by the end of 2030 (DigitálisJólétTeam,2020).

2.2.3 Comparison between the two countries

The two countries are located on two different continents, Europe and Asia, but the two countries share many characteristics such as population and area, and in the economy also, the two countries share an early approach to an open economy and a trend to privatization since the 1990s. But, as mentioned, the economic difference is greatly in the interest of Hungary, and the Jordanian economy next to Hungarian is considered small as the gross domestic product 150 billion and a growth rate of 4% in the past years before the Corona pandemic in Hungary, compared with 44 billion for Jordan and a growth rate of 2% before the pandemic.

The two economies depend largely on the services sector mainly, and then industry and agriculture. The two countries are similar in the desire to develop the technology and communications sector. A very high percentage appears in both countries in terms of access to the Internet and the participation of the technology and communications sector in the GDP, which is 10% in Hungary and 12% in Jordan of the GDP, and government spending is close In both countries in Jordan 15% and Hungary 19% of the GDP with taking in consideration

that this is a percentage of the GDP which is great in the interest of Hungary when it comes to real numbers as mentioned before (Worldbank, 2020).

The countries differ in terms of economic challenges, as Jordan appears in a critical situation with a greater number of challenges than we mentioned, but the two countries share the latest global challenge. This Covid19 pandemic affected the two countries significantly and led to a decline in economic growth, but also, the pandemic prompted the two countries to adopt more electronic solutions.

The public administration and digitalization in the two country

When we look at the structure of the public sector in the two countries, we find a big difference. Jordan is a monarchy, and Hungary is a republic. By looking more deeply at the public administration structure, the structure of public administration in Hungary appears more complex and depends on more decentralization. Hungary is divided into eight main regions, and these main regions are divided into 19 counties and then into 197 districts and the last level contains around 3200 municipalities (Hungarian central statistics office, 2020). On the other hand, Jordan moved to implement the decentralization system in the year 2015, but it is less complex than it's in Hungary in Jordan the country divided into three main regions, and each region is divided into four governorates, and in these governorates, there are only 100 municipalities (Department Of Statistics, 2020).

Electronic government services at the present time are an urgent necessity to improve the users' experience, especially after the private sector has raised the level of quality of services, and governments are expected to keep pace with this development, as this transaction assure it continues to provide its services even during crises, such as the “Covid-19” pandemic, unlike traditional offices. For this transformation, there must be major changes in the institutions, whether in the front or back offices, in addition to the legal framework accompanying these changes. The Jordanian government has taken major steps to support digitalization, in 2019 Digital Economy and Entrepreneurship ministry has been established to replace the Ministry of Information and Communication, and since that time, many regulations have been taken to go to the direction of digitalization and a new strategy for the digitalization in 2025.

The government adopted a model of a public-private partnership aimed to expand the country’s fast internet and support the 5G technology, supporting the development of digital skills for hundreds of young people, launching an ambitious plan for electronic payment of government transactions. Supporting entrepreneurs in obtaining financing and accessing Global markets, all these changes came after the Corona pandemic, which quickly prompted the country to this direction (Digital Economy and Entrepreneurship ministry, 2020).

As for Hungary, changes are made earlier to support this transformation by adopting three strategies to support this trend in recent years, starting in 2015 “Digital Success Program 1.0”. Started by the Hungarian government at the end of 2015 aims to make all Hungarian citizens and businesses get the maximum benefits of digitalization. Although in Hungary, the process of digitization has visibly accelerated recently, strategies defining the digital development directions of the following years have been completed: Hungary's Digital Education Strategy (DOS), Hungary's Digital Export Development (DES), Hungary's Digital Startup Strategy (DSS), Hungary's Digital Child Protection Strategy (DCPS).

And two years later, the country adopted "Digital Success Program 2.0" (DigitálisJólétTeam, 2020) to contribute to new areas in order to make Hungary as prepared as possible for the digital transformation, in addition to making the Internet accessible and affordable to all, infrastructure development, digitization of education and other activities already underway.

And finally, in 2020, the country started the new strategy "Digital Success Program Success 2030", which builds on the successes of DSP 1.0 and 2.0. The starting point of the DSP is that the state is also responsible for the digital well-being of its citizens, so the central theme of the DSP2030 is digital state governance. The DSP 2030 defines its strategic goals and areas of intervention in a triple division to the human-machine system. In 2020, several key strategic documents prepared within the framework of the Digital Welfare Program will be submitted to the Government, such as the Artificial Intelligence and Sport Strategy of Hungary and the Action Plan of the Digital Agricultural Strategy (DigitálisJólétTeam, 2020).

In the end, we note that the two countries are seeking to shift to digitization in the public sector, and these steps have accelerated in recent years due to the spread of the Coronavirus, but on the ground, we see that Hungary is more serious and advanced than Jordan at all levels.

2.2.4 E-government in Jordan and Hungary

Jordan

Jordan is one of the first countries that have implemented e-government to find channels and means to develop citizens' economic and social lives. In 2001, King Abdullah II announced the start of the program and assigned the Ministry of Communications and Technology to implement and supervise the initiative in the whole country (MoICT, 2016), and the ministry launched the main portal for electronic services in 2006 to provide services to all stakeholders (citizens and businesses) (MoICT, 2016).

During the first years of implementing the program 2001-2003, the Ministry of Communications tried to create a legal basis for the program, and the program was

implemented in an experimental and limited version on five government institutions only: lands and survey, income tax department, drivers and vehicle licensing, the Telecommunications Regulatory Agency and the Ministry of Trade and Industry (MoICT, 2016).

The real launch of the program was during the years 2006-2009, as the government expanded its implementation of the program, and some units were established within government institutions (107 units) to implement and shift to the electronic services and facilitate interactions between the government institutions (G2G), the most important milestone of this stage was the launch of the **E-government Portal** (Figure2.6) that collected all government services and provided various services to citizens and business in one shop stop, and more easily for users. Later, the government decided that each ministry is responsible for developing and maintaining its website to be efficient, up-to-date, and deliver information and services to users (Saleh, Obei, & Khamayseh, 2013).

Figure 2.6. Jordanian E-government Portal (www.Jordan.gov.jo)

In 2010, the government set a new plan for three years, and the government continued to increase the number of electronic services to reach about 70 services and access to these services via mobile phone, and the government sought to train government employees to eliminate technological illiteracy.

Currently, users in Jordan can obtain more than 295 electronic services in the different governmental institutions' websites, and the government is seeking to collect them on one electronic application, "Sanad," which was launched in early 2020, which currently includes about 100 electronic services. Furthermore, the government is working on adding more services through this application, as the Minister of Digital Economy and entrepreneurship mentioned (The seventh day, 2020).

The e-government implementation stages are a process that includes four basic phases: Emerging, Enhanced, Transactional and Connected, and All governments try to offer services and deliver them through a one-stop portal (MoICT, 2016). As such, this puts the Jordanian's e-government between the implementation phase II and III in the E-government Stage Model (Alawneh, Al-Refai, & Batiha, 2013), and Majdalawi, Y. K. *et al.* (2015) In their research to assist the Jordain plans and strategies, the researchers point out that Jordan still faces many challenges in the e-government program. The researchers identified 17 challenges for the e-government program, most related to infrastructure and trust.

E-government in Hungary

Hungary launched the e-government program in 2001 as part of version 1.0 of the National Information Society Strategy (NISS), after opinion polls were conducted on a large scale, and the government allocated about 48 million euros to implement the program in the first year (OECD, 2007).

The government has set two main objectives for the program: improving government efficiency and internal operations and providing better services to citizens, all of which will necessarily lead to lower operating costs in public administration (OECD, 2007).

In 2005, a plan was launched to implement the program, and the main e-government portal www.magyarorszag.hu was launched, which enabled all users to access information and obtain services in electronic form.

Despite this, the program faced many challenges, and the most prominent challenge was the multiplicity of agencies responsible for the program (Prime Minister's Office Electronic Government Center (MEH EKK), Hungarian Office for Administration and Electronic Public Services, (KEKKH), Ministry of Economy and Transport)and poor coordination between them, which led to poor implementation of the program and the achievement of its objectives (OECD, 2007).

In the year 2008, the program improved significantly, such as improvements in the legal framework, launch the hotline (1818 and 1818.hu) and customer service, and established centers to provide electronic services in Local municipalities, and finally adopting a digital ID card to be used in obtaining access to services through electronic portals such as: www. netenahivatal.hu; http://okmany.hu; www.kormanyablak.hu; www.kozbeszerzes.hu (European Union, 2014).

Currently, the responsibility of managing the e-government in Hungary is between many government agencies for eight main roles (Table.2.3):

Table 2.3 E-government responsibilities in Hungary (European Commission, 2020b)

The role	National level	Subnational level	Description
Policies	The Ministry of Interior	The Ministry of Interior, Secretary of State for Regional Public Administration, The Permanent Secretary of State	Legal framework for implementing the program
Coordination	Permanent Secretary of State, Cabinet Office of the Prime Minister, Ministry of Interior, Ministry of Innovation and Technology	The Ministry of Interior, Secretary of State for Regional Public Administration, The Permanent Secretary of State	Coordination of tasks related to eGovernment and information technology policy- and strategy-making
Implementation	Ministry of Interior, National Infocommunications Service Provider Ltd. (NISZ Zrt.), Ministry of Innovation and Technology	Deputy Secretary of State for Informatics, Ministry of Interior	Implementation and spread of E-government
Support	Governmental Information Technology Development Agency (KIFU), Digital Success Point Network	National Association of Local Authorities (TÖOSZ), Association of Cities of County Rank (MJVSZ), National Association of Intelligent Local Authorities (ITOSZ)	To Provide supports with research and introduction of the most advanced networking technologies in Hungary.
Interoperability coordination	Ministry of Interior	*	*
Base registry coordination	Ministry of Interior	Ministry of Interior	*
Audit	State Audit Office (SAO)(independent institution)	State Audit Office (SAO) (independent institution)	Auditing and evaluating the operation and development of the public finances system
Data Protection	National Data Protection and Freedom of Information Authority	National Data Protection and Freedom of Information Authority (independent institution)	To Safeguard the processing of personal data by public and private bodies.

* no responsible party

Currently, a new electronic portal has been launched that is more flexible and easier to use (https://szuf.magyarorszag.hu/szuf_fooldal#fooldal) To replace the old client gate (magyarorszag.hu) In the future. But On the other hand, citizens still interact with the electronic gates so limit (Figure 2.7). Moreover, It is worth noting that Hungary in 2018 enacted a new law regulating administrative transactions in an electronic manner, the most prominent of which was that it obligated government institutions to provide an electronic option to obtain services in a mandatory manner with some exceptions all these changes and regulations will push the transformation faster (Hoffman, I.; Cseh, K. B., 2020).

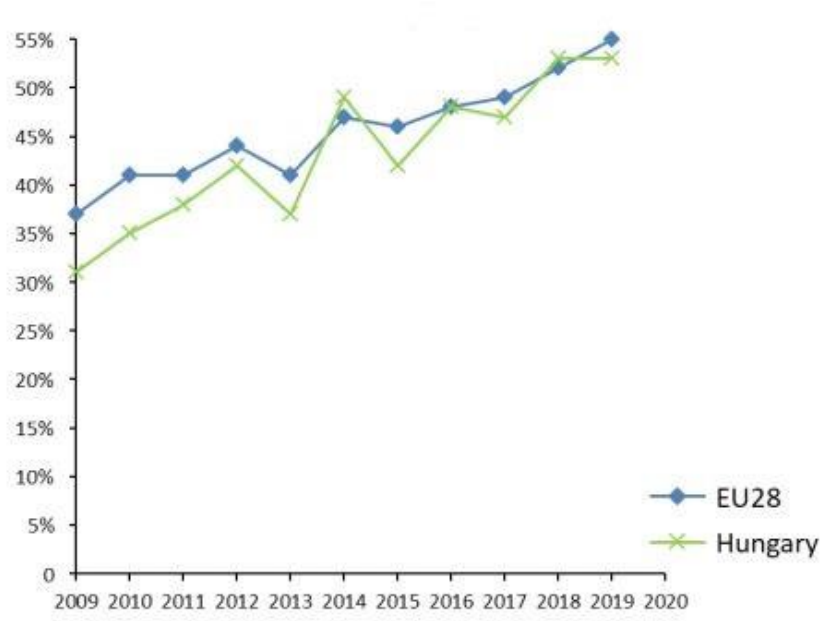


Figure 2.7. Active internet users interacting with e-portals in Hungary (European Commission, 2020b)

This indicates that the program still faces many challenges, most notably:

- The percentage of the active internet users who interacted with government websites during the past ten years did not exceed half and reached the maximum in 2020 with Only 49% (Figure 2.7).
- Presence of many electronic portals that provide services, which must be unified under one portal.

As mentioned earlier, less than half of the Internet users in Hungary use electronic portals in Hungary, and in addition, less than half of this number use electronic portals to obtain information only (European Commission, 2020b).

E-government Comparison between both countries

The two programs began in the same year, 2001, and the two countries are trying to become pioneers in their region. In the legal framework, the Hungarian program remains superior to the Jordanian program, as Hungary sought in previous years to legislate laws regulating the transition to full digitization and forced government institutions to create the electronic option along with the traditional option. However, Jordan still does not push in this direction sufficiently, the two countries have a strategy to support the program in the future, and Hungary is also excelling by adopting modern communication technology such as 5G, In Jordan, the government mentioned these modern technologies such as 5G, Artificial

intelligence, blockchain and the Internet of things in the strategy New 2019-2025 but still as future plans.

The e-government program in Jordan is still facing many challenges. Although the spread of technology has increased after 2000, it still does live up to all expectations (Al-Shqairat & Altarawneh, 2011). However, there is a slight tendency towards using ICT and a weakness to benefit from this usage. Based on the latest report issued by the United Nations on e-government ranking, Jordan reached its best rank in 2008 and occupied 50th place, but it kept retreating to reach 117 places in 2020 out of 193. In Hungary, the position of e-government is better regarding the same classification. Hungary achieved the best position in 2010 and 2012, as it ranked 36th, but it fell in the last survey to 75th place (Figure 2.8) countries (United Nation, 2020;UN DoESA, 2016).This indicates that e-government program growth is declining in both countries or the two countries are developing slower than other countries, but the situation in genral is much worse in Jordan. According to the Department of Statistics and the Ministry of Communications in 2014, more than 67% of Jordanian citizens are negligent of e-government services(Department of Statistics, 2020).

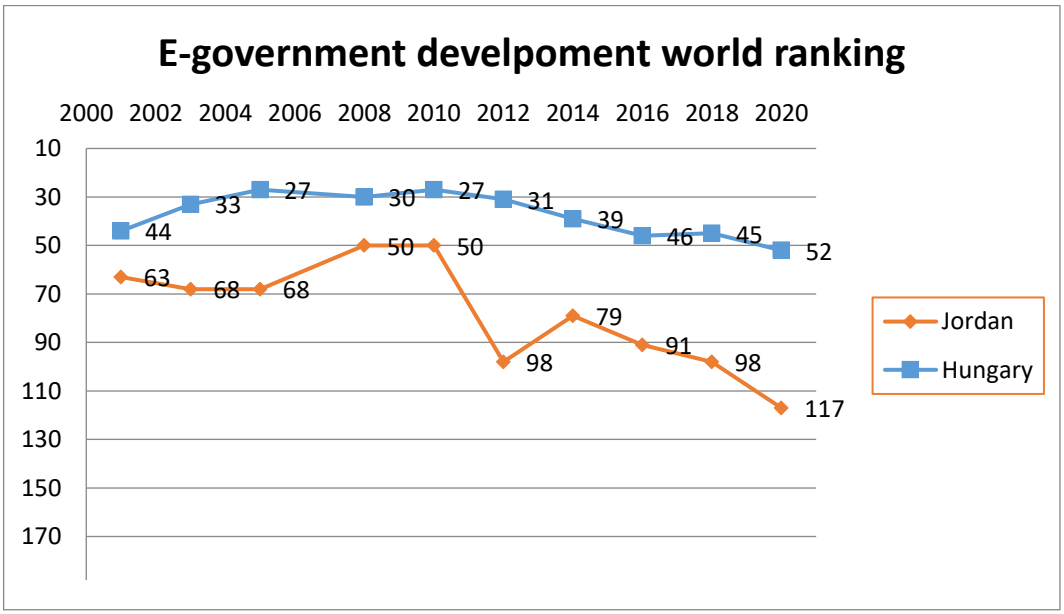


Figure 2.8. E-government Ranking. (UN DoESA, 2020)

The dramatic changes in the global ranking of Jordan were greatly affected by the economic situation in the country, where it witnessed financial stability until 2008, which was obviously seen in Jordan's high ranking until the year 2010, taking into account that this survey comes out every two years, but after 2008 the GDP declined due to several reasons, most notably the global crisis and the Syrian refugee crisis which can be seen in the rank 2012. in 2013 the economy began to grow again and Jordan launched new electronic services, including

electronic payment, and this contributed to the improvement of Jordan's rank in 2014, but not for a long time, as it is still suffering Among other crises such as the Corona epidemic which started in 2020 and will certainly be reflected on the e-government program and we will see its effect in future.

Suppose we look deeper into the same previous classification of the United Nations, which is based on four main criteria E-Participation, Online Service, Telecommunication Infrastructure, and Human Capital. Both countries in 2020 achieved the highest results in Human Capital, but also both got the lowest results in Telecommunication Infrastructure, but we can see that Hungary is superior to Jordan in all axes (Figure 2.9), Moreover, Figure 2.10 shows also the historical development of the online service index (between 0-1) which is the most important indicator of the services provided by the government and the front office of the system. The situation of Hungary has improved significantly since the launch of the program to the year 2020, in contrast to Jordan, in which this indicator has declined, and all that due to Hungary's speed in amending regulations and adopting modern technology in the sector faster than Jordan.

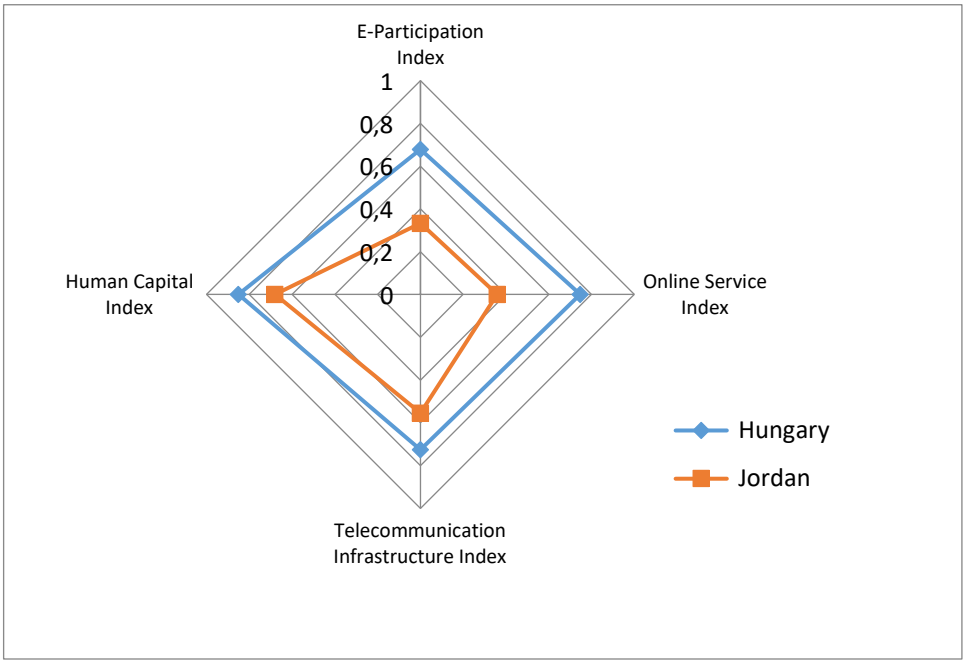


Figure 2. 9 United Nations E-government Index Hungary and Jordan

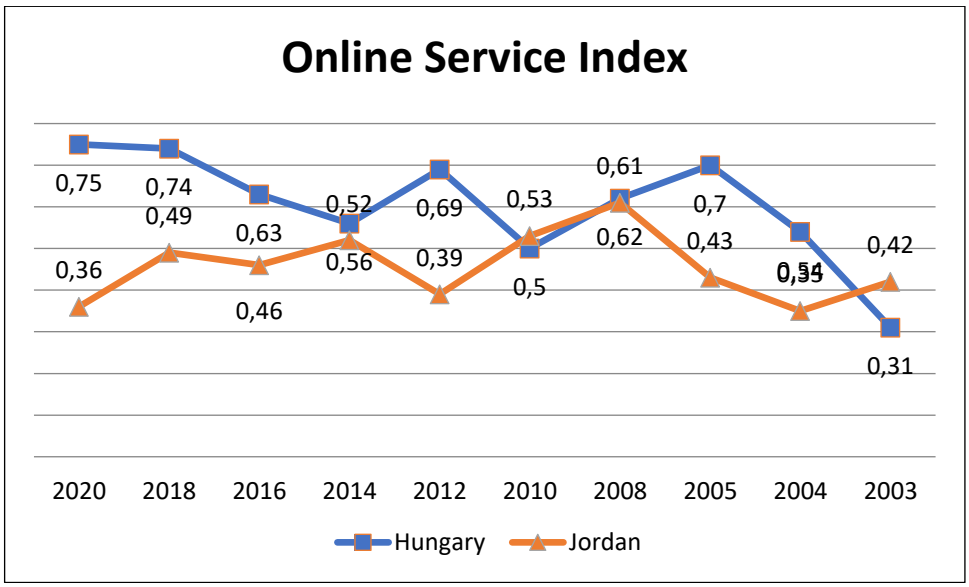


Figure 2.10. online service index (UN DoESA, 2020)

Most previous work on the adoption of e-government services is still very recent in the literature (Elsheikh et al., 2012). Only a few studies determined the factors that affect the use of e-government services in developing countries, especially in Jordan. The revolutionary ICT change occurring in Jordan is making it particularly important for future research to understand the variables that hamper the progress of adopting e-government services among the citizens.

2.3 E-government Acceptance

The success of any electronic system fails unless the users use it. Acceptance and use of the system are followed by adopting the system, which is the first decision that the user takes to use the new system (Venkatesh, Morris, Davis, & Davis, 2003).

Many previous studies review models for accepting any new technology or system in the public sector, either by applying well-known theories on technology acceptance or even amended it, and most of these studies are applied in developed countries (Alsaif, 2014; Alshehri, Drew, Alhussain, & Alghamdi, 2012; Elsheikh, 2012).

2.3.1 Theories and Models of Technology Acceptance

Here in this section, the most prominent models and theories dealing with technology acceptance will be reviewed. It specifically discusses the following particular models and theories: Theory of Reasoned Action (TRA), Theory of Planning Behavior (TPB), Technology Acceptance Model (TAM), Motivational Model (MM), Unified Theory of

Acceptance and Use Technology Model (UTAUT), Unified Theory of Acceptance, and Use Technology Model 2 (UTAUT2).

2.3.2 Theory of Reasoned Action (TRA)

This theory is a central tenet to the technology acceptance models that received significant attention in the literature's recent theoretical and empirical works. It mainly aims to specify the elements that affect the intended behavior of users. This theory was developed by Ajzen & Fishbein (1980). As shown in Figure 2.11, the core idea of its framework is centered on the idea of motivation. It states that there are two individuals' motivational behaviors in people: People's attitude towards their behaviors and people's thoughts about the importance of their behaviors and their relation to others.

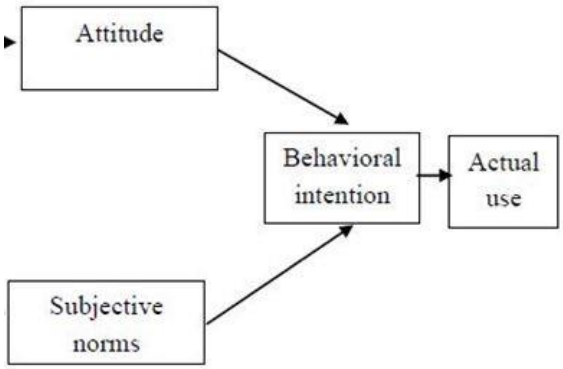


Figure 2.11. Theory of Reasoned Action Model (TRA) (Ajzen & Fishbein, 1980)

Ajzen & Fishbein (1980) observed that there are three fundamental components that are thought to establish the behavioral intention amongst individuals: the attitude towards behavior, behavioral intention, and subjective norms.

Attitude towards Behaviour: it attempts to measure how much the behavioral performance is positive or negative.

Subjective Norms: it seeks to measure the effect of social environment on behavior, specifically how other people's impression plays a role in an individual's behavior.

The previous research works have uncovered numerous limitations related to the use of TRA and behavior evaluation. For example, Sheppard, Hartwick, Warshaw, & Hartwick (1988) stated that TRA is only likely to accurately evaluate the behavior when there is an alignment between the intention and attitude on one hand and with action, context, and context target, and time on the other hand. Similarly, Ajzen, (1985a) and Sheppard et al. (1988) suggested that TRA is somewhat limited to what is referred to as correspondence. And they emphasized that there must be an alignment between the intention and the attitudes with the rest of the

components, as mentioned earlier. Moreover, the theory will not be able to provide the theoretical framework for analyzing government applications.

2.3.3 Theory of Planned Behaviour (TPB)

TPB aims to estimate and describe the individual's intention towards a particular action. It is developed out of TRA by Ajzen (1985). This theory discusses how beliefs influence the decision or intention to use technology. Its core idea centers on three concepts: perceived behavioral control(PBC), attitude, and subjective norms, as shown in Figure 2.12.

Ajzen (1985) defines **PBC** as the extent of the individual or user's perception of the ease and difficulty of doing an action. This term has a special explanatory effect in the area of information systems. Lean, Zailani, Ramayah, & Fernando, (2009) suggest that the perceived behavioral control has the potential to provide a reliable prediction of the extent of adoption of e-government services. The limitations of this theory are the lack of personal and demographic variables and the subjective measurements of perceived behavioral control. It also only operates when the behavior is under volitional control, and it does not attend to unconscious motives.

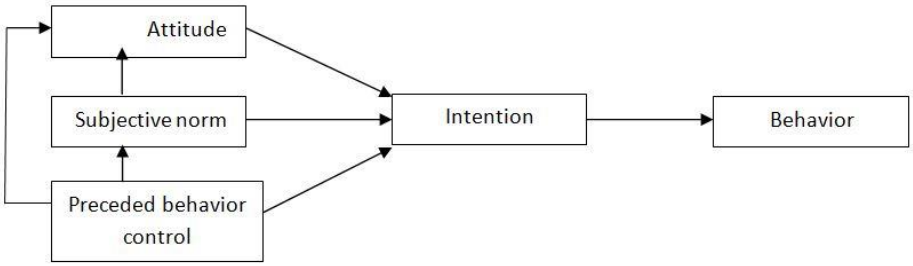


Figure 2.12. Theory of Planned Behaviour(Ajzen, 1985)

2.3.4 Technology Acceptance Model (TAM)

TAM is the most widely used model in the literature. It has been adopted in various fields of study, including management, business, and information systems (Benbasat & Barki, 2007). TAM focuses on the individual's attitude and personal intention to use technology and the actual use of technology. This model is based on the idea of TRA, which states that the belief affects intention that in turn affects action. It is developed by Davis, Bagozzi, & Warshaw, (1989) and aims to predict how the employees of an organization accept software technology.

This model has two main psychological variables; Perceived Ease of Use (PEOU) and Perceived Usefulness (PU):

- (PU) can be defined as the users' level of perception of any system of the benefits and gains that the system can provide to them in doing their jobs (Davis, Bagozzi, & Warshaw, 1989).
- (PEOU) Davis defined it as the level of users' ability to use the system easily without any difficulty. In addition, the individual's level of perception of the external variables and their effect on the two variables PU and PEOU leads to strengthening the intention towards use.

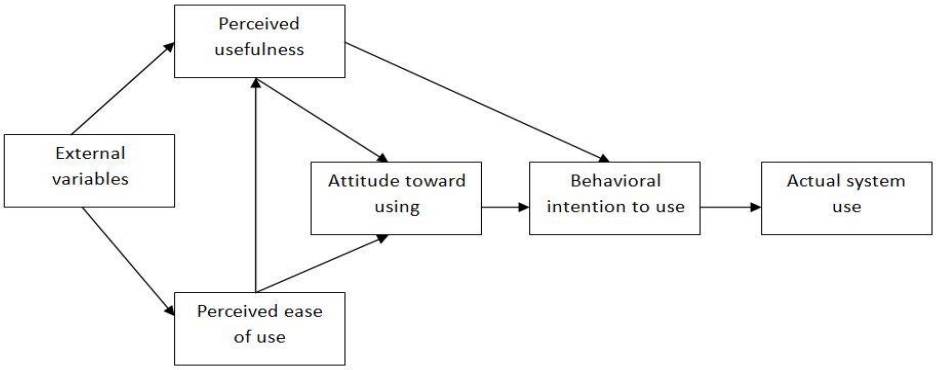


Figure 2.13. Technology Acceptance Model (TAM) (Davis et al., 1989)

One of the controversial issues of TAM is that it excludes the social norm factor that TRA validated. Benbasat & Barki, (2007) indicated that TAM has major limitations in its explanatory power and extendibility. It only focuses on the explanatory powers paradigm at the expense of determining and clarifying grounded variables. It also does not have the potential to extend its facilities and to provide a mechanism to include additional future variables. Finally, TAM cannot account for the emotional choices. It took the acceptance of technology instead of user behavior.

2.3.5 Motivational Model (MM)

Motivation is a term related to energy, direction, and persistence, which is used to explain an intention or behavior (Ryan & Deci, 2000). According to Deci, Cascio, & Krusell, (1975), motivation is of two types: extrinsic and intrinsic. Intrinsic motivation is defined as when "When the use of a system is enjoyable by itself and without regard to the results that may arise from the use" (Venkatesh et al., 2003). Maintaining motivation requires a feeling of competence and self-efficiency.

Extrinsic motivation is defined as performing an action or behavior for the sake of external outcomes, like money, promotions, rewards, as well as other tangible benefits. This type of motivation is highly significant in studies that are concerned with information systems. According to (Davis et al., 1989), extrinsic motivation refers to perceived usefulness, while

intrinsic motivation refers to activity enjoyment. In brief, intrinsic motivation is concerned with the successful adoption of information systems.

2.3.6 Unified Theory of Acceptance and Use of Technology (UTAUT)

This form provides explanations of the level of user acceptance of any new technology system. (UTAUT) is a merged model of many previous theories and models:(TAM) (TRA) (TPB) (MM) (IDT) (MPCU) (SCT) (C-TAM-TPB) (Table.4) (Venkatesh et al., 2003). This model includes four main independent variables that affect the level of acceptance of any new system, and this model has four variables mainly:

Performance Expectancy (PE): The users' level of perception of any system of the benefits and gains that the system can provide to them (Venkatesh et al., 2003).

Effort Expectancy (EE): The level of users' ability to use the system easily without any difficulty (Venkatesh et al., 2003).

Social Impact (SI): The level to which any user thinks it is very important for others to believe they must use any new system (Venkatesh et al., 2003).

Facilitating Conditions (FC): The individual's perception that the existing system has an infrastructure, whether organizational or technical, that helps to use the system better.

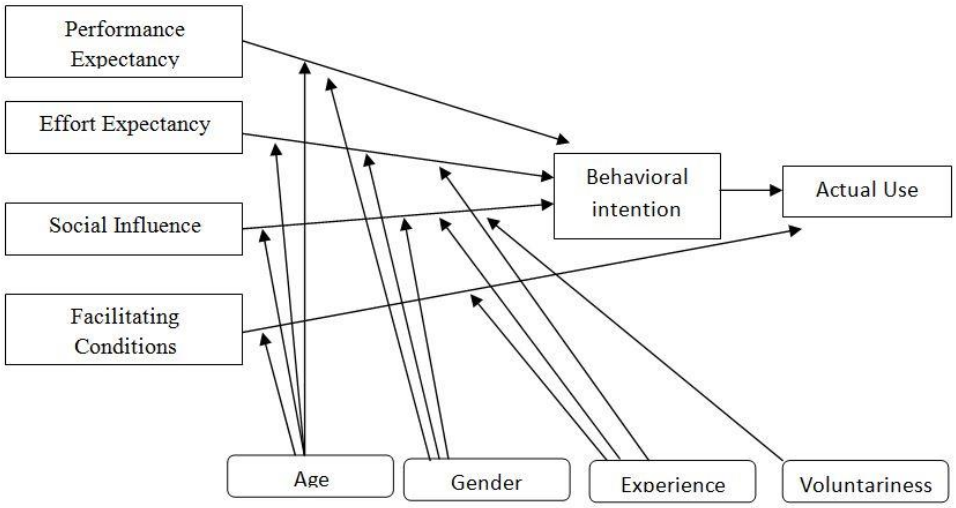


Figure 2.14. Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003)

The new model leads to be able to account for as much as 70% of the differences in the use of intention. This is considered as a big significant progress in measurement when compared with other frameworks get 40% or so (Venkatesh et al., 2003).

Table 2.4. UTAUT Variables from merged Other Models variables (own editing)

Variables	Definition	Built from previous models	
		Construct	Model
Performance Expectancy	It is the users' perception of any system of the benefits and gains that the system can provide to them.	Perceived usefulness	**TAM**
		Relative advantage	**DOI**
		Extrinsic motivation	**MM**
		Job fit	**MPCU**
		Outcomes expectations	**SCT**
Effort expectancy	The level of users' ability to use the system easily without any difficulty	Complexity	**DOI**
		Complexity	**MPCU**
		Ease of use	**TAM**
Social influence	The level to which any user thinks it is very important for others to believe they must use any new system.	Subjective norms	**TAM2 and TRA**
		Social factors	**MPCU**
		Image	**DOI**
Facilitating conditions	The individual's perception that the existing system has an infrastructure, whether organizational or technical that helps to use the system better	Perceived Behavior Control	**TPB**
		Facilitating conditions	**MPCU**
		Compatibility	**DOI**

2.3.7 Extending the Unified Theory of Acceptance and Use of Technology (UTAUT2)

Venkatesh et al (2012) have developed the UTAUT model through three key contributions. First, Venkatesh and his colleagues introduced three constructs to the model: namely, hedonic motivation (**HM**), habit (**H**), and price value (**PV**). as shown in Figure 2.15. Second, they altered and developed UTAUT by modifying the existing links and including new constructs. This contribution is important to extending the generalizability associated with UTAUT and is fundamental in theory advancement. Third and last, the improved model is pivotal to assisting businesses in the consumer technology field from a more practical perspective.

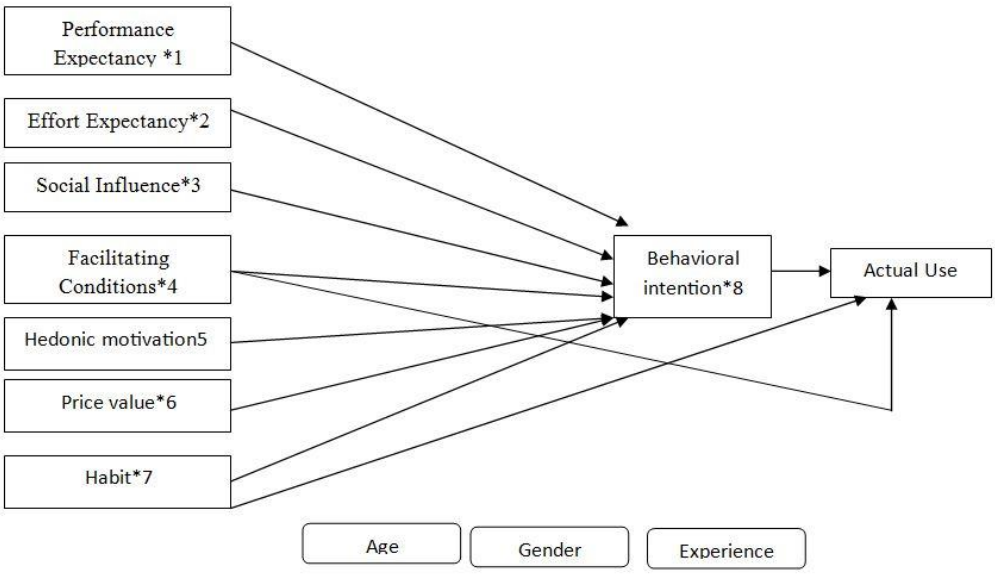


Figure 2.15. Unified Theory of Acceptance and Use of Technology 2 (Venkatesh, Thong, & Xu, 2012)

As mentioned earlier, Venkatesh et al. (2012) extended the new framework with the new three variables:

Hedonic motivation: It refers to the fun or pleasure expressed in the use of technology. It is considered very fundamental to the use and acceptance of the technology. More specifically, it is an important determinant of the use and acceptance of technology in the consumer context. Hence, (HM) is very useful to estimate the consumers' behavioral intention in technology use.

Price value: This variable measures the impact of the user's costs when using the system and the impact of this cost on the level of acceptance of this system.

Habit**:** Most of the previous studies concerned with the use of any technology have two aspects related and close to the concept, but they are separate, and they are experience and habit. Experience is, as operationalized by Venkatesh et al. (2003), the amount of time that an individual experiences in the use of technology. Habit is the degree to which people are likely to learn to use technology and carry out behaviors in an automatic way. There are two key differences between habit and experience. Moreover, the experience is a prerequisite for the development of a habit. On the other hand, habit measures are based on the degree of familiarity and interaction between the user and the targeted system.

2.4 The reasons why using the UTAUT for this research

All the models we mentioned provide explanations of the factors that affect the users 'decision to adopt and accept new technology. The current study adopts the model UTAUT2 for many reasons, including:

1. The model is comprehensive, as many previous theories support it. In addition, this model merged eight previous models (TRA, TAM, TPB, MM, C-TAM-TPB, MPCU, IDT, SCT) to explain the users' acceptance of the technology.

2. The model is more accurate than the previous models, as the model showed an interpretive capacity of up to 70%. On the other hand, the previous models showed an explanatory capacity estimated at 40% of the cases studied. Besides, the model showed more flexibility compared to other models in measuring the acceptance of new technology (Venkatesh et al., 2003).

3. UTAUT2 employs key factors that are important to the present research, such as (PE), (EE), (SI), (FC), and (H). The price value and hedonic motivation may not be important in several contexts or technologies, such as public sector systems. (Venkatesh et al., 2012). The simultaneous integration of these key factors and moderators in the model form the nucleus of the present research. The present study tries to determine the key factors that affect the usage behavior and the intention of continued usage of e-government services among Jordanian and Hungarian users. Alvesson & Kärreman, (2007) noted that testing the theories in new contexts can bring further insights into their practicality. Therefore, the present study tends to adopt UTAUT2 to investigate e-government services in a new context.

4. As indicated by many previous studies, the model can be applied in different environments and contexts such as countries, systems, or community groups. This makes this model explain and spread more widely than the user's use of technology only.

5. The model has demonstrated great applicability in several previous studies(Al-Shafi & Weerakkody, 2010; Rahim & Athmay, 2013; Yahya, Nadzar, & Rahman, 2012). It also provides a diagnostic tool to assess whether the information meets the technology system's users' needs.

6. In the end, and in the context of the current study, which is the public sector, this model was tested mainly in developed countries, and much less extent in developing countries such as Jordan, or as a comparison between two countries such as Jordan and Hungary with many differences in cultural and environmental.

Al Hujran et al. in (2013) the researcher has adopted the model TAM to explore the factors affecting the adoption of e-government services in Jordan, the researcher expanded the

original model with factors as trust and public value, and he collected the data from 65 university students in Jordan, the results showed the importance and the direct relationship of trust and citizens' perceptions of public value on the adoption of e-government in Jordan. In 2015 the researcher expanded the same model with new factors that are related to citizen satisfaction, service quality, and trustworthiness, the results showed that PEOU, PU, trustworthiness, and citizen satisfaction are significant predictors of usage intention and these factors make up to 54% of the Variance in citizens' intention to use e-government services (Alhujran et al, 2015).

Alryalat et al. (2013) has expanded the model UTAUT with the variables related to trust and security, the study was conducted in Jordan to explore the impact of these factors on citizens' adoption of e-government services. The results showed that trust, the perceived security, facilitating conditions, and social influence have a direct impact on citizens' intention to use electronic services.

In another study, researchers (Al Khattab, et al., 2015) extended the model TAM By adding a number of factors, the results of their study that took place in Jordan showed that the factors perceived usefulness, perceived ease of use, trust in electronic channels and perceived risk are factors that directly influence the citizens' decision to use electronic services in Jordan.
Nofal, M. I. *et al.* (2021) conducted a questionnaire on 423 employees of public universities, and their results showed that perceived ease of use, perceived usefulness, is highly related to the adoption of e-government as well; Trust plays a mediating role between perceived ease of use and e-government adoption.

Pérez-Morote, et al. (2020) The researchers conducted their research on 27 European countries during the 8 years from 2010-2018, including Hungary, and reached their conclusions that governments should care about raising the level of citizens' confidence in E-government and this will increase the level of citizens' acceptance of electronic services in addition to other factors related to the digital divide, income, and education.

Csótó, M. (2019) The researcher used data from an opinion survey conducted in 2017 on public services in Hungary, and one of the most prominent results of the research, which focused on the knowledge gap of citizens to adopt electronic services, through two main indicators, trust in the use of the Internet and Difficulty of dealing with public administration. In this paper, the researcher confirms that the best position is not only with the use of technology in public administration in a broader and larger way but with more knowledge about the procedures of public services themselves. The paper showed the existence of a

knowledge gap in terms of knowledge related to public administration, and this, in turn, affects users' choices between different channels for using public services. The research showed that many respondents try to avoid electronic services option and the participants' number who used electronic services in the last three years is still modest, the researcher pointed out the importance of trust and the importance of conducting more studies in the adoption of electronic government in Hungary.

Aranyossy, M. (2018) The researcher used the data of the questionnaire that was carried out in Hungary in 2017 on 2506 citizens. Among this questionnaire were 70 questions about the use of electronic services. The researcher uses the data to analyze the adoption of 22 types of services. The researcher used the results of this questionnaire to test the effect of effort expectancy, trust in the internet, trust of government, facilitating conditions, experience, habit On citizens' acceptance of electronic services. The results have shown that the biggest effect was for Habit, Trust of internet, Facilitating conditions. The results also showed that trust in the government has no direct effect on the level of acceptance, which is consistent with other studies in Hungary (Nemeslaki et al. 2016).

Many studies explored the factors that related to e-government adoption in the developed countries, and many explored the demand said (Government) and less the citizen point of view (e.g. (Carter & Belanger, 2004; Choudrie, Dwivedi, & Yogesh, 2005; Kumar, Mukerji, Butt, & Persaud, 2007). However, there is still a lack of evidence on the factors that explain the citizens' adoption of e-government services in Jordan and Hungary (Al-Hujran et al., 2011; Csótó, M. , 2019). Moreover, many studies in both countries confirmed the importance of the factors related to the users' perceptions, infrastructure, and trust; In this respect, the present study aims to provide e-government officials with a helpful guideline that helps them have better e-government services and to channel their policies towards increasing the citizens' adoption of these services. Furthermore, the present study's findings are hoped to help the government agencies capture the factors that enhance and influence the citizens' adoption of e-government.

Finally, In this chapter, comprehensive reviews of the most prominent theories and models used in measuring and discovering the factors affecting user acceptance of any new technological system. As it is clear, most of the previous studies focused on developed countries and are still limits in developing countries and countries that face problems in implementing e-government, such as Jordan and Hungary. Accordingly, many previous studies recommended further research to discover the influencing factors in developing countries or countries of different natures or environments, such as Hungary and Jordan. The

chapter discussed the most prominent previous theories such as TRA, (TAM), (TPB) (MM), (UTAUT), (UTAUT2), and explained all its components and how all of these models were combined in the end with the UTAUT model. The chapter deeply discusses the UTAUT model adopted in this study and the main reasons to adopt this model, especially in the field of e-government.

3. MATERIAL AND METHODS

3.1 Conceptual Development of Framework

Many types of research adopted the well-known theories in this field to explore the factors affecting users' acceptance of any new system, and as we mentioned previously, the most popular and most used models were: TRA, TPB, TAM, DOI, MM, UTAUT, and UTAUT2.

In this research, we have main factors that include other sub-factors, and these factors are the factors that are based on the users' perceptions of the system, the factors related to the infrastructure of the system, and the factors related to trust.UTAUT2 model postulates four factors that are thought to influence the behavioral intentions: namely, performance expectancy (PE), effort expectancy (EE), social influence (SI), hedonic motivation (HM), habit (H), and price value (PV) which all express the users' perceptions of the system and facilitating conditions which express the infrastructure of the system.

This study is conducted in the public sector, so two variables were excluded from the original model: (HM) and (PV) Firstly, the variable (HM) was excluded because the services provided by governments in the public sector are government services that are free of fun, as this variable measures the level of fun that occurs to the user during the completion of the process, and secondly, the variable (PV) is excluded because the services provided in the two countries (Jordan and Hungary) is provided free of charge, and its use does not constitute any costs to the users. Therefore, the effect of this variable will not affect the decision of the users in the two countries, and the two variables were excluded from the proposed framework (Lian, 2015).

In addition to that, the current research excluded two moderating variables, namely gender, and age, as services are provided in the two countries equally between males and females, and accordingly, gender will not be a factor affecting users' acceptance of these services, in addition, the usage of the services is voluntary and available for all ages, so the current study believes that age and gender will not affect the results of the study and the user's intention to use the system, and they are excluded (Al-Shafi & Weerakkody, 2010). However, one moderating variable the experience was retained; Venkatesh et al. (2003) indicated that the higher experience using any system or similar systems could change the effect of some variables on the users' intention to use the system.

On the other hand, the proposed framework extended UTAUT model by adding new variables as mentioned. The findings of previous research have Indicated that UTAUT2 did not consider the system characteristics (system flexibility, enjoyment, and interactivity) that could

affect the infrastructure of the system or the awareness which is related to the user perception, or even the trust that could have a major effect on the users' attention of the system especially in countries like Jordan and Hungary who are still facing challenges regarding these factors; therefore, the present study has incorporated new variables in the in order to provide a better understanding about the factors that influence the attention of users to use e-government system.

The system characteristics is another construct that is related to system factors. It affects the user's attention to use a particular system. The system characteristics: namely, system flexibility, system interactivity, and system enjoyment were added to the framework of the present study as a part of the infrastructure. In addition, system flexibility refers to "the degree to which the users have perceived that they can use the system anywhere and anytime" (Hsia & Tseng, 2008). System interactivity indicates "the interactions among the users themselves, the interactions between the system and users, and the collaboration in the system that results from these interactions." System enjoyment is referring to "the degree to which the user believes that using a particular system will be enjoyable." All these factors play a major role in the user's attention to use the e-government (Conci, Pianesi, & Zancanaro, 2009). According to (Sahin & Shelley, 2008), (Hsia & seng, 2008), (Abbad, Morris, & Nahlik, 2009), (Conci et al., 2009), and (Zhang, Zhao, & Tan, 2008), there are many subcritical success factors in the system acceptance that are related to the system factor.

The original model UTAUT2 addresses the various factors that may affect the user's intention to accept and adopt any new system, but this model does not address the impact of factors related to trust that may play an important role in affecting users' acceptance of the system, especially when it comes to services in the public sector because trust in the system is must for the direction of users to use this system because they will use their data and personal information. As for the current study, the context of the study is the e-government in both Jordan and Hungary, and trust can play either in the system or the government that provides services with an important factor that may affect the users' decision to accept and use the system (Spacek et al., 2020; Csótó, 2019 ;Al-Hujran et al., 2015).

Finally, the current study added another variable, which is (awareness), which is usually the first stage in using any system, the awareness which the knowledge of the importance of the system to the users and knowing the benefits that may accrue to them from using the system, which leads to the adoption of the system at the end (Pavlou & Fygenson, 2006), and this is confirmed by many previous studies. van Dijk, Peters, & Ebbers, (2008), divided the process of adopting the system into four main phases, and in the first phase were: knowing the system,

encouragement, decision, and finally using, moreover, Shareef, Kumar, Kumar, & Dwivedi, (2011) indicated that the starting point in the process of adopting any system is to know it and take a complete picture of it. And they mentioned that belief in the system is the most important factor affecting the user's decision to adopt the system.

Proposed Research Framework

The current study adopted the model UTAUT2 after excluding some elements and expanding it by adding three new elements as we mentioned previously (Figure 3.1); the first is related to the infrastructure, the second is awareness related to users' perception, and the last is related to trust. The added elements were extracted from previous studies as shown in Table (3.1), In this research, to make the framework easier, has grouped the variables under three basic complex variables that express the three main factors:

- **Human E-government interaction :** effort expectancy (EE), performance expectancy, influence (SI), habit (H), awareness(AW).
- **Moderating**: Experience (EX)
- **E-government Infrastructure :** facilitating conditions (FC), system characteristics (system flexibility (SF), system Interactivity (SI), system enjoyment (SE))
- **Trust:** trust in the system (TS), trust in government (TG).

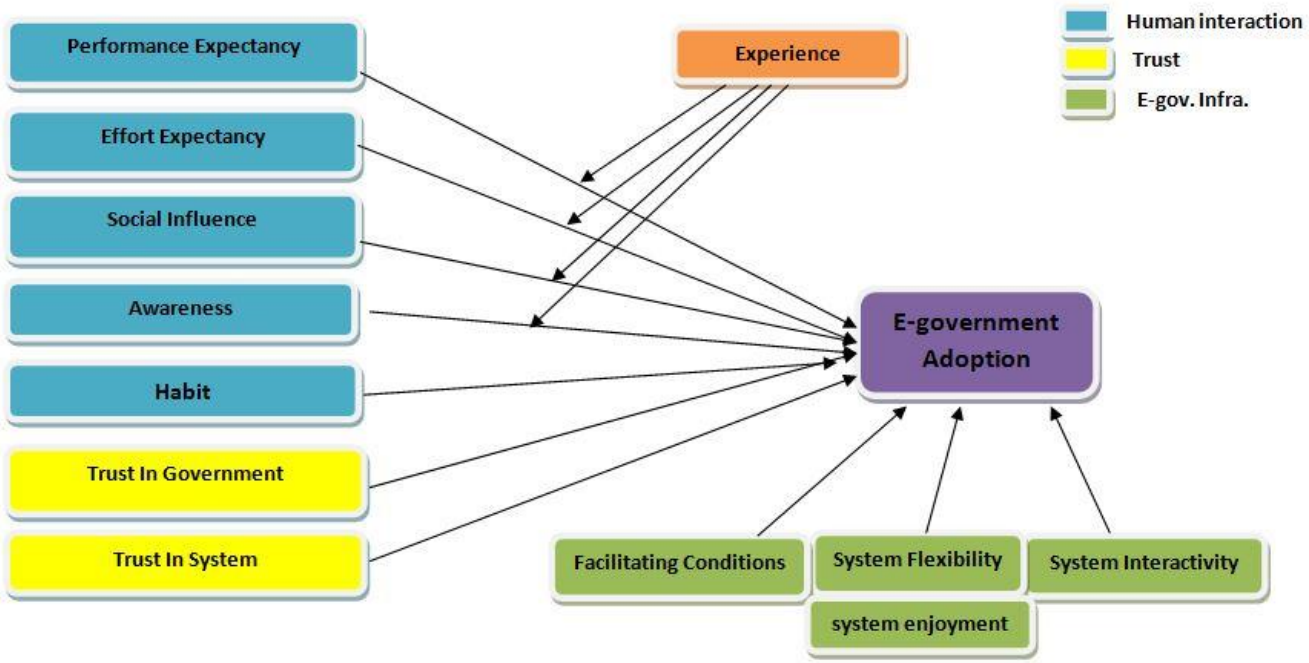


Figure 3.1 Proposed Research Model(own editing)

The study survey (Measurement of Variables)

This research referred to previous studies in the same field to create the appropriate tool to measure variables in the study and choose the elements of the questionnaire that can measure the effect of variables on the acceptance of e-government, and among the previous studies that the research referred to extract the elements of the questionnaire and number of the items are shown in Table (Table 3.1).

Table 3.1 Measures' Resources (own editing)

Factor	Item no.	Studies
Human Interaction	**21 Items**	**Grouping variable**
Performance expectancy	4 Items	(Alsaif, 2014; Venkatesh et al., 2012)
Effort expectancy	5 Items	(Venkatesh et al., 2012)
Social influence	5 Items	(Alsaif, 2014; Venkatesh et al., 2012)
Awareness of the system	4 items	(Alsaif, 2014)
Habit (HT)	3 items	(Venkatesh et al., 2012)
Infrastructure	**14 Items**	**Grouping variable**
Facilitating Conditions (FC)	3 items	(Venkatesh et al., 2012)
System Interactivity	4 Items	(Abbad et al., 2009; Alrawashdeh, Muhairat, & Alqatawnah, 2013)
System Flexibility	3 Items	(Alrawashdeh et al., 2013)
System Enjoyment	4 Items	(Alrawashdeh et al., 2013)
Behaviour Intention (BI)	5 Items	(Venkatesh et al., 2012)
Experience	**5 Items**	(Venkatesh et al., 2003)
Trust	**8 Items**	**Grouping variable**
Trust in system	4 Items	(Alshehri et al., 2012; Omar Al Hujran, Anas Aloudat, 2013)
Trust in Government	4 Items	(Alshehri et al., 2012; Omar Al Hujran, Anas Aloudat, 2013)
Total	**53 Items**	

The current study adopted the five-point Likert scale in the questionnaire for all the variables, except the demographic variables due to the nature of the different questions, this scale uses five different answers for each question from 1-5 where 1 strongly disagrees, and 5 strongly agrees (Babbie, 2010). Figure (3.2) shows and summarizes the general steps of the research methodology for both countries.

Overview The Methodology

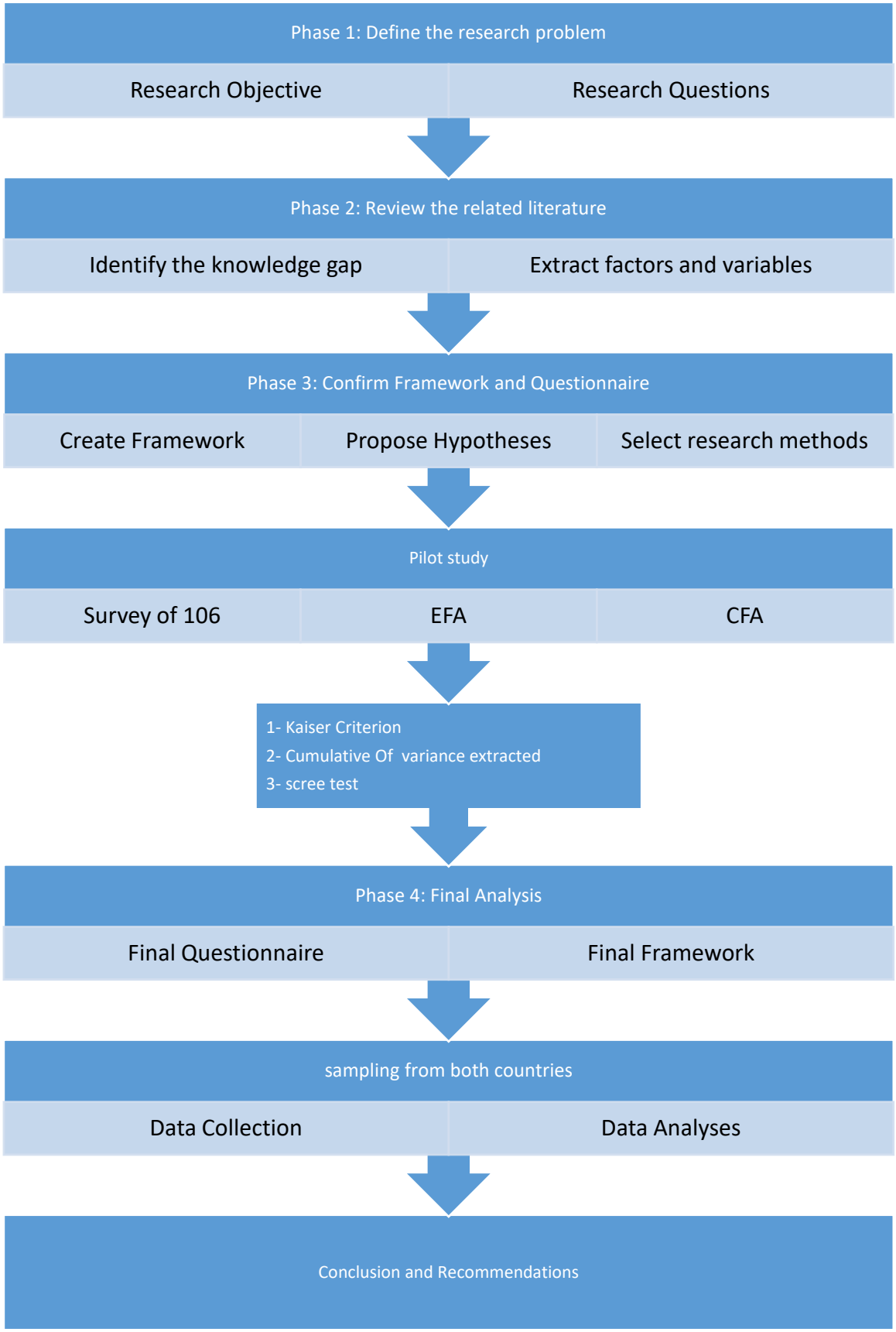


Figure 3.2. Research methodology for both countries (own editing)

3.2 Methods and Statistical analysis

Exploratory Factor analysis (EFA)

EFA is an apparently complicated statistical method, the approach to analysis is really linear, sequential, and covers several options. Accordingly, the progress of a protocol or pathway is significant in potential monitoring methods. The following five-step exploration factor analysis protocol that the researcher used in this research gives the researcher a reference point to start forming clear decision pathways. All these steps will now be described in more detail (Williams, et al. 2012):

Step 1: Does the data fit for factor analysis?

Sample Size for the pilot study: Although the sample size is necessary in factor analysis, there are different opinions, and many guiding rules of thumb are mentioned in the literature, the common rule covers the Tabachnik rule, which recommends at least 300 cases are needed for factor analysis. Hair et al. recommended that sample sizes should be 100 or higher. Another set of references also exists that afford researchers with direction on the number of participants needed for a specific variable, usually called the sample to variable ratio, regularly referred to as the N:p ratio where N refers to the number of participants and p: refers to the number of the variables.

Factorability of the correlation matrix: The correlation matrix should be used in the EFA method to present the relations among the different variables. Henson and Roberts remark that the correlation matrix is the most common among researchers. Tabachnick and Fidell suggested checking the correlation matrix (often named the Factorability of R) for correlation coefficients higher than 0.30. Hair and others. (2006) divided these loadings using another common rule as ±0.30 = minimal, ±0.40 = significant, and ±0.50 = practically significant.

Kaiser-Meyer-Olkin (KMO): Type of Sampling Adequacy/Bartlett's Test of Sphericity, Before factoring out, various analyses should be applied to evaluate the suitability of respondent data for factor analysis. These tests involve the Kaiser-Meyer-Olkin Scale (KMO) of sampling adequacy and the Barlett test for sphericity.

The KMO index is recommended, in particular, when the ratio of cases to variants is smaller than 1:5. The KMO index differs from 0 to 1, rating 0.50 is fit for factor analysis. Bartlett's Sphericity test need to be significant ($p < .05$) for factor analysis to be proper.

Step 2: Will the factors be rotated?

In this research, the goal of the rotation is to simplify the factor structure of a collection of items, or in other words, high item loadings on one factor and smaller item loadings on the remaining factor solutions. There are many methods to extract factors: Principal components analysis (PCA), principal axis factoring (PAF), image factoring, maximum likelihood, alpha factoring, and canonical.

Step 3: What criteria will support in deciding factor extraction?

In this research, data extraction is to reduce a high number of items into factors as this research extended the original model (UTAUT) which has many items. In order to create a one-dimensional measure, and to simplify factor solutions, various criteria are available to researchers. But, due to the selection and sometimes complex nature of factor analysis, no single criterion should be assumed for determining factor extraction. This is recommended by Hair et al. (2006) indicate that the majority of analysts typically use various criteria. Several extraction rules and approaches including Kaiser's criteria (eigenvalue > 1 rule), the Scree test, the cumulative percent of variance extracted.

Step 4: Choose the rotation methods

In this research, a different point when deciding how many factors will analyze your data is whether the variable may be related to more than one factor. Rotation maximizes high item loadings and reduces low item loadings, thus ending in a more interpretable and simpler solution. There are two popular methods of rotation: orthogonal rotation and diagonal rotation. Researchers have many methods to choose among the two rotation choices, for example, orthogonal varimax / quartimax or oblique olbimin / promax.

Step 5: Interpretation

The researcher examining which variables are attributable to a factor, and providing that factor a name or subject. For example, one factor might involve four variables that all relate to awareness and attention of the e-government system; so the researcher creates an "awareness of system" label for this factor. Traditionally, at least two or three variables have to be loaded onto a factor so that a meaningful explanation can be given.

Reliability and validity

Reliability: Reliability is the degree to which a measurement reflects actual results when the measurement process is repeated (Malhotra and Birks, 2007). In order to examine the internal consistency of the instrument, a pilot study was performed on respondents, and a reliability

test was run using Cronbach-Alpha. Cronbach's α is the commonly used test to discover the internal consistency of an instrument. The average of all correlations in a split-halves combination is defined in this test. Instruments with questions that have two answers or more can be used in this test. The Cronbach's α result is a number within 0 and 1. The acceptable reliability rate is 0.7 or higher (Mohajan, 2017). Hence, this test was used in this thesis.

Discovering how consistently the reliability and validity of a study were considered is a vital component of the study's critique and affects the decision as to whether the results of the study should in fact be performed by the government in both countries. In quantitative studies, accuracy is resolved by evaluating the validity and reliability of the instruments used in the study. A high-quality study tells how all these factors were addressed. This will help to assess the validity and reliability of the study and determine whether or not to use the results of your study model.

Validity: Validity is the most critical measure and refers to the extent to which a tool measures what it should measure. It can also be considered as a utility. Validity refers to whether an indicator (or many indicators) used to measure a concept truly measures that concept. Various methods to set validity are convergent validity, construct validity, discriminant validity, predictive validity, and concurrent validity (Voorhees et al., 2016). According to Heale and Twycross (2015) there are two main kinds of validity that can measure validity in quantitative research:

Content validity: this type shows whether the instrument adequately includes all the content that it should with respect to the variable. In other words, does the instrument include the whole domain related to the variable, or construct it was created to measure?

Construct validity: this one relates to whether you can draw inferences about test scores related to the concept being studied. There are three kinds of evidence that can be used to demonstrate a research tool has construct validity:

- Homogeneity: This determines if the tool measures only one construct.
- Convergence: this happens if the means measures concepts similarly to other instruments. Although if there are no similar instruments possible this will not be possible to do.
- Theory evidence (discriminant validity): this is visible if the response is similar to theoretical propositions of the construct measured in the instrument.

In this research, convergent, and discriminant validities have been used. The current study infers the hypotheses from theory related to the concept.

SEM methodology

SEM is a strong multivariate method that is increasingly found in scientific experiments to examine and assess multivariate causal relations. SEM differs from other modeling methods in that it tests direct and indirect impacts on previously assumed causal relations. (Fan et al, 2016). Moreover, SEM is consists of the analysis model and the structural model. A measurement model measures the latent variables, while, the structural model test all the hypotheses based on path analysis (Kline, 2010; Schumacker et al, 2004). There are five relevant steps in SEM: model specification, identification, parameter estimation, model evaluation, and model modification. The model specification determines the hypothesized relations between the variables based on one's understanding. Model identification is to verify if the model is over-identified, just-identified, or under-identified. Model coefficients can be only considered in the just-identified or over-identified model. The model evaluation evaluates model performance or fit, with quantitative indices calculated for the overall goodness of fit. Modification adjusts the model to improve model fit, i.e., the post hoc model modification, in this study, EFA was performed prior to model confirmation via CFA.

The use of CFA in scale adoption studies differs in use. In some adaptation studies, it is noticed that both EFA and CFA are used, while in others only CFA is used. The use of CFA only in adaptation studies may produce some problems. For example, if a translation error happened in an adaptation study, using the CFA only might appear in a different position than would actually occur, and the model could be misleading. In addition, a data set may suit with more than one CFA model, so it would be more suitable to carry an EFA first to introduce possible cultural differences in the adaptation. In such a case, if an EFA is not completed, a researcher will not test a second model since the first examined model fits the data. Thus, it is necessary to run an EFA first to see the possible error (Orcan, 2018).

Finally, In this research used some Statistical analysis tools as following: Frequencies and Percentages, the geographical distribution of the sample, Means and standard deviation for items.

Cronbach alpha for reliability: It is a statistical tool for measuring the relevance of variables with each other and their relevance as a group, and it measures the level of reliability. Covariance Structure Model (CSM): This statistical tool collects all strengths to analyze factors in the study and overcomes the weaknesses by combining them with structural equation models. A single model estimates all relationships between variables and the relationships among latent variables (Long, 1983).

This research created a CSM after validating the measurement models of every latent construct. The CFA main function was to assess the causal relationship between the variables. The CSM covered all endogenous variables, exogenous variables, moderator variables, and measurement error terms. It also has the first-order factors for all latent constructs. The relationships between human E-government interaction, E-government infrastructure, trust, and experience on behavior Intention by the covariance structure model. The R2 and beta values were measured for the endogenous variable to confirm the significance of the hypotheses. Paths and explanatory power of the models. Kaplan, (2008) indicated that R2 main function is to confirm the total variation of endogenous variables, and that was explained by the exogenous variables.

Moreover, the research in this analysis used three-step procedures: 1) verified and removed when necessary the items with low factor loadings or weak, 2) verified using some indices to validate the model, and finally, 3) to develop and improve the general model and get a well-fitted model, the modification indices for highly correlated measurement errors of the indicators was verified as can see in the next chapter in both countries data.

3.3 Pilot Study

Always researchers recommend conducting a pilot study at the beginning before the actual distribution process, especially when the population size is large, such as this study, and this pilot study is an opportunity for the researcher to refine and improve the questionnaire and avoid errors that may affect the respondents understanding (Saunders, 2011).

Sample size (pilot study)

Determining the sample size for the pilot study is an important factor for analyzing the variables later, and by referring to the previous studies, we found that most of the previous studies headed in two directions: the first is Sapnas & Zeller, (2002), which indicates that only 50 responses are sufficient for the pilot study, on the other hand, the second direction suggested that the required number must be proportional to the number of variables in the study, the rules of thumb range anywhere from 2: 1, 3: 1, 4: 1, 6: 1, 10: 1, 15: 1, or 20: 1 (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005; Tabachnick, Fidell, & Ullman, 2007). Based on the above, this study adopted the second direction, and accordingly, the suggested sample size for the pilot study is (2 * 53 = 106).

Instrument Design (pilot instrument)

A preliminary Instrument was designed to meet the research goal and consisted of (53) items (Appendices 3) where the Human-E government interaction variable (21) items, the E-

government Infrastructure variable (14) items, the trust variable (8) items, the Experience variable (5) and the Behaviour Intention variable also consisted of (5) items.

The study also contains a Hungarian and a Jordanian sample, in Hungary the researcher selected four bachelor classes In The Department Of Businesses Informatics At The University Of Debrecen, and an electronic questionnaire was posted on the official website of the e-learning, the students were asked to fill up the questionnaire electronically and their participation was voluntary. In Jordan, the researcher selected four Bachelor Management Information Systems Classes At The Faculty Of Business, and it was distributed to students electronically like in Hungary. in both countries around 300 students participated and 106 (35%) filled the questionnaire in a correct way. To ensure study Instrument is valid and reliable, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis tests applied (CFA).

3.3.1 Exploratory Factor Analysis: assumptions for the pilot study (Hungarian sample)

Factorability of the correlation matrix

Before doing an extract for the factors, some tests would be used to assess the suitability of respondents' data for analyzing the factor. These tests include the correlation matrix, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and finally Bartlett's Test of Sphericity. First, the significant values of the correlation matrix determinant for all factors, as the table Appx 2.1 (Appendices 2) shows, are between (0.010 - 0.432) and that consider statistically acceptable at (0.00001) level. Also, this shows no "Multicollinearity," and there is no linear overlap between columns or between rows within the matrix, and there is no high or unrealistic correlation between the variables.

However, a minimum correlation among variables (items), and must not be a singular matrix "relationship-free".Bartlett's Test check the two conditions mentioned as: "$\chi 2$" for all factors range of (87.39 to 467.78), and the second condition is P-value for all factors is <0.05.
Finally, used KMO-test to measure Sampling Adequacy as mentioned before, and all factors values were higher than (0.50). And that means all the requirements have been met to check the factorability of the correlation matrix (Yong & Pearce, 2013).

Factors Loading

Many methods work to extract factors, and by referring to previous studies, it was found that the most used is Principal components analysis (PCA) which is adopted by this study. In this step, this statistical tool is based on simplifying the factors, which is a process of gathering factors that showed a high item load in one factor and the other factors that showed less item

load on the remaining factor solutions (Williams, Onsman, & Brown, 2012) . The main aim of data extraction to reduce some of the items into factors. To produce scale one-dimensionality and simplify the factor solutions, there are many ways to do that (Williams et al., 2012). In this study, there are three main variables Human E-government interaction variable, the E-government Infrastructure variable, and trust, and there are sub-factors within them. And after this process, the researcher will confirm the proposed sub-factors under the main factors.

Hair, Black, Babin, Anderson, & Tatham, (2006) et al. indicate that most researchers and analysts use multiple criteria. The existing extraction approaches include many ways as the cumulative percent of variance extracted, Scree test, and Kaiser's criteria (Eigenvalue> 1 rule) (Williams et al. 2012).

First, the Kaiser Criterion, Eigenvalues is a critical criterion to determine the factors. If Eigenvalue is more than one, then that factor could be considered, but if Eigenvalue is less than one, the factor should not consider. on the other hand, the cumulative percent of variance extraction assumes that variance should be greater than 0.5. If it is less than 0.5, the factor should not be considered (Hair et al., 2006). to conclude, in this research, the researcher uses three conditions to determine the number of factors: Kaiser Criterion, Scree Test and Extraction items of factors.

(A) Kaiser Criterion

Table 3.2 Total Variance Explained (own editing)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Eigenvalue	%Variance	% Cumulative	Eigenvalue	% Variance	% Cumulative
Human-E government interaction						
1	3.643	28.025	28.025	2.650	20.386	20.386
2	1.940	14.920	42.945	1.920	14.768	35.154
3	1.349	10.376	53.321	1.904	14.643	49.798
4	1.301	10.006	63.327	1.759	13.529	63.327
5	.767	5.899	69.226			
E-government Infrastructure						
1	4.256	38.694	38.694	2.544	23.123	23.123
2	1.477	13.430	52.124	2.513	22.845	45.968
3	1.078	9.798	61.922	1.755	15.953	61.922
4	.966	8.784	70.705			
Trust						
1	2.976	49.597	49.597	2.047	34.112	34.112
2	1.070	17.825	67.422	1.999	33.310	67.422

3	0.696	11.592	79.013			
4	0.497	8.285	87.299			
5	0.407	6.790	94.088			
Experience						
1	2.053	68.418	68.418	2.053	68.418	68.418
2	0.592	19.718	88.136			
3	0.356	11.864	100.000			
Behaviour Intention						
1	2.530	63.254	63.254	2.530	63.254	63.254
2	0.700	17.494	80.749			
3	0.458	11.446	92.194			

From table 3.2, noticed that the **Human E-government interaction** scale consists of four factors (1-4) depend on Eigenvalues are greater than one "Kaiser's criteria (Eigenvalue > 1 rule)" and the cumulative per cent of variance extracted > 0.50 for four factors together, Cumulative per cent of variance extracted from four factors are (63.33%), and this value is accepted according to (Hair et al., 2006).

E-government Infrastructure consists of three factors (1-3) based on (Kaiser's criteria) and Cumulative percent of variance extracted for the four factors are (61.92%). T**rust** consists of two factors (1,2), and Cumulative percent of variance extracted from four factors are (67.42%). **Experience** consists of one factor with percent of variance extraction (68.42%). Extraction Sums of Squared Loadings from one factor is (68.42%). **Behavior Intention** consists of one factor, and the sum of the Extraction of Squared Loadings from one factor is (63.25%). And all the values are acceptable (Hair et al., 2006).

(B) The second criterion Scree Test

In multivariate statistics, a scree plot is a curve plot of the eigenvalues of factors or principal components in the analysis, A scree plot always shows the eigenvalues in a sloped curve and order; the eigenvalues start from large values to the small ones. (Lewith, Jonas, & Walach, 2010).

In appendices 1, Figure Appx 1.1 , the results confirm that the data must be extracted in 4 factors in **Human-E government interaction**. And Figure Appx 1.2 confirms that **E-government Infrastructure** data must be extracted in 3 factors. And Figure Appx 1.3 confirms that just two factors may be adequate to summarize the data in **Trust**. And Finally, Figure Appx 1.4 **Experience** and Appx 1.5 **Behaviour Intention** shows that the data must be extracted in just 1 factor.

(C) Third: Confirm items of factors

Table 3.3 below illustrates that 13 questions relating to the **human E-government interaction** dimension were analyzed using (PCA) with Varimax (orthogonal) rotation. The analysis produces four factors that explain a total of 63.60% of the differences in the current variables.

The first factor was labeled the **Performance expectancy** of human-E government interaction and that because of the high loadings by the items: Q8, Q6 (questionnaire in appendices 3). And this first factor explained 20.39% of the total variance.

The second derived factor was labeled **Effort expectancy** of human-E government interaction. And that because of the high loadings by the items: Q12, Q11(questionnaire in appendices 3). And the variance explained by this factor was 14.77%.

The third derived factor was named the **Awareness of the system** of human-E government interaction. The name of this factor came because of the high loadings by the items: Q22, Q21(questionnaire in appendices 3). And the variance explained by this factor was 14.64%.

The fourth derived factor was the **Social influence** of human-E government interaction. And the name of this factor came because of the high loadings by the items: Q19, Q15(questionnaire in appendices 3). Moreover, this factor variance explained 13.53%.

All the communalities values of human-E government interaction items came between (0.506-0.719) and were all greater than (0.30). The values of the commonalities offer the variation percentage in the given by variable, which the extracted factors showed the ability to explain. Considerably, it means we have identified four clear patterns of response among human-E government interaction respondents: pattern of Performance expectancy, the pattern of Awareness of the system, Effort expectancy, and pattern of Social influence.

Table 3.3 Matrix of factors, Loadings, and Communalities (own editing)

Items	Loadings				Communalities
	Factor 1*	Factor 2*	Factor 3*	Factor 4*	
Q8	0.807	----	----	----	0.700
Q6	0.781	----	----	----	0.691
Q7	0.771	----	----	----	0.645
Q9	0.723	----	----	----	0.553
Q12	----	0.813	----	----	0.689
Q11	----	0.784	----	----	0.629
Q13	----	0.710	----	----	0.644
Q22	----	----	0.830	----	0.719

Q21	----	----	0.804	----	0.652
Q26	----	----	0.667	----	0.506
Q19	----	----	----	0.818	0.673
Q15	----	----	----	0.744	0.617
Q25	----	----	----	0.601	0.514
Eigenvalue	2.650	1.920	1.904	1.759	63.60 (% Cumulative of Variance)
% of Total Variance	20.39	14.77	14.64	13.53	
	E-government Infrastructure				
Q27	0.820	----	----		0.749
Q29	0.819	----	----		0.671
Q28	0.785	----	----		0.688
Q30	----	0.594	----		0.490
Q33	----	0.812	----		0.697
Q34	----	0.639	----		0.432
Q37	----	0.757	----		0.595
Q39	----	0.559	----		0.527
Q31	----	----	0.758		0.595
Q38	0.436	----	0.661		0.694
Q40	----	----	0.721		0.675
Eigenvalue	2.544	2.513	1.755		61.92 (% Cumulative of Variance)
% of Total Variance	23.12	22.85	15.95		
	Trust				
Q52	0.671	----			0.540
Q53	0.797	----			0.730
Q54	0.885	----			0.784
Q56	----	0.730			0.669
Q57	----	0.794			0.665
Q58	----	0.806			0.657
Eigenvalue	2.047	1.999			67.42 (% Cumulative of Variance)
% of Total Variance	34.112	33.310			
	Experience				
Q46	0.820				0.672
Q47	0.880				0.775
Q48	0.778				0.606
Eigenvalue	2.053				68.42 (% Cumulative of Variance)
% of Total Variance	68.42				
	Behaviour Intention				
Q41	0.830				0.688
Q42	0.885				0.783
Q43	0.742				0.550

Q45	0.714				0.509
Eigenvalue	2.530				68.40 (% Cumulative of Variance)
% of Total Variance	63.254				

** Extraction technique: Principal Component Analysis, (PCA) Rotation technique: Varimax with Kaiser Normalization (VKN)*

Moreover, Table 3.3 illustrates that 11 questions relating to the **E-government Infrastructure**. The analysis produces four factors that explain 61.92% of the differences in the current variables. The first derived factor was named as **Facilitating Conditions** of E-government Infrastructure because of the high loadings by the items: Q27, Q29(questionnaire in appendices 3). And this factor explained 23.12% of the total variance. The second derived factor was named **System Interactivity** of E-government Infrastructure and that because of the high loadings by the items: Q33, Q37. And this factor explained 22.85% of the variance. The third derived factor is named **System Flexibility** of E-government Infrastructure. And that because of the high loadings of the items: Q31, Q40(questionnaire in appendices 3). This factor explained 15.95% of the variance. The communalities values of E-government Infrastructure items were between (0.490-0.749) and were all of them were greater than (0.30), and the values of the commonalities show that the percentage of variation in the given by variable, which the extracted factors are can explain this construction. Table 3.3 illustrates that 6 questions relating to the **trust** dimension the analysis gave two factors and explained 67.42% of the variance for the current set of variables.

The first derived factor was named as **Trust in the system** of trust dimension because of the high loadings by the items: Q54, Q53(questionnaire in appendices 3). And this factor showed an ability to explain 34.11% of all variance. The second derived factor was named as **Trust in the government** of the trust dimension and that because of the high loadings by the items: Q58, Q57(questionnaire in appendices 3). The factor showed an ability to explain 33.31 % of the whole variance .All the communalities values of trust items came between (0 540-0.784), and all of them were greater than (0.30), and these values show that the percentage of variation, which extracted factors showed the ability to explain or interpret.

Table 3.3 illustrates that 3 questions relating to the Experience dimension the analysis produced four factors that explain 68.42% of the variance for the current set of variables. This factor was named Experience dimension and the high loadings by the items: Q47, Q46 (questionnaire in appendices 3). And this factor shows an ability to explain 68.42% of the total variance. The whole communalities values of **Experience** items came between (0.606-0.775) and that greater than (0.30), which means that the extracted factor showed the ability to explain or interpret.

Finally, Table 3.3 illustrates that 4 questions relating to the Behaviour Intention dimension. The analysis produced four factors that explain 63.254% of the variance for the current set of variables. This factor was named Behavior Intention dimension because of the high loadings by the items: Q42, Q41 (questionnaire in appendices 3). This factor can explain 63.254% of the total variance. Finally, the commonalities values of **Behaviour Intention** items came between (0.509-0.783), which is higher than (0.30), and that means the extracted factor showed the ability to interpret.

3.3.2 Confirmatory Factor Analysis (Hungarian sample)

Step 1: Model fit of the structural model

Fit refers to the ability of a model to represent the data. Specifically, in CFA, a model fit refers to how closely observed data match the relationships specified in a hypothesized model. (Bollen, 1989) also, there are cutoff criteria to consider Goodness-of-Fit Indicators of Models; in below table illustrates that.

Table 3.4 Cutoff Criteria* (own editing)

Measure	Terrible	Acceptable	Excellent
CMIN/DF	> 5	> 3	> 1
CFI	<0.90	<0.95	>0.95
P Close	<0.01	<0.05	>0.05

*(Gaskin & Lim, 2018)

To measure study models fitting, SEM approach was used with IBM SPSS-AMOS program in below all study dimensions as we see the results in table.3.4.

Table 3.5 Goodness-of-Fit Indicators of Model (n = 106) (own editing)

	Human-E government interaction		
Measure	Estimate	Threshold	Interpretation
CMIN (χ^2 value)	55.939	--	--
DF	59	--	--
CMIN/DF	0.948	Between 1 and 3	Excellent
CFI	1.000	>0.95	Excellent
P Close	0.918	>0.05	Excellent
	E-government Infrastructure		
CMIN (χ^2 value)	65.298	--	--
DF	41	--	--
CMIN/DF	1.593	Between 1 and 3	Excellent
CFI	0.934	>0.95	Acceptable
P Close	0.119	>0.05	Excellent
	Trust		

CMIN (χ2 value)	7.098	--	--
DF	6	--	--
CMIN/DF	1.183	Between 1 and 3	Excellent
CFI	0.994	>0.95	Excellent
P Close	0.472	>0.05	Excellent
	Experience		
CMIN (χ2 value)	0.669	--	--
DF	1	--	--
CMIN/DF	0.669	Between 1 and 3	Excellent
CFI	1	>0.95	Excellent
P Close	0.468	>0.05	Excellent
	Behaviour Intention		
CMIN (χ2 value)	0.450	--	--
DF	1	--	--
CMIN/DF	0.450	Between 1 and 3	Excellent
CFI	1	>0.95	Excellent
P Close	0.555	>0.05	Excellent

Table 3.5, p-value>0.05, and CFI value greater than 0.95 all criteria are acceptable and mean the model is fit.

Step 2: Path analysis and Standardized Loadings for study factors

Standardized Loadings for **4-Factor** Confirmatory Model of **Human-E government interaction**. Figure Appx 1.6 (In the Appendices 1) showed that the covariance values between externalizing and internalizing latent variables are 21- 61, and these values less than 0.70 and acceptable. Moreover, the figure showed that the correlation between externalizing and internalizing latent variables is 0.59 - 0.90, and these values greater than 0.50 and acceptable. Figure Appx 1.7 (In the Appendices 1) Standardized Loadings for 3-Factor Confirmatory Model of **E-government Infrastructure** the covariance values between externalizing and internalizing latent variables are 0.53 – 0.64, and these values are acceptable. Moreover, the figure showed that the correlation between externalizing and internalizing latent variables is correlated with the values of correlation between externalizing and internalizing latent variables, which are 0.54 to 0.79, and these values more than 0.50, and that is acceptable values.

Figure Appx 1.8 (In the Appendices 1) Standardized Loadings for 2-Factor Confirmatory Model of **Trust,** The showed that the covariance value between externalizing and internalizing latent variable is 0.58, and this value less than 0.70, and that is an acceptable value. Moreover, the figure showed that the correlation between externalizing and

internalizing latent variables is 0.61 to 0.97, and these values are more than 0.50 and are acceptable values.

Figure Appx 1.9 (In the Appendices 1) of **Experience** showed that the correlation between externalizing and internalizing latent variables is 0.62 - 0.91, and these values more than 0.40 and it is acceptable values. Finally, Figure Appx 1.10 (In the Appendices 1) of **Behaviour Intention** showed that the correlation between externalizing and internalizing latent variables is 0.62 - 0.91, and these values are more than 0.50, and it is acceptable values. Finally, the results of the path analysis of all the variables match with EFA.

3.3.3 Exploratory Factor Analysis: assumptions for the pilot study (Jordan sample)

Factorability of the correlation matrix

As we did with the Hungarian data before doing an extract for the factors the research used some tests include the correlation matrix, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and Bartlett's Test of Sphericity. As shown in Table Appx 2.2 (Appendices 2), the significant values came between (0.0005 and 0.389) for all factors and that acceptable statistically at (0.00001) level also this confirm that there is no "Multicollinearity" furthermore, there is no linear overlap between columns or rows within the matrix or unrealistic correlation between variables. To conclude, all the requirements to check the factorability of the correlation matrix have been met (Yong & Pearce, 2013).

A. Kaiser Criterion

From table 3.6 , noticed that the **Human E-government interaction** scale consists of two factors depend on Eigenvalues are greater than one “Kaiser’s criteria (Eigenvalue > 1 rule)” and the cumulative percent of variance extracted > 0.50 for two factors together. Cumulative percent of variance extracted from four factors are (67.41%).

E-government Infrastructure consists of three factors, and their cumulative percent of variance extracted > 0.50. **Trust** consists of two factors, and cumulative per cent of variance extracted from the four factors were (88.21%). **Experience** consists of one factor and percent of variance extraction (55.70%). Extraction Sums of Squared Loadings from one factor is (55.70%). **Behavior Intention** consists of one factor and percent of variance extraction (63.77%). Extraction Sums of Squared Loadings from one factor is (63.77%), and all the mentioned values for the new factors are accepted according to (Hair et al., 2006).

Table 3.6 Total Variance Explained by Human-E government interaction (own editing)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Eigenvalue	% Variance	%Cumulative	Eigenvalue	% Variance	%Cumulative
	Human-E government interaction					
1	3.161	39.517	39.517	3.106	38.837	38.837
2	2.232	27.895	67.412	2.286	28.575	67.412
3	.676	8.447	75.859			
4	.643	8.043	83.902			
5	.613	7.658	91.560			
	E-government Infrastructure					
1	4.743	47.434	47.434	3.326	33.260	33.260
2	1.958	19.580	67.014	2.547	25.466	58.726
3	1.135	11.349	78.364	1.964	19.637	78.364
4	.740	7.402	85.766			
	Trust					
1	4.526	56.570	56.570	3.728	46.595	46.595
2	2.531	31.636	88.206	3.329	41.611	88.206
3	.312	3.901	92.106			
4	.231	2.884	94.990			
5	.168	2.094	97.084			
	Experience					
1	2.228	55.699	55.699	2.228	55.699	55.699
2	.853	21.333	77.032			
3	.540	13.492	90.524			
	Behaviour Intention					
1	2.551	63.774	63.774	2.551	63.774	63.774
2	0.603	15.069	78.843			
3	0.515	12.868	91.712			

B. The second criterion Scree Test

In appendices 1 Figure Appx 1.11 , the results confirm that the data must be extracted in 2 factors in Human-E government interaction. And Figure Appx 1.12 confirm that E-government Infrastructure data must be extracted in 3 factors. And Figure Appx 1.13 confirms that just two factors may be adequate to summarize the data in Trust. And Finally, Figure Appx 1.14 for Experience .Finally, Figure Appx 1.15 (Appendices 1) Behaviour Intention shows that the data must be extracted in just 1 factor.

C. Third: Confirm the items of factors

Table 3.7 illustrates that 8 questions relating to the **human-E government interaction** dimension were analyzed using (PCA) with Varimax (orthogonal) rotation. The analysis yielded four factors explaining a total of 67.41% of the variance for the entire set of variables.

The first derived factor was named as **Performance expectancy** of human-E government interaction because of the high loadings by the items: Q8, Q9 (Appendices 3). And the same factor explained 38.84% of the whole variance. The second derived factor was named Effort expectancy of human-E government interaction because of the high loadings by the items: Q14, Q10. And the variance explained by the same factor was 28.58%. All the communalities values of human-E government interaction items came between (0.450-0.907) and all of them were greater than (0.30), which means the extracted factors showed the ability to interpret. Considerably, this means that we have identified two clear patterns of response among human-E government interaction respondents: pattern of **Performance expectancy** and the pattern of **Effort expectancy.**

Table 3.7 also, illustrates that 10 questions relating to the **E-government Infrastructure dimension**. The analysis yielded three factors explaining a total of 78.36 % of the variance for the entire set of variables. The first derived factor was named the **System Interactivity** of E-government Infrastructure because of the high loadings by the items: Q32, Q33(Appendices). And the same factor explained 33.26% of the whole variance. The second derived factor was named as **Facilitating conditions**. Because of the high loadings by the items: Q27, Q29 (Appendices 3). And the variance explained 25.47%.by this factor from the whole variance. The third derived factor (Factor 3) was named **System Flexibility** because of the high loadings by the items: Q38, Q40 (Appendices 3).and the variance explained 19.64% of the whole variance. All the communalities values of E-government Infrastructure items came between (0.457-0.886) and all of them were greater than (0.30), and these values mean the extracted factor showed the ability to interpret.

Table 3.7 illustrates that 8 questions relating to the **trust dimension**. The analysis produced two factors that explain a total of 88.21% of the whole variance. Four items were loaded inside (Factor 1), and all of these four items were related to government agencies and trust. Therefore, this factor was named "**Trust in the government**." Also, the same factor explained 46.60% of the whole variance. Items for (Factor 2) identified E-government portals and other system services and how users feel toward them. This factor was labeled "**Trust in the system**" also, the same factor explained 41.61% of the whole variance. All the

communalities values of trust items came between (0.787-0.951) and all of them were greater than (0.30), and these values show that the extracted factors showed the ability to interpret.

Table 3.7 Matrix of factors, Loadings, and Communalities (own editing)

Items	Loadings			Communalities
	Human-E government			
	Factor 1*	Factor 2*		
Q8	0.952	---		0.907
Q9	0.937	---		0.878
Q7	0.934	---		0.873
Q6	0.665	---		0.450
Q14	---	0.822		0.680
Q10	---	0.765		0.588
Q13	---	0.717		0.515
Q11	---	0.709		0.503
Eigenvalue	3.106	2.286		67.41 (% Cumulative of Variance)
% of Total Variance	38.84	28.58		
	E-government Infrastructure			
Q32	0.882	----	----	0.845
Q33	0.881	----	----	0.843
Q31	0.864	----	----	0.816
Q30	0.837	----	----	0.822
Q27	----	0.890	----	0.836
Q29	----	0.868	----	0.886
Q28	----	0.838	----	0.830
Q38	----	----	0.899	0.811
Q40	----	----	0.831	0.692
Q39	----	----	0.655	0.457
Eigenvalue	4.743	1.958	1.135	78.36 (% Cumulative of Variance)
% of Total Variance	33.26	25.47	19.64	
	Trust			
Q51	----	0.904		0.829
Q52	----	0.880		0.787
Q53	----	0.920		0.871
Q54	----	0.903		0.835
Q55	0.953	----		0.934
Q56	0.961	----		0.941
Q57	0.966	----		0.951
Q58	0.947	----		0.909
Eigenvalue	3.728	3.329		88.21 (% Cumulative

% of Total Variance	46.60	41.61		of Variance)
	Experience			
Q46	0.743			0.552
Q47	0.838			0.702
Q49	0.624			0.389
Q48	0.765			0.585
Eigenvalue	2.228			55.67(% Cumulative of Variance)
% of Total Variance	55.67			
	Behaviour Intention			
Q41	0.809			0.654
Q42	0.857			0.735
Q43	0.750			0.562
Q45	0.774			0.599
Eigenvalue	2.551			63.77 (% Cumulative of Variance)
% of Total Variance	63.77			

** Extraction technique: (PCA), Rotation technique: (VKN)*

Moreover, Table 3.7 shows that 4 questions relating to the **Experience** dimension. The analysis produced only one factor that explains 55.67% of the whole variance. This factor is given a name as **Experience** dimension because of the high loadings by the items: Q47, Q48 (Appendices 3) which are related to experience, and the same factor explained 55.67% of the whole variance. All the communalities values of experience items came between (0.389-0.702) and all of them were greater than (0.30), which means the extracted factors showed the ability to interpret.

Finally, Table 3.7 illustrates that 4 questions relating to the **Behaviour Intention dimension**. The analysis yielded four factors explaining a total of 63.77% of the variance for the entire set of variables. This factor was named as **Behaviour Intention** dimension because of the high loadings by the items: Q42, Q41 (Appendices 3) which are related to the same name. Moreover, the same factor explained 63.77% of the whole variance. All the communalities values of Behaviour Intention items came between (0.562-0.735) and all of them were greater than (0.30), which means that the extracted factor showed the ability to interpret.

3.3.4 Confirmatory Factor Analysis (Jordan sample)

Step 1: Model fit of the structural model

To measure study models fitting, SEM approach used with IBM SPSS-AMOS program in below all study dimensions:

Table 3.8 Goodness-of-Fit Indicators of Model (n = 106) (own editing)

Measure	Estimate	Threshold	Interpretation
CMIN (χ^2 value)	27.457	--	--
DF	19	--	--
CMIN/DF	1.445	Between 1 and 3	Excellent
CFI	0.996	>0.95	Excellent
P Close	0.900	>0.05	Excellent
	E-government Infrastructure		
CMIN (χ^2 value)	59.027	--	--
DF	31	--	--
CMIN/DF	1.904	Between 1 and 3	Excellent
CFI	0.972	>0.95	Excellent
P Close	0.067	>0.05	Excellent
	Trust		
CMIN (χ2 value)	31.300	--	--
DF	17	--	--
CMIN/DF	1.841	Between 1 and 3	Excellent
CFI	0.990	>0.95	Excellent
P Close	0.149	>0.05	Excellent
	Experience		
CMIN	0.093	--	--
DF	1	--	--
CMIN/DF	0.093	Between 1 and 3	Excellent
CFI	1.000	>0.95	Excellent
P Close	0.789	>0.05	Excellent

From table 3.8, all criteria are acceptable, and that means the model is fit.

Step 2: Path analysis and Standardized Loadings for study factors

Standardized Loadings for 2-Factor Confirmatory Model of Human-E government interaction, Figure Appx 1.16 (In Appendices 1) showed that the covariance values between externalizing and internalizing latent variables are 0.09, and these values less than 0.70, and it is acceptable values. Moreover, the figure showed that the values of correlation between internalizing latent variables are 0.53 - 0.96, and these values more than 0.50, and it is acceptable values. Standardized Loadings for 3-Factor Confirmatory Model of E-government Infrastructure, Figure Appx 1.17 (In Appendices 1) showed that the covariance values between externalizing and internalizing latent variables are 0.04 - 0.65, and these values less than 0.70, and it is acceptable values. Moreover, the figure showed that the correlation between externalizing and internalizing latent variables is 0.74 -0.95, and these values are more than 0.50, and it is an acceptable value.

Standardized Loadings for 2-Factor Confirmatory Model of Trust, Figure Appx 1.18 (In Appendices 1) showed that the covariance value between externalizing and internalizing latent variable is 0.28, and this value less than 0.70 and it is an acceptable value. Moreover, the figure indicates that the values of correlation between externalizing and internalizing latent variables are 0.83 -0.97, and these values greater than 0.50 and it is acceptable values.

Figure Appx 1.19 (In Appendices 1) Experience showed that correlation between externalizing and internalizing latent variables is 0.51 - 0.88, and these values are more than 0.50, and it is acceptable. And finally, Behavior Intention, Figure Appx 1.20 (In Appendices 1) showed that the correlation between externalizing and internalizing latent variables is 0.63 - 0.74 and these values more than 0.50, and it is acceptable values. Furthermore, the results of the path analysis of Behavior Intention match with EFA.

The Result Of The Pilot Study Summary And Discussion.

In this pilot test, the researcher removed the vague and confusing questions, determined the time taken to complete the survey, and checked for the proper sequencing of the questions. The feedback and Recommendations were used to finalize the content of the questionnaire. Several items were re-sorted to make them more convenient for the respondents. Several sentences were rephrased and reword to suit the objectives of the study, Finally, the researcher identified the common factors between the two countries to make a comparison.

This research suggested three main variables: Human E-government interaction (5 sub-factors), E-government Infrastructure (4 sub-factors), and trust (2 sub-factors). And From the previous studies, all the sub-factors that fall under these variables were identified, and after the pilot study, which went through two main stages: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis, tests applied (CFA) To confirm and extract the proposed factors under the main variables, sifting and sorting and finalizing the questionnaire for distribution to the final sample and finally create one joint model from common factors between the two countries to make a comparison. the . In the first stage (EFA), three tests were carried out:

- Kaiser Criterion: After distributed the questionnaire in both countries this analysis showed the common number of factors under two main variables in both countries: government Infrastructure three factors , two factors in trust, and in Human E-government interaction is two factors, and this results can make the compression possible with 7 shared factors in the final framework in both countries.

- Screen Test: It is a second analysis to confirm the results of the first analysis, and the results of this test confirmed the factors' numbers.

- Extraction items of factors: It is an analysis process to extract the factors and ensure the validity of the questionnaire questions confirmed in the previous two analyses. The results for the proposed factors were:

In both countries, the results showed one joint model for the comparison and the final framework shows that the system characteristics merged the three factors in two factors: System Interactivity and system flexibility, and excluded the system enjoyment. Moreover, from the original model: habit, awareness and social influence factors were excluded after the three analyzes test. after the three analyzes test as the final framework for both countries shows the 7 shared factors in both countries in Figure 3.3 which can make the comparison between the two countries possible in Chapter.5.

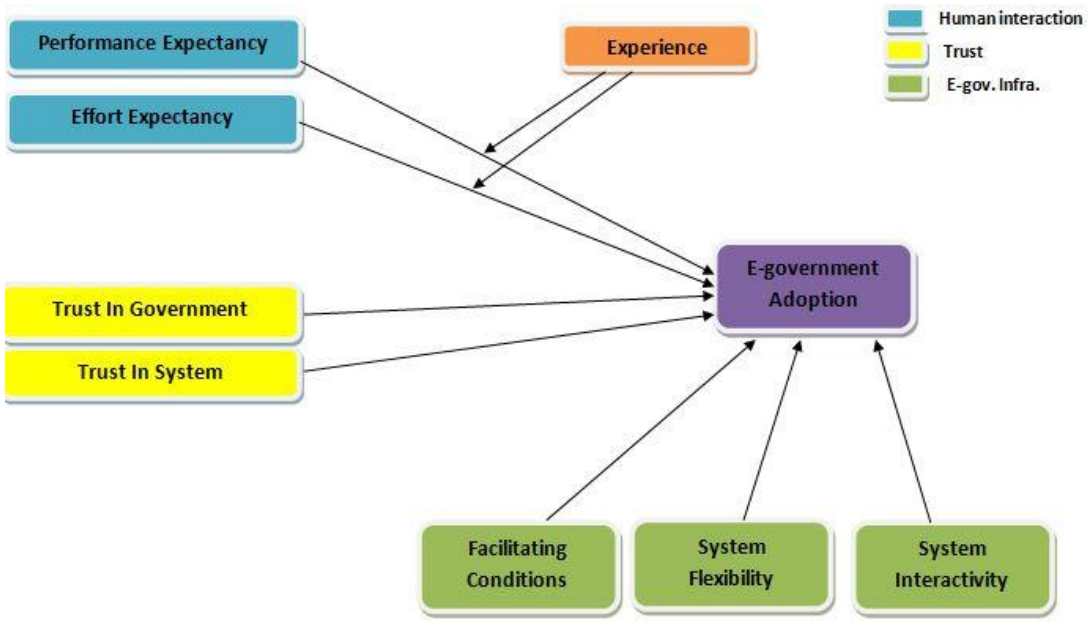


Figure 3. 3 The final joint framework after the pilot study for the comparison (own editing)

Changes on the questionnaire: The original questionnaire contained (53) questions used for the pilot study (Appendices 3) after analyse the pilot study results the changes were: 34 questions remained as valid and clear questions for the final version of the questionnaire for both countries and excluded the questions (Q12, Q15, Q16, Q17, Q18, Q19, Q20, Q 21, Q22, Q23, Q24, Q25, Q26, Q34, Q35, Q36, Q37, Q44, Q50) the researcher attached the original questionnaire in Appendices 3 with all items but the researcher used the original questionnaire after excluded the mentioned questions in both countries.

3.4 Discriminant and Convergent Validity (both countries)

The current study used the CFA technique to make and validate the measurement for the unobservable or latent variables. The CFA was created according to the theoretical search and understanding that determined the covariation and variation within the variables the study observed, which include indicators, latent variables, unobserved variables, and measurement errors(DeCoster, 1998) It identified if factors and loadings of the measured variables on them fit to what was expected according to pre-established theory. Therefore, CFA tried to clarify the variation and covariation in a group of observed variables in terms of a set of theoretical and unobserved factors (Suhr, 2006).

Table 3.9 CFA discriminant and convergent validity (own editing)

Variables	CR	AVE	CR	AVE
	Hungary		Jordan	
Performance expectancy	**0.912**	**0.724**	**0.931**	**0775**
Effort expectancy	**0.840**	**0.636**	**0.841**	**0.570**
System Interactivity	**0.916**	**0.688**	**0.926**	**0.757**
Facilitating conditions	**0.901**	**0.696**	**0.911**	**0.775**
System Flexibility	**0.869**	**0.690**	**0.854**	**0.664**
T.in. Sys.	**0.810**	**0.681**	**0.946**	**0.813**
T.in. Gov	**0.757**	**0.628**	**0.977**	**0.916**
Experience	**0.764**	**0.723**	**0.833**	**0.557**
Behavior Intention	**0.793**	**0.823**	**0.875**	**0.638**

Composite Reliability (CR)> 0.70, Average Variance Extracted (AVE) >0.50, (Catalán, 2019; MacKenzie, Podsakoff, & Podsakoff, 2011; Shaffer, DeGeest, & Li, 2016)

Table 3.9 shows that the (CR) of all the latent constructs is more than 0.70 and the average variance extracted (AVE) more than 0.50, and that confirms that the constructs have very good reliability and convergent validity (MacKenzie et al., 2011; Shaffer et al., 2016). The discriminate validity between the rest of the variables examined by cross Loadings n cross-loadings, the researcher examines the various items to identify those with high loadings on the same construct and those that load highly on multiple constructs. Thus, establishing discriminate validity at the item level means a high correlation between items of the same construct and a very weak correlation between items of a different construct. As simple as this approach is, it has no theoretical justifications or empirical proof (Henseler, Ringle, & Sarstedt, 2015). Also, finding and results in chapter 4 will show the model-fit indices of the Covariance Structure Model.

3.5 Reliability (both countries)

Table 3.10 Reliability of instrument of E-government acceptance using Cronbach alpha method for internal consistency (own editing)

Hungarian sample					
Main factors	**Dimensions**	**No. of items**	**Cronbach alpha**	**Skewness**	**Kurtosis**
Human - E-government interaction	Performance expectancy	4	0.818	-0.402	1.095
	Effort expectancy	4	0.710	-0.687	0.834
E-government Infrastructure	Facilitating conditions	3	0.791	-0.276	0.161
	System Interactivity	4	0.762	-0.317	0.601
	System Flexibility	3	0.701	-0.360	0.749
Trust	Trust in system	4	0.753	-0.230	0.340
	Trust in government	4	0.736	-0.217	0.015
Experience		4	0.769	-0.045	-0.063
Behaviour Intention		4	0.800	-0.159	0.194
Jordan sample					
Main factors	**Dimensions**	**No. of items**	**Cronbach alpha**	**Skewness**	**Kurtosis**
Human - E-government interaction	Performance expectancy	4	0.713	-0.718	0.420
	Effort expectancy	4	0.750	-0.961	1.640
E-government Infrastructure	Facilitating conditions	3	0.861	-0.395	0.677
	System Interactivity	4	0.821	-0.772	1.403
	System Flexibility	3	0.701	-0.745	0.682
Trust	Trust in system	4	0.781	-0.195	-0.096
	Trust in government	4	0.722	-0.054	0.434
Experience		4	0.719	0.014	-0.410
Behavior Intention		4	0.830	-0.260	0.267

Table 3.10 shows the reliability results for the dimensions representing Cronbach alpha technique for internal consistency. The values came between (0.701-0.861), and that is a high result and confirms high reliability. The values to be accepted and reliable have to be greater than 0.60(> 0.60), which is acceptable reliability, and in the last table, most of the values were > 0.70, and that means the current values confirm high reliability according to (Santos, J. Reynaldo A., 1999). Also, the above table indicates that multivariate normality assumption is met by values of Skewness and Kurtosis, and these values within acceptable range ±1 for Skewness and ±2.5 Kurtosis (Hair et al., 2006). As all measurement models were validated via CFA with high reliability, in chapter 4 will discuss the covariance structure model to perform the hypotheses testing.

4. RESEARCH FINDINGS AND THEIR EVALUATION

4.1 Population And Sampling Size For The Main Research

Many previous studies have shown that educated people who can use the Internet are the ones who are the first to use any technological system (Al-Hujran et al., 2011) and these early adopters play the most important role to measure the success of the system and as Al-Hujran et al., (2011) added that they would have a decisive role in motivating potential users to use the system. In the beginning, the people who embrace technology are the ones who value technology for its own; therefore, in this study, the internet users are the population to conduct the research.

Sample size

Subsequently, this study used a quantitative research method in the third stage, where questionnaires were distributed to collect data from citizens in Jordan and Hungary to measure the acceptance of e-government services. According to (Uma Sekaran, 2016), this data collection method (questionnaire) is more suitable if the sample size is large and its subjects stay in a wide geographic area. The population for this study (Jordan 6.78 million, Hungary 7.5 million (Global Digital Insights, 2020; Hungarian central statistics office, 2020)) is scattered throughout Jordan and Hungary.

It would be ideal for conducting the study on the entire population of citizens in Jordan and Hungary. However, since the population is huge, it is impossible to include every member.

A sample of such population was used, which was based on the Yamane, (1967) equation which reveals that:

$$n = \frac{N}{1 + N(e)^2}$$

where n = sample of study, N = population of study, and e (precision) = 0.05. As the previous equation applied, the sample size of this research population, where N is 9 m and 8 m citizens, is determined to be 351 for both countries.

Survey administration

Determining the method of distributing the questionnaire is a very important and sensitive step, as the researcher determines the most appropriate method for collecting information from the selected sample, and that is by different methods: either through traditional mail, e-mail, phone call, personally or using electronic forms via the Internet (Uma Sekaran, 2016) and each method of what we mentioned has advantages and disadvantages, but choosing the

appropriate method depending on the research conditions, the selected sample, costs and available time.

In this research, it was decided that the distribution would take place directly in person in different regions in the two countries, but with the beginning of 2020 and the spread of the Corona virus, the researcher turned to electronic forms via the Internet that does not require direct contact with the participants. And this method is scientific and has been used in much previous research and will be suitable for this research (Uma Sekaran, 2016).

Translation

The distribution of the questionnaire targets different groups and different scientific levels in the two countries (Jordan and Hungary), so the questionnaire must be translated into the Arabic and Hungarian languages, which is the mother tongue of the residents of the two countries, to ensure better understanding by the respondents and thus better results. The questionnaire was translated and revised from English with the help of specialized linguists in both countries.

4.1.1 Sample Description

Hungary sample

It was a challenge for the researcher to collect information from the selected sample, and for reasons related to the spread of the COVID19 virus, the researcher chose to use social media platforms to collect the data, specifically Facebook, and that is it is the most widespread in the two countries.

The researcher conducted a campaign to share the online questionnary link on Facebook using the "Facebook advertisment services" from mid-June until the beginning of July, and according to the indicators, the questionnaire link reached about 10,000 users, and the response can be estimated at a rate of 0.035 %, the low percentage is since the respondents always neglect the electronic forms.

Outliers and missing data among cases

Before the EFA and Confirmatory Factor Analysis CFA analysis, the data were evaluated for univariate and multivariate outliers by examining Mahalanobis distance for each participant. An outlier was defined as a Mahalanobis score that was over than Mahal. Critical score cv= 46.52. There are five values detected as univariate or multivariate outliers, and it excluded from the dataset—also, no missing values in all variables. The final sample consists of 351 useable responses for inferential data analysis. Table 4.1 shows the composition of the data.

Table 4.1Demographic data *(Hungary* sample) *(*own editing)

Demographic data	Categories	Count	%
Gender	Female	234	66.7%
	male	117	33.3%
	Total	351	100.0%
Education levels	Primary school	16	4.6%
	Secondary school	246	70.1%
	Bachelors' degree	58	16.5%
	Master / Postgraduate degree	25	7.1%
	PhD	6	1.7%
	Total	351	100.0%
Age groups	Under 25 years	177	50.4%
	26-45	75	21.4%
	46-55	2	0.6%
	55 and above	97	27.6%
	Total	351	100.0%
Internet usage	About once a month	1	0.3%
	A few times a month	2	0.6%
	About once a day	16	4.6%
	Several times a day	332	94.6%
	Total	351	100.0%
Monthly income	Less than 500 USD	151	43.0%
	500-1000 USD	85	24.2%
	1000-1500 USD	25	7.1%
	More than 1500 USD	10	2.8%
	I prefer not to say	80	22.8%
	Total	351	100.0%

Table 4.1 provides the frequency distribution for the participants' gender. According to Table 4.1, female the majority part of the participants at 66.7%. The remaining male groups were 33.3%. Also, the table provides the distribution of the participants' education levels. It illustrates that those having Secondary school degrees constitute the majority part of the participants (70.1%) while those having doctoral degree constitute the minority of the participants with percent (1.7%).

The third part of Table 4.1 indicates the distribution for the participants' age. According to the table, those who have Under 25 years old the largest part of the participants with 50.4%, while those with 46-55 years old minority part of the participants were 0.6%. Also, 94.6% of the sample answered, "Several times a day " about the question "How often do you use the internet?" but the answer "About once a month" has the lowest percentage in the previous question with 0.3%. finally, most of the sample earn Less than 500 USD with (43.0%) percent, but 2.8% of the sample earn More than 1500 USD.

Jordan sample

As mentioned previously, it was challenging to access the sample in collecting the data from Hungary. Therefore, the researcher also decided to use social platforms, and the most common website among the Jordanians is Facebook.

The campaign started on Facebook, at the same time the campaign started in Hungary from mid-June until the beginning of July. Facebook indicators showed that the link of the questionnaire reached abou 8,000 users, and the response rate was around 0.044 %. This is due to the lack of seriousness of users when they see electronic forms.

Outliers and missing data among cases

Before the EFA and CFA analysis, the data were evaluated for univariate and multivariate outliers by examining Mahalanobis distance for each participant. An outlier was defined as a Mahalanobis score that was over than Mahal. Critical score cv= 45.52. there are four values detected as univariate or multivariate outliers, and it excluded from the dataset—also, no missing values in all variables. The final sample consists of 356 useable responses for inferential data analysis. Table 4.2 shows the composition of the data.

Table 4.2 Demographic data (Jordan) (own editing)

Demographic data	Categories	Count	%
Gender	Female	226	63.5%
	Male	130	36.5%
	Total	356	100.0%
Education levels	Secondary school	19	5.3%
	Bachelors' degree	240	67.4%
	Master / Postgraduate degree	79	22.2%
	PhD	18	5.1%
	Total	356	100.0%
Age groups	Under 25 years	154	43.3%
	26-45	115	32.3%
	46-55	7	2.0%
	55 and above	80	22.5%
	Total	356	100.0%
Internet usage	About once a month	1	0.3%
	A few times a month	3	0.8%
	About once a day	16	4.5%
	Several times a day	336	94.4%
	Total	356	100.0%
Monthly income	Less than 500 USD	140	39.3%
	500-1000 USD	91	25.6%

	1000-1500 USD	27	7.6%
	More than 1500 USD	19	5.3%
	Prefer not to say	79	22.2%
	Total	**356**	**100.0%**

Table 4.2 provides the frequency distribution for the participants' gender. According to Table 4.2, males the majority part of the participants at 63.5%. The remaining male groups were 36.5%. Also, the table provides the distribution of the participants' education levels. It illustrates that those having Bachelors' degree constitute the majority part of the participants (67.4%) while those having doctoral degree constitute the minority of the participants with percent (5.1%).

The third part of Table 4.2 indicates the distribution for the participants' age. According to the table, those who have Under 25 years old the largest part of the participants with 43.3%, while those who have 46-55 years old minority part of the participants 2%. Also, 93% of the sample answered, " Several times a day "about the question "How often do you use the internet?" but the answer "About once a month" has the lowest percentage in the previous question with 0.3%. finally, most of the sample earn Less than 500 USD percent (39.3%), but 5.3% of the sample earn More than 1500 USD.

Normality Assumptions

Assumption 1: The residuals variance is constant. The standardized residuals plot versus the values of standardized predicted shown no apparent signs of funneling, which means homo scedasticity suggesting assumption was met.

Assumption 2: The residuals values were distributed normally . The plot of Histogram and P-P for the model supported the assumption and assumption was met.

Assumption 3: The assumption of multivariate normality is regularly assessed by skewness and kurtosis coefficients, but more tests can be used to support the results. The test of multivariate skewness and kurtosis is available widely. Additionally, when the assumption of multivariate normality is valid, the univariate and bivariate normality is supposed to be true. (Kyriazos, 2018).

4.2 Results for Hungary

This research tested four main hypotheses for the joint model in Hungary. This part would discuss if the dataset supported these hypotheses according to the structural equation modeling analysis results. The conceptual study model in Figure 4.1 showed the standardized regression weights of the relationships between exogenous and endogenous variables. The significant relationship between exogenous and endogenous variables is shown alongside the "*" star. The conceptual study model depicted in Figure 4.1 illustrates the standardized regression weights of the relationships between variables as the detailed results come in the next two sections.

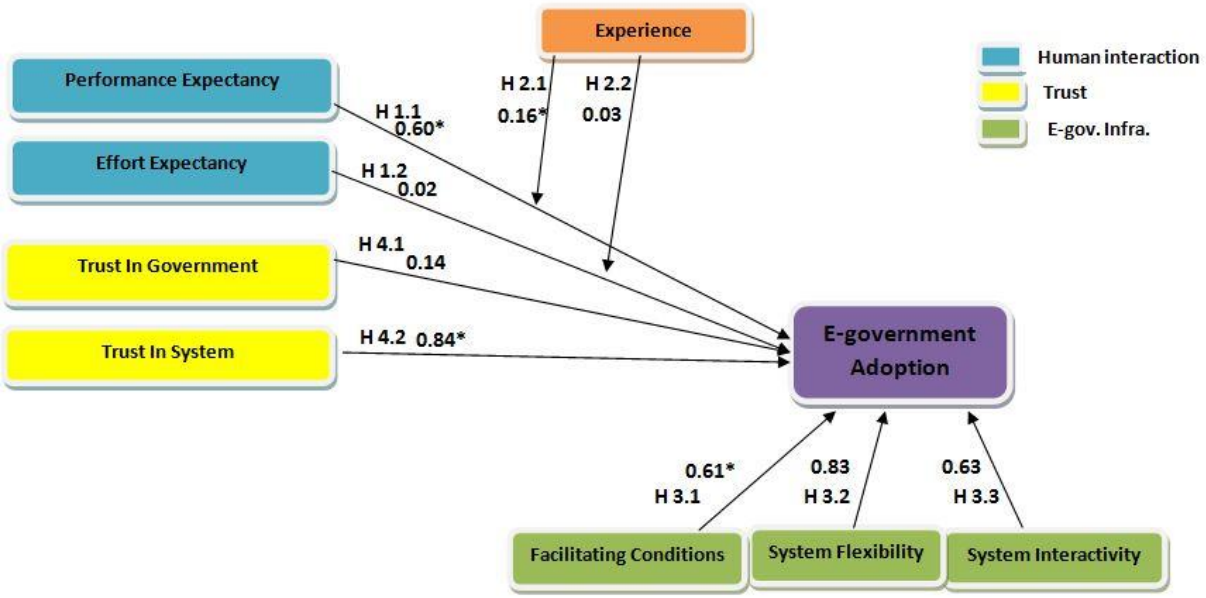


Figure 4.1 The Hypothesized pathways with SRC, *P < .0 (own editing)

4.2.1 Descriptive Model

As shown in Table 4.3., Performance expectancy reflected the most factor within human-E government interaction influence on Behavior Intention, with a mean and SD 3.50 (.688) respectively. The facilitating conditions reflect the greatest factor in the impact of e-government infrastructure on the behavioral intent of 3.67 (0.596), respectively. On the other hand, in the trust dimension, Trust in the system was the most factor effect on Behavior Intention with 3.38 (0.708). Finally, Experience has a moderate level from sample viewpoint with 3.07 (0.707).

Table 4.3 Mean, and standard deviation of factors influence behavior intention (own editing)

Factors	N	M(SD)	Skewnes	Kurtosis
Performance expectancy	351	3.50(0.688)	-0.405	0.086
Effort expectancy	351	3.35(0.737)	-0.692	0.830
Facilitating conditions	351	3.67(0.596)	-0.285	0.178
System Interactivity	351	3.23(0.639)	-0.321	0.592
System Flexibility	351	3.38(0.654)	-0.366	0.748
Trust in system	351	3.38(0.708)	-0.236	0.336
Trust in government	351	3.34(0.757)	-0.222	0.009
Experience	351	3.07(0.707)	0.030	-0.125

Table 4.4. indicate that Behavior Intention to accept e-government in Hungary was high with a mean, and standard deviation of 3.50 (0.671), and Skewness and Kurtosis reflect the normal distribution of responses.

Table 4.4 Mean and standard deviation of Behavior Intention.(own editing)

Factors	N	M(SD)	Skewness	Kurtosis
Behavior Intention	351	3.50 (0.671)	-0.166	0.197

4.2.2 Human-E government Interaction (Covariance Structure Model)

Figure 4.2 displays the covariance structure model between human-E government interaction model and Behavior Intention model.

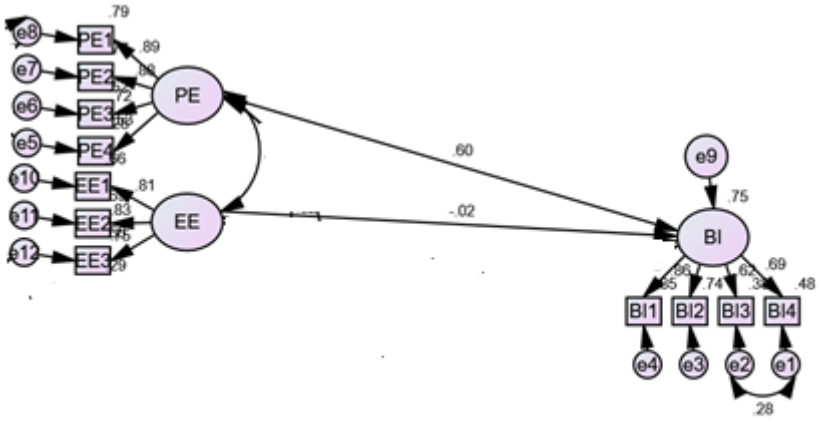


Figure 4.2 Revised Covariance Structure Model (Human-E government interaction) (own editing)

The hypothesized causal relations among exogenous and endogenous variables of the study can be seen in all the arrows between the variables in the last figure, while the predictive capacity of any item of the latent variables can seen in every single arrow between indicators

and variables symbolizes . Table 4.5 presents the parameter estimates of the revised model for the covariance structure model. As the table shows, all the indicators and correlations amongst measurement errors were statistically significant at the significant level of 0.05, except for the exogenous variable Effort expectancy since it had value greater than 0.05.

Table 4.5 Parameter Estimates and Regression Weights for the CSM (own editing)

Final Model						
Indicators			**SRW***	**URW***	**S.E.***	**P**
BI	<---	PE	0.604	0.475	.111	***
BI	**<---**	**EE**	**-0.015**	**-0.014**	**0.092**	**0.878**
BI4	<---	BI	0.689	0.865	0.106	***
BI3	**<---**	**BI**	**0.615**	**0.828**	**0.120**	*******
BI2	<---	BI	0.858	0.905	0.076	***
BI1	**<---**	**BI**	**0.921**	**1.000**		
PE4	<---	PE	0.533	0.494	0.088	***
PE3	**<---**	**PE**	**0.720**	**0.689**	**0.081**	*******
PE2	<---	PE	0.877	0.957	0.081	***
PE1	**<---**	**PE**	**0.889**	**1.000**		
EE3	<---	EE	0.749	0.994	0.131	***
EE2	**<---**	**EE**	**0.832**	**0.990**	**0.120**	*******
EE1	<---	EE	0.810	1.000		

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

In Table 4.6 it shows the goodness of fit the covariance structure model final model, and the table represents a well-fit covariance structure model through all the statistical models which provided enough indices. However, Effort expectancy was not statistically significant in the generic and revised models. Figure 4.2 represents the updated covariance structure model of the study.

Table 4.6 Model Fit Indices of Covariance Structure Model (own editing)

Models	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**SRMR**	**RMSEA**	**P Close**
Revised model	126.991	103	1.233	0.972	0.069	0.049	0.517
Interpretation	-----	-----	Excellent	Excellent	Excellent	Excellent	Excellent

As the results showed the fit model achieved successfully, so the importance of the study variables of the CSM was evaluated. And table 4.5 shows that all paths between the variables and measurement errors statistically significant at the significance level 0.05. Finally the results as shown in Table 4.5, show that Performance expectancy directly affected the

intended behavior. Morover the revised model results showed that Performance expectancy had the most powerful relationship with intention behavior, with standardized regression weights of 0.604.

As shown in the revised covariance structure model, Effort expectancy had a weak effect on behavior intention according to standardized regression weights with 0.169; also, it was insignificant with p-value >0.05.

The results of the Revised CSM analysis showed that Performance expectancy accounted for 75% of behavioral intention. Further, the variance in Intention to accept e-government was explained by exogenous variables, Performance expectancy, but Effort expectancy, Awareness of the system, and Social influence had a small effect and insignificant variance in Intention to accept e-government. The intention to accept e-government is explained by the variable mentioned above with a very high percentage.

4.2.3 Moderator Variable (Experience)

Interaction between the performance expectance (PE) and Experience (Expr):

The path coefficients are shown in Figure 4.3 indicate that the path coefficient between performance expectance (PE) and behavior intention (PI) is 0.66 (p< 0.05), which is a significant positive correlation. Also, the path coefficient between experience and behavior intention (PI) is 0.41 (p< 0.05), which is a significant positive correlation. Finally, Interaction effects were tested using the full dataset rather than the moderated dataset. To test the interaction hypotheses, we first standardized the IVs and then created product variables. In this case, the interaction was significant, as shown in the below figure, and the path coefficient between interaction (Exper. PE) and behavior intention (PI) is 0.14 (p< 0.05).

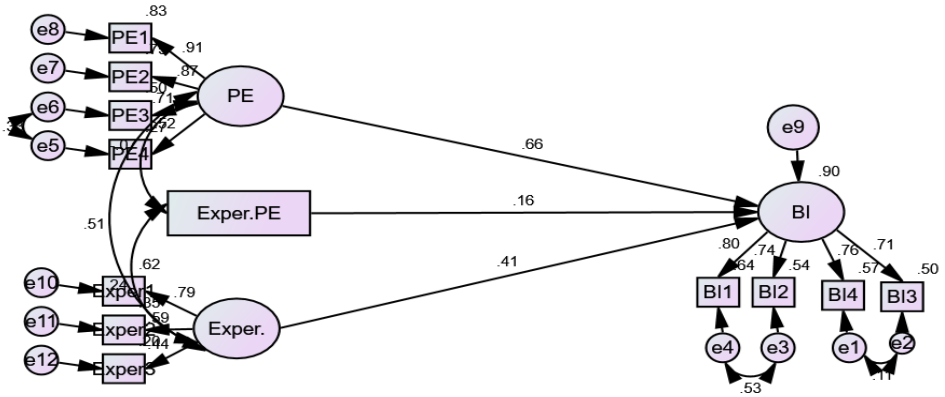


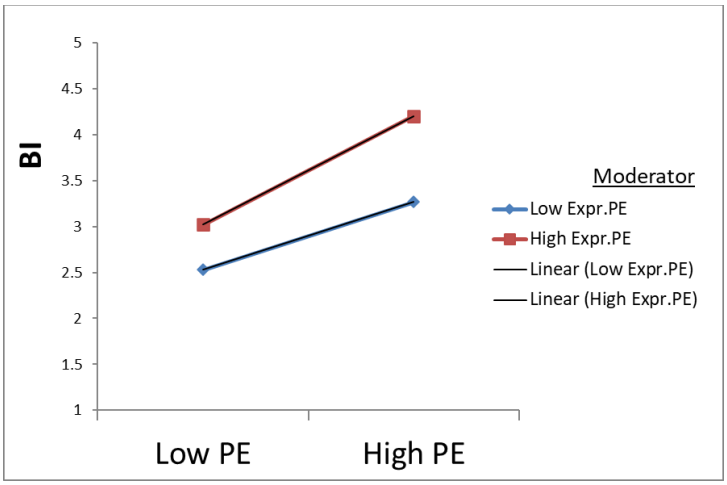
Figure 4.3 Revised Covariance Structure Model (interaction between PE and E) (own editing)

Table 4.7 Parameter Estimates and Regression Weights (own editing)

Final Model						
Indicators			**SRW***	**URW***	**S.E.***	**P***
BI	<---	PE	0.664	0.481	0.088	***
BI	**<---**	**Expr.**	**0.411**	**0.357**	**0.117**	**0.002**
BI	<---	Exper.PE	0.162	0.112	0.054	0.039
BI4	**<---**	**BI**	**0.756**	**0.998**	**0.135**	*******
BI3	<---	BI	0.707	1.000		
BI2	**<---**	**BI**	**0.737**	**0.817**	**0.123**	*******
BI1	<---	BI	0.799	0.913	0.127	***
PE4	**<---**	**PE**	**0.520**	**0.467**	**0.085**	*******
PE3	<---	PE	0.709	0.657	0.078	***
PE2	**<---**	**PE**	**0.868**	**0.917**	**0.079**	*******
PE1	<---	PE	0.910	1.000		
Exper3	**<---**	**Expr.**	**0.445**	**0.590**	**0.157**	*******
Exper2	<---	Expr.	0.595	0.758	0.158	***
Exper1	**<---**	**Expr.**	**0.789**	**1.000**		

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

As shown in Table 4.7, performance expectance significantly affected behavior intention, and experience significantly moderated that relationship. This interaction is illustrated in Figure 4.3. The interaction was probed by testing the performance expectance at three levels of experience: one standard deviation below the mean, one standard deviation above the mean, and one standard deviation. As shown in Figure 4.4, performance expectance positive impact with behavior intention when the experience was one standard deviation below the mean, when at the mean, and when one standard deviation above the mean ($p < 0.05$) previous indicating that the interaction between the experience (Expr) and performance expectance (PE) strengthens the positive relationship between performance expectance and behavior intention.



PE= Performance expectance, Expr= experience

Figure 4.4 Interaction between the PE and Expr (own editing)

Table 4.8 shows the goodness of fit of the revised model of the moderator structure model.

Table 4.8 Model Fit Indices of Covariance Structure Model (own editing)

Model	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	**60.682**	**44**	**1.379**	**0.972**	**0.071**	**0.062**	**0.289**
Interpretation	-----	-----	Excellent	Excellent	Excellent	Acceptable	Excellent

Interaction between the Effort expectancy (EE) and Experience (Expr)

The path coefficients are shown in Figure 4.5 indicate that the path coefficient between effort expectancy (PE) and behavior intention (PI) is 0.22 (p> 0.05), which is an insignificant positive correlation. Also, the path coefficient between experience and behavior intention (PI) is 0.57 (p< 0.05), which is a significant positive correlation. Finally, Interaction effects were tested using the full dataset rather than the moderated dataset. To test the interaction hypotheses, we first standardized the IVs and then created product variables. In this case, the interaction was insignificant, as shown in Table 4.9., and the path coefficient between interaction (Exper. EE) and behavior intention (PI) is 0.03 (p> 0.05).

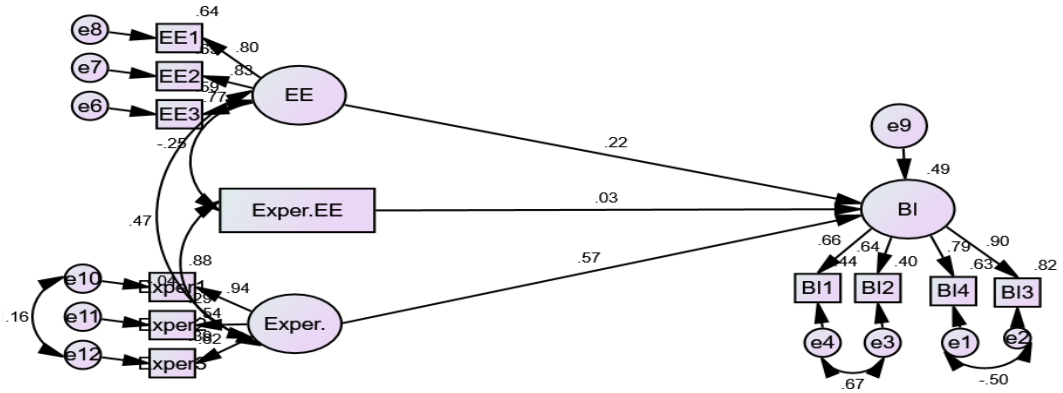


Figure 4.5 Final Covariance Structure Model (interaction between (EE) and E) (own editing)

Table 4.9 presents the indicators and correlations amongst measurement errors were statistically significant at the significant level of .05 except for two exogenous variables, Effort expectancy and interaction (Exper. EE). Since they had significant values more than .05. Additionally, as the results show the model fit was very good ($\chi 2$ /DF = 1.234; CFI = 0.981; SRMR=0.064; RMSEA = 0.049) for the final moderated model see Table 4.10.

Table 4.9 Parameter Estimates and Regression Weights for the CSM figure 4.3 (own editing)

Final Model						
Indicators			SRW*	URW*	S.E.*	P
BI	<---	EE	0.220	0.238	0.131	0.070
BI	<---	Expr.	0.573	0.537	0.151	***
BI	<---	Expr.EE	0.027	0.024	0.074	0.742
BI4	<---	BI	0.793	0.818	0.111	***
BI3	<---	BI	0.904	1.000		

BI2	<---	BI	0.636	0.551	0.097	***
BI1	<---	BI	0.661	0.591	0.100	***
EE3	<---	EE	0.770	1.000		
EE2	<---	EE	0.830	0.964	0.124	***
EE1	<---	EE	0.798	0.961	0.127	***
Exper3	<---	Exper.	0.624	0.697	0.157	***
Exper2	<---	Exper.	0.537	0.576	0.138	***
Exper1	<---	Exper.	0.937	1.000		

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.10 Model Fit Indices of Covariance Structure Model (own editing)

Model	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	44.433	36	1.234	0.981	0.064	0.049	0.488
Interpretation	-----	-----	Excellent	Excellent	Excellent	Excellent	Excellent

4.2.4 E-government infrastructure dimensions and behavior intention

The results of the path analysis with the standardized regression coefficients for e-government infrastructure are presented below in Figure 4.6. This model had a good fit with a chi-square = 109.263 (df = 75, P = 0.147), RMSEA = 0.068, SRMR = 0.064 and a CFI = 0.949 (Table 4.15). Figure 4.6 and Table 4.11 indicate that Facilitating conditions (FC) directly affect behaviour intention with β= 0.61, P < .05). However, System Interactivity (S.Inter) and System Flexibility (FS) didn't appear to statistically influence behavior intention (β=0.846, β=0.691 P >0.05). R-square indicates that 51% of the variance in behavioral intention can be explained by this model (Table 4.12).

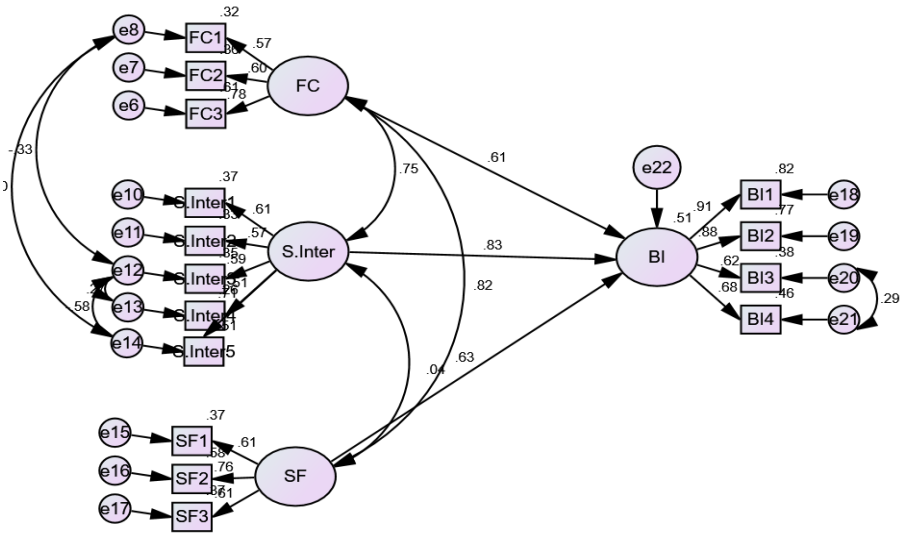


Figure 4.6 Final Covariance Structure Model (e-gov. infra. and BI) (own editing)

Table 4.11 Parameter Estimates and Regression Weights for the CSM (own editing)

Indicators			SRW*	URW*	S.E.*	P*
BI	**<---**	FC	0.612	0.691	0.328	0.035
BI	<---	S.Inter	0.831	0.846	0.142	0.459
BI	<---	SF	0.629	0.691	0.322	0.601
FC3	<---	FC	0.784	1.000		
FC2	<---	FC	0.598	0.882	0.164	***
FC1	<---	FC	0.570	0.778	0.152	***
S. Inter4	<---	S.Inter	0.588	0.636	0.135	***
S. Inter5	<---	S.Inter	0.573	1.000		
S. Inter3	<---	S.Inter	0.609	0.776	0.177	***
S. Inter2	<---	S.Inter	0.605	0.763	0.144	***
S. Inter1	<---	S.Inter	0.760	0.800	0.142	***
SF3	<---	SF	0.611	0.741	0.120	***
SF2	<---	SF	0.514	1.000		
SF1	<---	SF	0.712	0.802	0.128	***
BI1	<---	BI	0.908	1.000		
BI2	<---	BI	0.877	0.937	0.082	***
BI3	<---	BI	0.620	0.846	0.124	***
BI4	<---	*BI*	*0.677*	*0.861*	*0.111*	***

**** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05***

Table 4.12 Model Fit Indices of Covariance Structure Model (e-government infrastructure dimensions) (own editing)

Model	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Final model	109.263	75	1.457	0.949	0.064	0.068	0.147
Interpretation	-----	-----	Excellent	Acceptable	Excellent	Acceptable	Excellent

4.2.5 Trust

Dimensions of Trust (system, government) and behavior intention

Figure 4.7 displays the covariance structure model between dimensions of Trust in the E-government model and Behavior Intention model. Table 4.13 presents the parameter estimates of the final model for the covariance structure model and shows that the correlations amongst measurement errors and all the indicators and were statistically significant at 0.05, except Trust in the government, because it had values greater than 0.05.

Table 4.14 shows the final model of the covariance structure goodness of fit. However, because the exogenous variable Trust in the government was not statistically significant in the generic model as mentioned.Moreover, Table 4.13 shows that Trust in the system directly influenced the behavioral intention.And baised on the results of the revised model , Trust in

the system had the most powerful relationship with behavior intention, with standardized regression weights of 84%. On the other hand Trust in the government had a weak effect on behavior intention and the standardized regression weights was14%; and it was insignificant because the p-value >0.05.

The results of the Revised CSM analysis showed that Trust in the system accounted for 84% of behavioral intention. Further, the variance in Intention to accept e-government applications is explained by the exogenous variable, Trust in the system, but Trust in the government had a small effect and insignificant variance in Intention to accept e-government applications.

The variable, as mentioned earlier, explains the intention to accept e-government with a very high percentage.

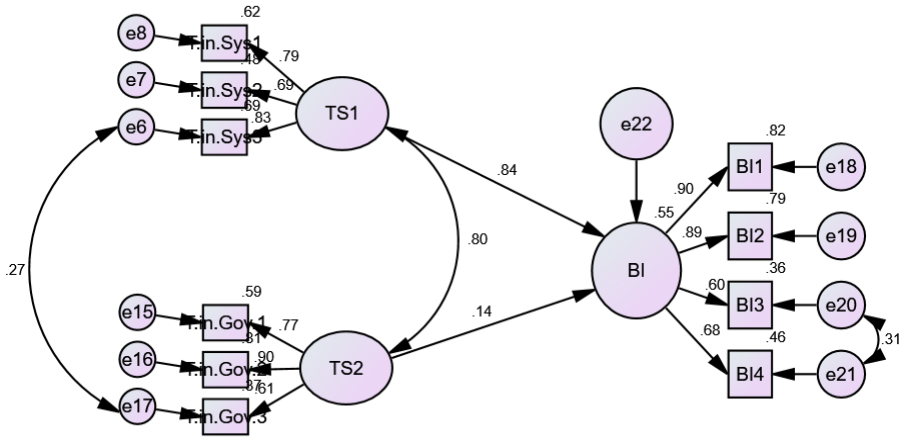


Figure 4.7 Final Covariance Structure Model (*Trust in E-gov. and BI*) (own editing)

Table 4.13 Parameter Estimates and Regression Weights for the CSM figure 4.9 (own editing)

Reversed Model						
Indicators			**SRW***	**URW***	**S.E.***	**P***
BI	<---	TS1	0.845	0.802	0.202	***
BI	<---	TS2	0.136	0.114	0.164	0.488
T.in. Sys3	<---	TS1	0.828	1.000		
T.in. Sys2	<---	TS1	0.690	0.813	0.113	***
T.in. Sys1	<---	TS1	0.790	0.934	0.110	***
T.in.Gov.3	<---	TS2	0.605	0.694	0.111	***
T.in.Gov.2	<---	TS2	0.902	1.000		
T.in.Gov.1	<---	TS2	0.771	0.863	0.105	***
BI1	<---	BI	0.903	1.000		
BI2	<---	BI	0.887	0.953	0.083	***
BI3	<---	BI	0.598	0.820	0.126	***
BI4	<---	BI	0.679	0.869	0.112	***

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.14Model Fit Indices of Covariance Structure Model (Dimensions of Trust in E-government) (own editing)

Models	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	41.544	30	1.385	0.978	0.061	0.062	0.308
Interpretation	-----	-----	Excellent	Excellent	Excellent	Acceptable	Excellent

4.3 Results for Jordan

As we mentioned in the Hungarian results part in Jordan this research tested four main hypotheses in the joint Model in Jordan. and part would discuss if the dataset supported these hypotheses according to the structural equation modeling analysis results.

The conceptual study model in Figure 4.8 showed the standardized regression weights of the relationships between exogenous and endogenous variables. The significant relationship between exogenous and endogenous variables is shown with star "*." and all the detailed results come in the next two sections.

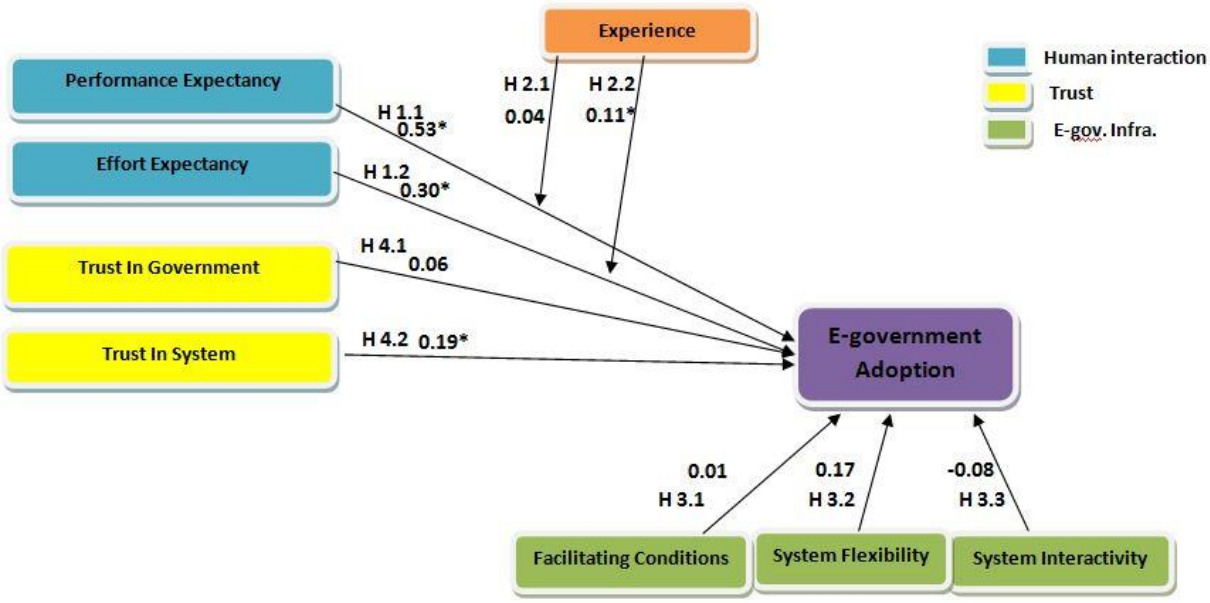


Figure 4.8 The Hypothesized pathways with SRC, * significant at P < .05 (own editing)

4.3.1 Descriptive statistics

As shown in Table 4.15., Performance expectancy reflected the most factor within human-E government interaction influence on Behavior Intention, with a mean and SD 3.45 (0.781) respectively. The facilitating conditions reflect the greatest factor in the impact of e-government infrastructure on the behavioral intent of 3.52 (0.666), respectively. On the other hand, in the trust dimension, Trust in the system was the most factor effect on Behavior

Intention with 3.15 (0.729). Finally, Experience has a moderate level from sample viewpoint with 3.10 (0.707).

Table 4.15 Mean and standard deviation of factors influence behavior intention (own editing)

Factors	N	M(SD)	Skewness	Kurtosis
Performance expectancy	356	3.45(.781)	-0.601	1.013
Effort expectancy	356	3.19(.640)	-0.302	0.599
Facilitating conditions	356	3.52(.666)	-0.708	1.272
System Interactivity	356	3.33 (.707)	-0.336	0.779
System Flexibility	356	3.31(.780)	-0.599	0.562
Trust in system	356	3.15(.729)	-0.511	0.513
Trust in government	356	3.11(.709)	-0.479	0.436
Experience	356	3.10 (.677)	-0.168	0.093

Table 4.16 indicate that Behavior Intention to accept e-government in Hungary was high with a mean, and standard deviation of 3.30 (0.800), and Skewness and Kurtosis reflect the normal distribution of responses.

Table 4.16 Mean and standard deviation of behaviour intention (own editing)

Factors	Items	M(SD)	Skewness	Kurtosis
Behavior Intention	256	3.30(.800)	-0.512	0.445

4.3.2 Human E-government interaction (covariance structure model)

The arrows between variables show the hypothesized causal relationships among exogenous (performance expectancy and effort expectancy) and endogenous (behavior intention) variables of the study. In contrast, each arrow between indicators and variables present the predictive capacity of each item of the latent variables.

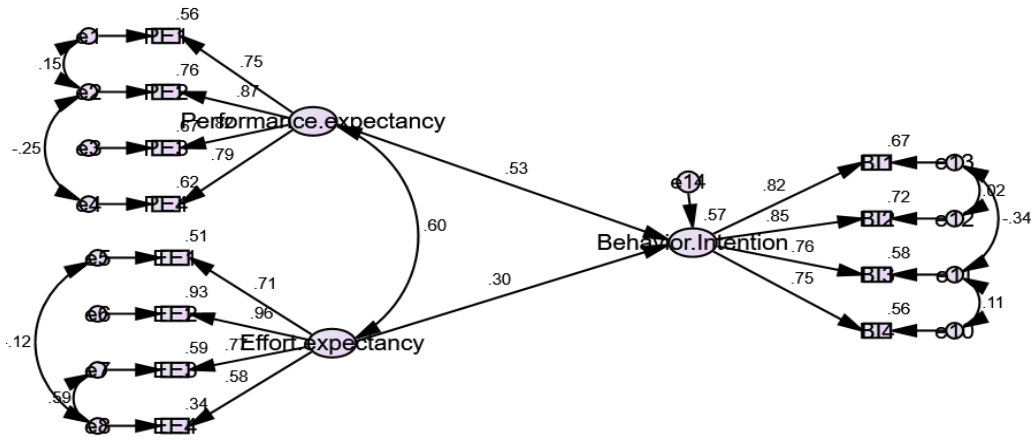


Figure 4.9 Final C S M (Human-E gov. t interaction, and B I model) (own editing)

Table 4.17 provides the parameter estimates of the final model for the covariance structure model. As the table indicates, all the indicators and correlations amongst measurement errors were statistically significant at the p-value of 0.05.

The goodness of fit indices of the final model of the covariance structure model is shown in Table 4.18 depicts a chi-square = 109.263 (df = 75, P = 0.147), RMSEA = 0.068, SRMR = 0.064 and a CFI = 0.949, and that mean all statistics model provided sufficient indices for a well-fit covariance structure model. Since the fit model was successfully achieved, the importance of the study variables of the CSM was evaluated. Table 4.17 indicates that all paths among variables and measurement errors were statistically significant at the P-value <0.05. The results of the covariance structure model, as shown in Table 4.17, shows that Performance Expectancy and Effort Expectancy had direct effects on Behavior Intention.

According to the final model results, Performance expectancy had the strongest impact on intention behavior, with SRW 0.533, P<0.05. then Effort expectancy had the second impact on intention behavior with SRW 0.30, P<0.05.

The results of the Revised CSM analysis showed that Performance Expectancy and Effort Expectancy accounted for 53.3%, 30% respectively of behavior intention. Further, the whole model (Performance expectancy and Effort Expectancy) explains 57% of the variance in Intention to accept e-government. And its high percentage.

Table 4.17 Parameter Estimates and Regression Weights for the CSM (own editing)

Final Model						
Indicators			**SRW***	**URW***	**S.E.***	**P**
BI	<---	PE	0.533	0.534	0.065	***
BI	<---	EE	0.300	0.287	0.056	***
PE1	<---	PE	0.751	0.843	0.049	***
PE2	<---	PE	0.869	1.000		
PE3	<---	PE	0.819	0.910	0.055	***
PE4	<---	PE	0.788	0.824	0.053	***
EE1	<---	EE	0.714	0.736	0.046	***
EE2	<---	EE	0.965	1.000		
EE3	<---	EE	0.767	0.849	0.048	***
EE4	<---	EE	0.582	0.613	0.051	***
BI4	<---	BI	0.751	0.853	0.062	***
BI3	<---	BI	0.764	0.885	0.064	***
BI2	<---	BI	0.851	1.000		
BI1	<---	BI	0.821	0.921	0.053	***

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.18 Model Fit Indices of Covariance Structure Model (own editing)

Models	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	101.218	41	2.469	0.976	0.048	0.064	0.065
Interpretation	-----	-----	Excellent	Excellent	Excellent	Acceptable	Excellent

Interaction between the performance expectance (PE) and Experience (Expr)

The path diagram is shown in Figure 4.10 indicate that the path coefficient between performance expectancy (PE) and behavior intention (PI) is 0.41 ($p< 0.05$), which is a significant positive effect. Also, the path coefficient between experience and behavior intention (PI) is 0.44 ($p< 0.05$), which is a significant positive correlation. Finally, Interaction effects were tested using the z score of composite variables. To test the interaction hypotheses, the researcher standardized the IVs and then generated product variables (PE.Expr). In this case, the interaction was insignificant, as shown in Table 4.19, and the path coefficient between interaction (Exper. EE) and behavior intention (PI) is 0.04 ($p> 0.05$).

Table 4.19 provides the estimation of the parameters of the interaction model. As the table indicates, all the indicators and correlations amongst measurement errors were statistically significant at the significant level of .01, except one exogenous variable, interaction (Exper. EE). Since they had significant values higher than the significant level of .05. Additionally, Table 4.20 showed that model fit was very good ($\chi 2$ /DF = 1.379; CFI = 0.972; SRMR=0.071; RMSEA = 0.062) for the final moderated model.

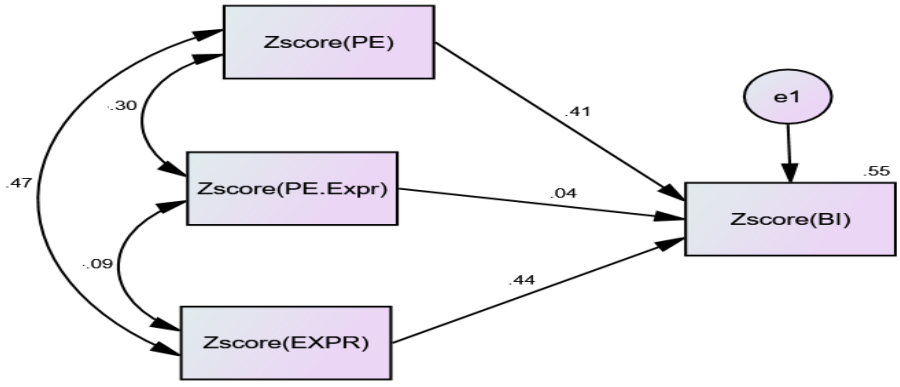


Figure 4.10 Revised C S M (interaction between performance expectance and experience) (own editing)

Table 4.19 Parameter Estimates and Regression Weights for the CSM (own editing)

Final Model						
Indicators			**SRW***	**URW***	**S.E.***	**P***
BI	<---	PE	0.412	0.423	0.043	***
BI	<---	Expr	0.441	0.522	0.048	***
BI	<---	PE. Expr	0.042	0.024	0.021	0.262

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.20 Model Fit Indices of Covariance Structure Model (own editing)

Models	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	60.682	44	1.379	0.972	0.071	0.062	0.289
Interpretation	-----	-----	Excellent	Excellent	Excellent	Acceptable	Excellent

4.3.3 Moderator Variable (Experience)

Interaction between the Effort expectancy (EE) and Experience (Expr)

The path coefficients are shown in Figure 4.11 indicate that the coefficient between effort expectance (EE) and behavior intention (PI) is 0.082 ($p< 0.05$), which is a significant positive impact. Also, the path coefficient between experience and behavior intention (PI) is 0.602 ($p< 0.05$), which is a significant positive impact. Finally, Interaction effects were tested using the z score of composite variables. To test the moderation hypothesis, the researcher standardized the Ivs and then generated product variables, it named (EE.Expr), the interaction term between (EE) and (Expr) was significant as shown in the below figure, and the path coefficient between interaction (Exper. PE) and behavior intention (BI) is 0.11.

As shown in Table 4.21, the interaction term between effort expectancy (EE) and experience (Expr) was entered, and it explained a significant increase in variance in behavior intention, $\beta = .11$, $p < .05$. Thus, experience (Expr) was a significant moderator of the relationship between effort expectancy (EE) and behavior intention (BI). This interaction is illustrated in Figure 4.10. The interaction was probed by testing the effort expectance at three levels of experience: one standard deviation below the mean, one standard deviation above the mean, and one standard deviation. As shown in Figure 4.12, effort expectance positively impacts behavior intention when the experience was one standard deviation below the mean, when at the mean, and when one standard deviation above the mean ($p < 0.05$) see Table 4.21 in other words, the interaction between the experience (Expr) and effort expectance (EE) strengthens the positive relationship between effort expectance and behavior intention. The goodness of fit indices of the interaction model is shown in Table 4.22 As the table depicts, all statistics for the model provided sufficient indices for a well-fit covariance structure model.

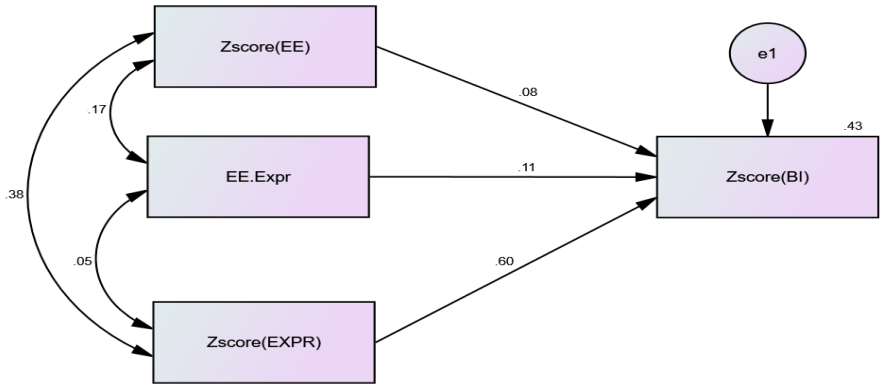


Figure 4.11 Final C S M (interaction between (EE) and exper.) (own editing)

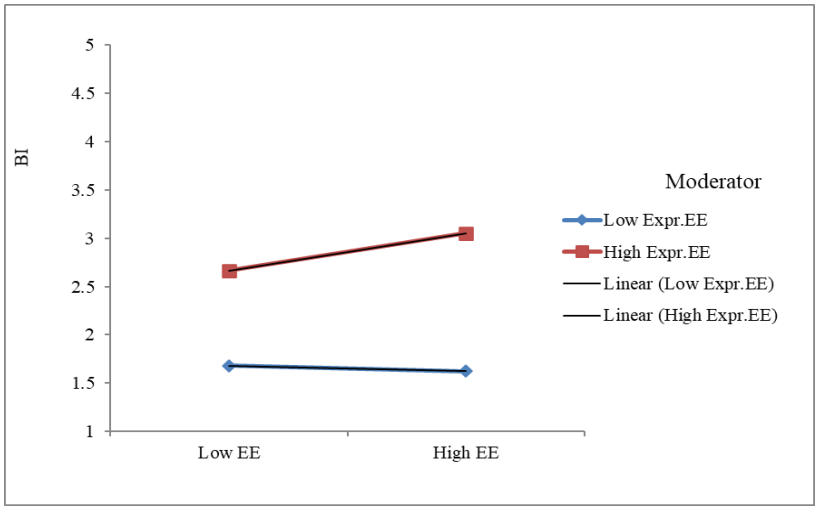


Figure 4.12 Interaction term between (EE) and (Expr) (own editing)

Table 4.21 Parameter Estimates and Regression Weights for the CSM (own editing)

Final Model						
Indicators			SRW*	URW*	S.E.*	P
BI	←-	EE	0.082	0.082	0.044	0.041
BI	←-	Expr.	0.602	0.602	0.043	***
BI	←-	Expr.EE	0.111	0.084	0.031	0.007

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.22 Model Fit Indices of Covariance Structure Model (own editing)

Models	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	44.433	36	1.234	0.981	0.064	0.049	0.488
Interpretation	-----	-----	Excellent	Excellent	Excellent	Excellent	Excellent

4.3.4 E-government infrastructure dimensions and behavior intention

The results of the path analysis with the standardized regression coefficients for e-government infrastructure are presented in Figure 4.13 This model had a good fit with a chi-square = 86.470 (df = 68, P = 0.657), RMSEA = 0.043, SRMR = 0.059 and a CFI = 0.985 (Table 4.28).

Figure 4.12 and Table 4.23 indicate that all dimensions of E-government infrastructure (Facilitating conditions (FC), System Interactivity (S.Inter) and System Flexibility (FS)) didn't statistically influence on behavior intention (β= -0.079, β=0.014 and, β=0.170 respectively, P >0.05). R-square indicates that this model can explain 3% of the variance in behavioral intention.

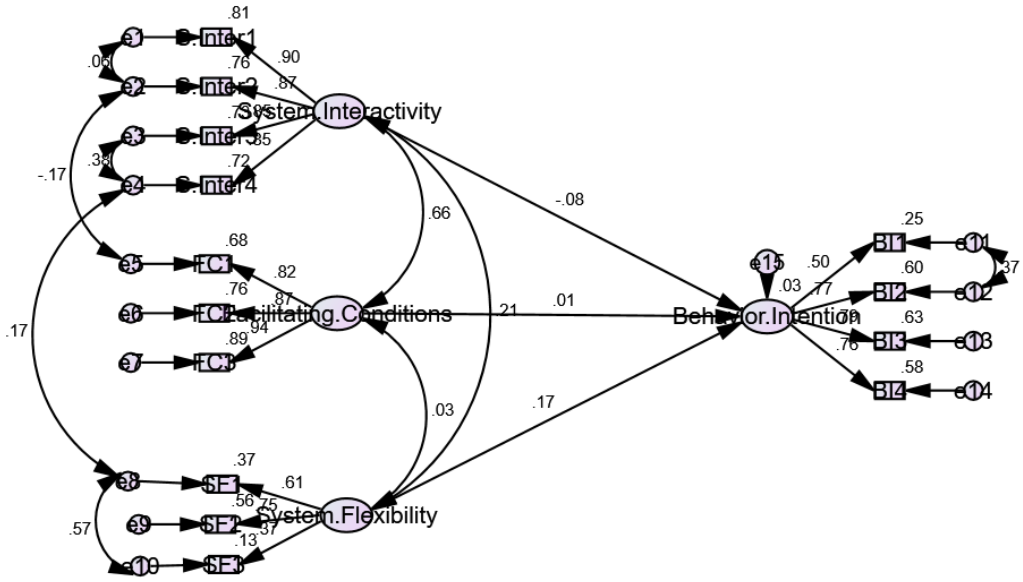


Figure 4.13 Final Covariance Structure Model (e-gov. infrastructure and BI) (own editing)

Table 4.23 Parameter Estimates and Regression Weights for the CSM (own editing)

Indicators			SRW*	URW*	S.E.*	P*
BI	<---	S. Inter	-0.079	-0.068	0.122	0.577
BI	<---	FC	0.014	0.013	0.126	0.915
BI	<---	SF	0.170	0.174	0.133	0.192
S. Inter1	<---	S. Inter	0.898	1.000		
S. Inter2	<---	S. Inter	0.874	0.975	0.063	***
S. Inter3	<---	S. Inter	0.852	0.930	0.083	***
S. Inter4	<---	S. Inter	0.847	0.894	0.080	***
FC1	<---	FC	0.822	0.705	0.054	***
FC2	<---	FC	0.871	1.000		
FC3	<---	FC	0.944	0.991	0.062	***
SF1	<---	SF	0.611	0.744	0.342	.030
SF2	<---	SF	0.566	1.000		

SF3	<---	SF	0.765	0.459	0.236	***
BI4	<---	BI	0.792	1.000		
BI3	<---	BI	0.774	0.969	0.117	***
BI2	<---	BI	0.496	0.965	0.117	***
BI1	<---	BI	0.751	0.562	0.107	***

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.24 Model Fit Indices of Covariance Structure Model (e-government infrastructure dimensions)(own editing)

Models	CMIN	DF	CMIN/DF	CFI	SRMR	RMSEA	P Close
Revised model	86.470	68	1.272	0.985	0.059	0.043	0.657
Interpretation	-----	-----	Excellent	Excellent	Excellent	Excellent	Excellent

4.3.5 Trust

Dimensions of Trust in E-government system and behavior intention

Figure 4.14 displays the covariance structure model between dimensions of Trust in the E-government model and Behavior Intention model. Table 4.25 presents the parameter estimates of the final model for the covariance structure model and shows that the correlations amongst measurement errors and all the indicators and were statistically significant at 0.05, except Trust in the government, because it had values greater than 0.05.

Table 4.26 shows the final model of the covariance structure goodness of fit. However, because the exogenous variable Trust in the government was not statistically significant in the generic model as mentioned. Moreover, Table 4.25 shows that Trust in the system directly influenced the behavioral intention.And baised on the results of the revised model , Trust in the system had the most powerful relationship with behavior intention, with standardized regression weights of 0.19. On the other hand Trust in the government had a weak effect on behavior intention and the standardized regression weights was 0.06; and it was insignificant because the p-value >0.05.

The results of the Revised CSM analysis showed that Trust in the system accounted for 19.3% of behavioral intention. Further, the variance in Intention to accept e-government applications is explained by the exogenous variable, Trust in the system, but Trust in the government had a small effect and insignificant variance in Intention to accept e-government applications.

The variable, as mentioned earlier, explains the intention to accept e-government with a very high percentage.

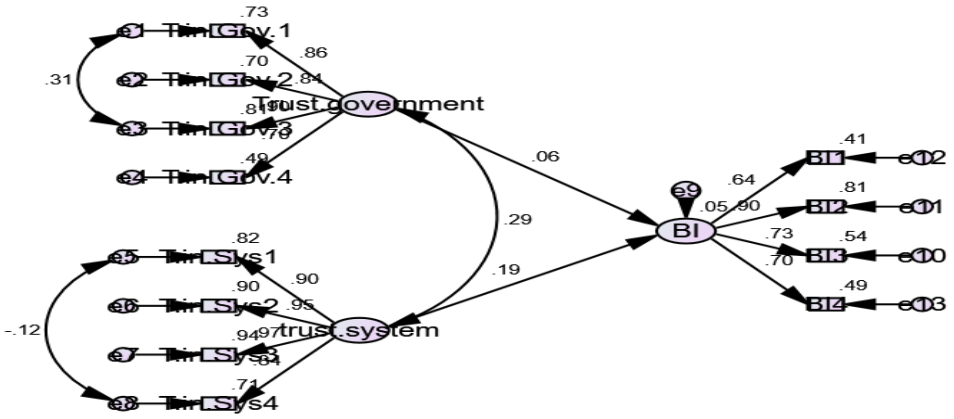


Figure 4.14. Final CSM (Dimensions of Trust in E-government and BI) (own editing)

Table 4.25 Parameter Estimates and Regression Weights for the CSM figure 4.8 (own editing)

Reversed Model						
Indicators			**SRW***	**URW***	**S.E.***	**P***
BI	<--	Trust government	0.057	0.060	0.100	0.553
BI	<--	Trust system	0.193	0.174	0.083	0.036
T.in.Gov.1	<--	Trust government	0.857	1.094	0.126	***
T.in.Gov.2	<--	Trust government	0.835	1.022	0.111	***
T.in.Gov.3	<--	Trust government	0.900	1.158	0.127	***
T.in.Gov.4	<--	Trust government	0.698	1.000		
T.in. Sys1	<--	Trust system	0.903	1.000		
T.in. Sys2	<--	Trust system	0.950	0.903	0.044	***
T.in. Sys3	<--	Trust system	0.970	0.949	0.044	***
T.in. Sys4	<--	Trust system	0.841	0.787	0.055	***
BI4	<--	BI	0.704	0.793	0.088	***
BI3	<--	BI	0.734	0.776	0.082	***
BI2	<--	BI	0.898	1.000		
BI1	<--	BI	0.643	0.652	0.080	***

** SRW=Standardized Regression Weights, URW= Unstandardized Regression Weights, S.E.= Standard Error and P<0.05*

Table 4.26 Model Fit Indices of Covariance Structure Model (Dimensions of Trust in E-government) (own editing)

Models	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**SRMR**	**RMSEA**	**P Close**
Final model	65.369	48	1.362	0.987	0.049	0.048	0.491
Interpretation	-----	-----	Excellent	Excellent	Excellent	Excellent	Excellent

4.4 Hypotheses Testing Results (Both countries)

- **First main hypothesis: The dimensions of Human E-government interaction have a positive influence on Behavioral Intention to adopt e-government applications.**

H1.1: Performance expectancy has a positive influence on Behavioral Intention to adopt e-government applications.

The first sub-hypothesis was about the relationship between Performance expectancy and Behavioral Intention to accept e-government applications. **in Jordan,** The study's findings showed that Performance expectancy was positively and significantly related to the Intention to adopt e-government applications in Jordan, and which is obvious through the standardized regression weight, which was 53% at the confidence level of 0.95 and p-value of <0.05. in other words, the results show that **the research data supported the hypothesis**. Moreover, the URW within the research variables was 0.534, which means that one unit in Performance expectancy led to a 0.534 unit increase in Intention to adopt e-government applications in Jordan. **In Hungary**, the results show a 60% standardized regression weight at a 0.95 confidence level and a p-value of <0.05. **The research data supported the hypothesis**. Moreover, the URW of 47.5% among the study variables means that if Performance expectancy increased by one will led to a 47.5% increase unit in Intention to adopt e-government applications in Hungary.

H1.2: Effort expectancy has a positive influence on Behavioral Intention to adopt e-government applications.

The second sub-hypothesis was about the relationship between Effort expectancy and Intention to adopt e-government applications. **in Jordan,** The study's findings showed that Effort expectancy influences Behavioral Intention to adopt e-government and which is obvious through the standardized regression weight, which was 30% at the confidence level of 0.95 and p-value of <0.05. in other words, t**he results show that the research data supported the hypothesis**. Moreover, the URW within the research variables was 0.287, which means an increase by one unit in Effort expectancy led to a 0.287 unit increase in Intention to adopt e-government applications. **In Hungary**, the research results found that Effort expectancy did not influence behavioral intention to adopt e-government with only 2% standardized regression weight at 0.95 confidence level and a p-value of >0.05. which means the results confirm that **the hypothesis did not support by the study data**.

- **Second main hypothesis**: **Experience moderates the relationship between Human E-government interaction and Behavioral Intention to adopt e-government applications, and the relationship becomes more positive when the experience is high.**

That means the relationship between them when the experience is high, the relationship becomes more positive. It divides into four hypotheses moderation hypotheses with multiple moderated regression by Amos program, followed by Marsh recommendations (Marsh, Wen, & Hau, 2004). the dimensions of Human E-government interaction, Experience, and Behavioral Intention were mean-centered before entering the analyses. Three steps were followed. First, convert variables scores to z scores. Second, we added the interaction term between the dimensions of Human E-government interaction and Experience. Third, import and draw three variables from SPSS into Amos at all phases of testing moderator variables, Moderation results are displayed in Tables (4.7 till 4.10), and Figures (4.2- 4.4) showed the interaction effects. Low and high values of the predictor and moderator variables represent values one standard deviation below and above the mean, respectively.

H2.1: As the value of the experience increases, the relationship between Performance expectancy and Behavioral Intention to adopt e-government applications also increases.

The first sub-hypothesis was about the interaction between experience and Performance expectancy, and it will be impacted positively in the relationship between Performance expectancy and Behavioral Intention to use e-government applications. **in Jordan,** The findings of the study showed that the interaction between experience and performance expectancy was not significant ($\beta = 0.04$, $p > 0.05$). **This result is not supported H2.1**.

In Hungary, the findings of the study showed that the interaction between experience and performance expectancy was significant (($\beta = 0.162$, $p < 0.05$) Simple slope analysis (Figure 4.3) revealed that performance expectancy was positively related to Behavioral Intention when there was a high experience in e-government application (URW = 0.112, $p < 0.05$). When there was low-performance expectancy, also the relationship between performance expectancy and Behavioral Intention becomes low. In other words, experience positively moderates (amplified) with 16.2% of that relationship. **These results support H2.1**

H2.2. Experience moderates the relationship between Effort expectancy and Behavioral Intention to adopt e-government applications, such that the relationship becomes more positive when the experience is high.

The second sub-hypothesis was about the interaction between experience and effort expectancy, and it will be impacted positively in the relationship between Effort expectancy and Behavioral Intention. **In Jordan,** the findings of the study showed that the interaction between experience and effort expectancy was significant (($\beta = 0.11$, $p < 0.05$) Simple slope analysis (Figure4.13) revealed that effort expectancy was positively related to Behavioral Intention when there was a high experience in e-government application (URW = 0.084, $p < 0.05$). Also, when there was low effort expectancy, the relationship between Effort expectancy and behavioral intention becomes low. In other words, experience positively moderates (amplified) with 11% of that relationship. **These results support H2.2 in Jordan**. **In Hungary**, the research results showed that the interaction between experience and performance expectancy was not significant ($\beta = 0.03$, $p > 0.05$); **this result is not supported H2.2**.

- **Third main hypothesis**: **The dimensions of E-government infrastructure positively influence Behavioral Intention to adopt e-government applications.**

H3.1: Facilitating conditions have a positive influence on Behavioral Intention to adopt e-government applications.

The first sub-hypothesis investigates the relationship between Facilitating conditions and behavioral intention to use e-government applications. **In Jordan,** the analysis showed that System Interactivity was not statistically impacted on behavioral intention to adopt e-government with an -8% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, the results indicated that **the study data did not support the hypothesis**.

In Hungary, the research results confirmed that Facilitating conditions and Intention to adopt e-government applications in Hungary were positively and significantly related. It is obvious through the standardized regression weight, which was 61.2% at the confidence level of 0.95 and the p-value <0.05. which means **the results confirmed the hypothesis and supported it by the research data**. Moreover, the URW within the study variables was 69.1%, which also means if Facilitating conditions increased by one unit will increase by 69.1% unit of in Intention of the citizen to adopt e-government applications in Hungary a very high percentage.

H3.2: System Interactivity has a positive influence on Behavioral Intention to adopt e-government applications.

The second sub-hypothesis was about the relationship between System Interactivity and Intention to adopt e-government applications. **In Jordan,** the study's findings showed that System Interactivity was not statistically impacted on behavioral intention to adopt e-government with a 1% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, the results indicated that **the study data did not support the hypothesis**. **In Hungary**, the study's findings showed that System Interactivity was not statistically impacted on Behavioral Intention to adopt e-government with an 83.1% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, **the results indicated that the study data did not support the hypothesis.**

H3.3: Flexibility of E-government System has a positive influence on Behavioral Intention to adopt e-government applications.

The third sub-hypothesis examined the relationship between System Flexibility and Intention to adopt e-government applications. **In Jordan,** the study's findings showed that System Flexibility was not statistically impacted on Behavioral Intention to adopt e-government with a 17% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, the results indicated that **the study data did not support the hypothesis**. **In Hungary**, the research results showed that System Flexibility was not statistically impacted on Behavioral Intention to adopt e-government with a 62.9% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, **the results indicated that the study data did not support the hypothesis.**

- **Fourth main hypothesis**: **The dimensions of trust positively influence behavioral intention to adopt e-government applications**.

H4.1: Trust in the e-government system positively influences behavioral intention to adopt e-government applications.

The first sub-hypothesis examined the relationship between Trust in the e-government system and Behavioral Intention among citizens toward e-government application. **In Jordan,** the study's findings showed that Trust in the e-government system was positively and significantly related to the Intention to adopt e-government applications in Jordan, which was obvious through the standardized regression weight, which was 19% at the confidence level of 0.95 and p-value of <0.05. in other words, **the results show that the research data supported the hypothesis**. Moreover, the URW within the research variables was. 17.4% means that an increase by one unit in Trust in the e-government system led to a 17.4% unit increase in Intention to adopt e-government applications.

In Hungary, the research results confirmed a positive and significant relation between Trust in the e-government system and Intention to adopt e-government applications in Hungary, and that obvious through the standardized regression weight what was 84.5% at the confidence level of 0.95 and a p-value of <0.05. that means **the results confirm the hypothesis and are supported by the research data**. Moreover, the URW within the research variables was 80.2%, which means that if Trust in the e-government system increase by one will lead to an increase by 80.2%, unit increase in the Intention of students to adopt e-government applications in Hungary is a high percentage.

H4.2: Trust in government has a positive influence on Behavioral Intention to adopt e-government applications.

The second sub-hypothesis was about the relationship between Trust in government and Intention to adopt e-government applications. **In Jordan,** the study's findings showed that Trust in government did not statistically impact behavioral intention to adopt e-government with a 6% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, the results indicated **that the study data did not support the hypothesis.**

In Hungary, the study's findings showed that Trust in government did not statistically impact behavioral intention to adopt e-government with a 13.6% standardized regression weight at 0.95 confidence level with a p-value of >0.05. Thus, **the results indicated that the study data did not support the hypothesis.**

Hypotheses results for both countries

After we got introduced to the factors that affect the adoption of e-government in the two countries separately in the previous paragraphs, here is table 4.27 showing the results of the hypotheses for the joint model between the two countries.

Table 4. 27 Hypotheses results for the joint model (Hungary and Jordan) (own editing)

	Hypothesis	**Hypotheses acceptance**
H1	**There is a significant relationship between Human-E government interaction and citizens' adoption of the e-government system.**	**Partly supported**
H1.1	Citizens' adoption of e-government services will be significantly affected by performance expectancy.	Supported
H1.2	Citizens' adoption of e-government will be significantly affected by effort expectancy.	Not Supported
H2	**Experience moderates the relationship between human-E government interaction and e-government adoption.**	**Partly supported**
H2.1	Experience positively moderates the relationship between Performance expectancy and e-government adoption.	Not Supported

H2.2	Experience positively moderates the relationship between effort expectancy and e-government adoption.	Not Supported
H3	**There is a significant relationship between E-government Infrastructure and citizens' adoption of the e-government system.**	**Not supported**
H3.1	There is a significant relationship between the facilitating conditions and citizens' adoption of the e-government system.	Not Supported
H3.2	There is a significant relationship between system interactivity and the citizens' adoption of e-government	Not Supported
H3.3	There is a significant relationship between the flexibility of e-government systems and the citizens' adoption of e-government	Not Supported
H4	**There is a significant relationship between trust and the citizens' adoption of e-government.**	**Partly supported**
H4.1	There is a significant relationship between trust in the system and the citizens' adoption of e-government.	Supported
H4.2	There is a significant relationship between trust in government and the citizens' adoption of e-government.	Not Supported

The final results of the hypotheses (both countries) came to answer the original questions of this research as the following:

- First research question: What is the main factors affecting E-government acceptance in Jordan?

In Jordan, the results showed the effect of three factors and one moderate. First, two factors: **performance expectancy** and **effort expectancy**, from the first dimension Human E-government interaction, second, the effect of the factor **trust in the system** from the third dimension Trust, and finally a limited effect of the moderating variable on the relationship between effort expectancy and e-government adoption.

- Second research question: What is the main factors affecting E-government acceptance in Hungary?

In Hungary, the results showed also an effect of three factors and one moderate. First factor: **performance expectancy**, from the first dimension Human E-government interaction, the second factor, the effect of the factor **facilitating conditions** from the dimension E-government Infrastructure, the third factor is **trust in the system** from the third dimension Trust, and finally a limited effect of the moderating variable on the relationship between effort expectancy and e-government adoption.

- Third question: What are the main differences or similarities factors in Jordan and Hungary?

The results between the two countries were more similar, as, from eight joint relationships, the results were similar in five relationships, and the results differed regarding three other relationships.

Similarities: the effect of five relationships between the factors: performance expectancy, trust in the system, trust in government, flexibility, system interactivity, and E-government adoption

Differences: the effect of three relationships between the factors: effort expectancy, facilitating conditions, experience (moderating), and E-government adoption. Finally the descusion of these hypotheses results in the next chapter.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

This study aims to develop a conceptual model for the adoption of e-government services in Jordan and Hungary. More specifically, it examined the effect of Human interactions, Infrastructure, and Trust on the level of e-government adoption by Jordanian and Hungarian citizens.

5.1.1 Human Interaction

Humans dealing with any system depends on many factors and directly affects the user's acceptance of any system. And these interactions can divide into many dimensions in this research were (effort expectancy (EE), performance expectancy, influence (SI), habit (H), awareness (AW).

In this axis in **Jordan**, the results showed greater influence of Human Interaction on the acceptance than Hungary, the results showed that the two most influential factors in the citizens' acceptance of e-government services were **performance expectancy** and **effort expectancy.** This indicates that citizens' acceptance depends mainly on the level of citizens 'perception that the system is easy to use and leads to improving their performance in completing their work faster and more effectively.

In this axis in **Hungary**, the results showed that the most influential factors in the citizens' acceptance of e-government services were **performance expectancy**. This indicates that citizens' acceptance depends mainly on citizens 'perception that the system is useful and leads to improving their performance in completing their work faster and more effectively, and the dataset did not support the effect of **effort expectancy** on the acceptance in Hungary like Jordan.

The other variable, social influence (SI), habit (H), and awareness (AOW) were excluded from Human E-government interaction after the EFA test and to make the comparison possible between the two countries.

Performance expectancy (PE)

The (UTAUT) model proposes that performance expectancy is a critical construct whose effects influence the citizens' attitudes towards technology adoption. (Venkatesh et al., 2012). The rapid application of e-government services attains usefulness, and hence it can save the user's time. Research has yet found no direct positive relationship between this variable and the adoption of e-government systems (Carter & Belanger, 2004). However, as noted by

(Shareef et al., 2011), Adding variables and combining them with other variables from different theories may reshape the relationship and re-effect these factors.

In **Jordan**, In the current research, the results showed that Performance expectancy has positive effects on the behavior intention in e-government services and came as the most effective factor with a 53% standardized regression weight. This confirms that citizens in Jordan believe that using the e-government system is beneficial for them to accomplish their work faster and more efficiently, and this directly affects the level of their acceptance and use of electronic services provided by the government. Finally, these results agreed with many other researchers (Alsaif, 2014; Alshehri et al., 2012; Ovais Ahmad, Markkula, & Oivo, 2013; Weerakkody, El-Haddadeh, Al-Sobhi, Shareef, & Dwivedi, 2013; Yahya et al., 2012; Zulkifli, Fuaad Said, Chun Kwong, & Wei Chong, 2015).

In **Hungary**, Performance expectancy has positive effects on the behavior intention in e-government services with a 60% standardized regression weight, and this confirms that citizens in Hungary believe that using the e-government system is beneficial for them to accomplish their work faster and more efficiently, and this affects directly on the level of their acceptance and use of electronic services provided by the government. The results showed the URW of 47.5% within the research variables show that one unit of increase in Performance expectancy led to a 47.5% unit of increase in Intention to adopt e-government.

Effort expectancy (EE)

Effort expectancy refers to the difficulty or ease of a new technological (Venkatesh et al., 2012). The effort expectancy in UTAUT, similar to TAM, summarizes the collective perception and perception of the system's ease of use through users' previous experiences (Rogers, 2003). The current study didn't support this relationship in **Hungary** but agreed that this factor has a possible effect on the acceptance and adoption of e-government services in **Jordan**. Moreover, the results in Jordan showed that this variable is a strong variable with a 30% standardized regression weight, which impacts the users' adoption of technology in the early stages of use (Venkatesh & Zhang, 2010). In other words, the present study predicts that the more the citizens become used to new technology, the more the efforts needed in the use of e-government services are small. Furthermore, the more citizens believe that the system can help them become skillful in using it, the more they will use the e-government system. So, it is assumed that the citizens will become more inclined to use e-government if the system is easy to use, easy to operate, and requires less effort to understand.

The study result shows a positive effect on the behavior intention in e-government services; the URW was 0.287 within the research variables show that is Effort expectancy increase by

one will lead to a 0.287 unit increase in Intention to adopt e-government and which agree with other researchers as well (Lian, 2015; Ovais Ahmad et al., 2013; Weerakkody et al., 2013; Yahya et al., 2012; Zulkifli et al., 2015).

5.1.2 Moderating Variable

Venkatesh et al. (2012) defined user acceptance as the opportunity to use a target technology since its initial use. Venkatesh et al. (2003) found that experience is a significant moderator variable in technology acceptance models. People with a higher level of experience are different from those with a lower level of experience, especially in knowledge structure (Söderlund, 2002).

According to Venkatesh et al., 2012, the effect of effort expectancy will decrease in increased experience. Experience is used as a moderating variable between human interaction and the adoption to determine whether the citizens were affected after the last time they had initially used a similar system.

Experience (EXP)

E-government in both countries is still in the early stages, especially in adoption, and people do not have that much experience in using such a system, so a previous experience with a similar system is expected to impact the usage of e-government systems. The results showed a positive experience with the system would moderate the relationship between human interaction and the adoption in both countries but differently.

In **Hungary,** experience affected **performance expectancy** towards system adoption, there is an evaluation that posits that the citizen's prior experience with e-government system or a similar system will positively moderate the relationship between performance expectancy with the citizen's adoption of e-government system when there was low-performance expectancy; also the relationship between performance expectancy and Behavioral Intention become low. In other words, experience positively moderates (amplified) with 16.2% of that relationship. To conclude, people's awareness of the system can play a major role in using this system. However, suppose they have a previous negative experience using similar systems assuming that they are hard to learn. In that case, likely, this experience would negatively affect citizens' belief about the performance of the e-government system, and we will be less aware of the benefits of the system on their performance expectancy as well and hence their adoption of the system. On the contrary, if the citizens have a positive experience with the facilities and support associated with the system and a high level of awareness about the system, then it is likely that this experience would positively affect citizens' attitudes towards

adopting the e-government system conditions and e-government adoption. and these results supported many researchers

On the Other hand, In **Jordan**, the results showed that a positive experience with the system would moderate the **effort expectancy** towards system adoption. An evaluation posits that the citizen's prior experience with an e-government system or a similar system will negatively moderate the relationship between effort expectancy and the citizen's adoption of an e-government system. However, this study showed that experience positively moderates the relationship between effort expectancy and e-government system adoption when there was low effort expectancy. The relationship between Effort expectancy and behavioral intention becomes low. In other words, experience positively moderates (amplified) with 11% of that relationship.

In conclusion, If the citizens perceive that learning to use e-government is an easy task, then there is a strong possibility of adopting the system. However, if they have a previous negative experience with similar systems assuming that they are hard to learn, likely, this experience would negatively affect citizens' belief about the ease of use of the e-government system, hence their adoption. On the contrary, if the citizens have a positive experience with the facilities and support associated with the system, then it is likely that this experience would positively affect citizens' attitudes towards adopting the e-government system conditions and e-government adoption, and these results supported many researchers (Alawadhi & Morris, 2008; Lin et al., 2011; Venkatesh et al., 2012).

5.1.3 E-government Infrastructure

In any system, infrastructure is an important factor in accepting this system. In this axis, the effect of the system's infrastructure was examined through 3 main factors, namely: facilitating conditions (FC), system flexibility (SF), and system Interactivity (SI), and the results showed that there is a direct impact of **facilitating conditions (FC)** with citizens in **Hungary** accepting the e-government and showed no direct impact in **Jordan**.

Facilitating Conditions (FC)

The authors suggested that facilitating conditions are directly related to the actual usage of new technology. This construct includes technological and organizational characteristics (e.g., regulations, incentives, and training) that help to facilitate system use. And the results supported this hypothesis and agreed with many Previous studies in Information Technology that reported that the facilitating condition constructs directly influence user behavior (Jong & Wang, 2009; Ovais Ahmad et al., 2013). This finding suggests that the citizens believe that the government agencies' support will enable them to use the e-government services on the

websites without encountering any problems. The facilitating conditions factor in the present study refers to the existence of supporting infrastructure available to the users of IS.

This construct is important because, without these supporting infrastructures, the citizens may believe that the e-government services are difficult to use. This study finds that the citizens will be more inclined to use the e-government system in **Hungary** if technical resources and operation manuals are readily available to them. Additionally, the system must be compatible with other applications. These results agreed with other Hungarian studies of (Aranyossy, M. , 2018), which found that facilitating conditions are the second most important factor influencing the acceptance of e-government in Hungary. The reason is the difference in acceabilty between regions and the nature of the public sector in Hungary, which is more decentraliz and many levels. Finally, the multiplicity of authorities responsible for the program in the country affect the regulations. The role of facilitating conditions in adopting e-government services has been found to affect behavior intention in several studies (Ovais Ahmad et al., 2013; Yahya et al., 2012; Zulkifli et al., 2015).

5.1.4 Trust

Prior e-government studies demonstrated the value of trust as a determinant of citizens' acceptance of e-government services. People must trust the government and enabling technology. People typically have reservations regarding protecting and abusing personal details as posted electronically (Carter & Belanger, 2004). Previous research, however, provided contradictory findings on the impact of trust on citizens' intention towards e-government services (Al-Hujran et al., 2011). However, current e-government trust literature primarily views trust as representing citizens' values (Lian, 2015; Weerakkody et al., 2013). In this study, trust is divided into two variables: trust in the system and trust in the government.

Results found that trust in Government does not affect the adoption in both countries, which agrees with other studies as the Hungarian study (Nemeslaki et al. 2016). On the other hand, **trust in the system** positively affects e-government adoption in both countries. In general, users of e-government programs still do not trust greatly in technological systems and even the Internet, especially because they use their personal data(Lian, 2015; Weerakkody et al., 2013 ;Al-Hujran et al., 2011; Alryalat et al. ,2013). The potential reason for that, that trust allows the usage of e-government systems effortless, eliminating the need to verify any protection and privacy-related information, and the two programs are still in the early stages of acceptance and need more time and procedures to raise the trust of users of this systems

through awareness campaigns and regulations that show the level of safety in the two systems.

Based on these results, governments must raise the level of trust in the system by focusing on all elements that affect users' confidence, such as safety, transparency, and privacy. And this result is consistent with several previous research in **Hungary** (Csótó, M. ,2019; Aranyossy, M. ,2018; Pérez-Morote, R., Pontones-Rosa, C. and Núñez-Chicharro, M. , 2020; Nemeslaki et al. ,2016) and in **Jordan** (Alryalat et al. ,2013; Alhujran et al ,2015). These results also confirm the importance of trust in the system for any e-government system, after the emergence of its strong impact in two different countries and two different systems.

5.2 Comparison

The two countries share many demographic characteristics such as population and area, and until the launch of the e-government project was in the same year 2001. However, the e-government program in Hungary enjoys a comparative advantage in terms of implementation, as Hungary occupies the ranking 52nd while Jordan is in the 117th out of 193 countries in United Nations e-Government Survey 2020. And according to the same classification of the United Nations, which is based on four main criteria E-Participation, Online Service, Telecommunication Infrastructure, and Human Capital. Both countries achieved the highest results in Human Capital, but also both of them got the lowest results in Telecommunication Infrastructure, but we can see that Hungary is superior to Jordan in all axes.

Hungary sought in previous years to legislate laws regulating the transition to full digitization and forced government institutions to create the electronic option along with The traditional option. However, Jordan still does not push in this direction sufficiently. The two countries have a strategy to support the program in the future, and Hungary is also excelling by adopting modern communication technology such as 5G; in Jordan, the government mentioned these modern technologies such as 5G, Artificial intelligence, blockchain, and the Internet of things in the new strategy 2019-2025 but still as plans.

The two programs face challenges in terms of user acceptance of the services provided by the e-government, and this is evidenced by the low percentage of users of these services. This research explored the main factors that affect the rate of acceptance of electronic services in the two countries. The results showed some similar results in the two countries, so factors such as **trust in the system** and **performance expectancy** are important and directly influencing the users' adoption of e-government services in both countries, the reason is due to the importance of these factors to any new system, especially in the public sector, where it

requires trust in the system that users will use using sensitive information, as well as their expectation of the benefit that may accrue to them from this system in light of its comparison with the traditional option.

On the other hand, the differences came in the infrastructure axis, **facilitating conditions** influential in Hungary and less important and effective in Jordan. This difference is due to factors related to the nature of the public sector in the two countries and the responsible authorities, as in Hungary there are many layers of the public sector, and there are many authorities responsible for the program.

Moreover, the results showed that the factor **effort expectancy** is important and directly influences the adoption of Jordan services, but less important and influential in Hungary. The importance of this factor for Jordan is because the system is still elementary and complex. In recent years, Jordan has launched many platforms for services, making the system more difficult than the Hungarian program, which has fewer platforms and easier than Jordan.

Finally, the moderating variable in the study has an important and different effect between the two countries, as the results showed that experience plays an important role and the relationship has changed in a positive way between the variable **performance expectancy** on the users' adoption in Hungary. However, in Jordan, this effect is limited to the relationship between **effort expectancy** and adoption. The experience differed in its impact between the two countries due to the nature of the two systems, where the Hungarian system is advanced for Jordan. Therefore the experience affected the Performance expectancy becouse of the experiment with other systems that increases the users' awareness of the importance of the system and its impact on their work and performance, However, in Jordan, because Jordan is still lagging behind Hungary, the effect came on users of other systems and their knowledge more to deal with the government system and thus affects the effort expectancy.

All these differences in results, in general, were also due to more differences in the culture and level of awareness between the population of the two countries and other variables that could be discovered in future studies to expand this study.

Recommendations

Practical effects

One of the study concerns is how this research might assist Jordan, Hungary, and other countries in preparing and growing e-government adoption rates with similar circumstances. This study offers a realistic and communicable checklist of social and technical considerations

to e-government officials and decision-makers and covering people's viewpoints about e-government. This checklist is the foundation of every e-government initiative.

Because Jordan and Hungary face low-level citizens' adoption of e-government services, research findings are anticipated to assist e-government officials and policymakers from Jordan and every other country with similar characteristics in better positioning their policies to facilitate quicker and more effective adoption of such services.

The citizens' survey found that trust in the system itself and effort expectation contributes significantly to citizens' acceptance of Jordan's e-government services. On the other hand, in Hungary, Performance expectancy, facilitating conditions, and trust in the system lead significantly to the adoption of e-government services. This study's findings indicated that e-government officials in both countries should pay attention to the trust dimensions. For example, increasing system security, privacy, and other considerations influences citizens' trust in the system.

In Jordan, government departments can, therefore, provide easy-to-use services. Carter and Belenger (2005) proposed various approaches to maximize planned commitment. One includes free guides on e-government platforms to explain how people should use and interact with these programs. Government agencies can also develop their websites' support and search facilities to locate relevant details easily. Moreover, citizens' input on e-government platforms can be elicited and evaluated. This will allow government departments to update their websites to display e-government resources and details efficiently for people.

Moreover, considering the performance expectancy in both countries, government departments must integrate valuable information and resources into their websites. These organizations can also use training and marketing methods to build citizens' views regarding e-government services' effectiveness and importance. To render e-government services valuable, making these services simple to use and trustworthy is essential.

Furthermore, trust has a huge effect on citizens' views in both nations. Therefore, government departments can improve trust in the system by implementing and strategically sharing their information protection policies on government websites.

5.3 Limitations and Future Research

The shortcomings of this study can be outlined in:

- This research took cross-sectional architecture. This cross-sectional analysis reflects a slice of time, not showing how the resident's attitude and actions will change over

time. Further analysis utilizing a longitudinal design will assess whether the mindset towards using e-government facilities has shifted over time.

- This research could not distribute the questionnaire evenly between the geographical regions in the country due to the Coronavirus pandemic that prompted the researcher to use the electronic questionnaire.
- The existence of many factors affects acceptance, and therefore the current study could not focus more on important factors and study them more deeply, such as (trust) related to other factors such as security and privacy.

Given these limits, this report provides useful insights into researching e-government citizenship. This study's known shortcomings contributed to recommendations for more studies.

Future research

This thesis is just one episode in a research chain. One potential path for future research is refining adoption and strengthening its calculation by introducing a semantic differential scale. Moreover, as stated, the current analysis used a cross-sectional approach. It would be useful to perform a longitudinal study and see whether the variables and their relationships remain stable over time. In addition, The Coronavirus pandemic has affected the questionnaire distribution process, as we mentioned earlier, and therefore conducting research that distributes the questionnaire equally in all geographical areas in the country will contribute to a deeper understanding of citizens' acceptance of electronic services.

The researcher studied the effect of trust in the system on acceptance, and it had a strong impact on the two countries. Accordingly, studying more variables related to trust in the system, such as (security, privacy, and transparency) may lead to a greater understanding of this variable.

Finally, this study's findings are assumed to assist Jordan, Hungary, and other countries with similar e-government and resident acceptance characteristics. More comparative research between different countries with different cultures and economies will be worth comparing this study's results with other developed countries. By performing a related analysis on various countries that could share basic characteristics with Jordan, the conclusions reached may be correlated with this study's results and validated or expanded.

6. MAIN CONCLUSIONS AND NOVEL FINDINGS OF THE DISSERTATION

Conclusion

This study reports empirical research on citizen adoption of e-government services in Jordan and Hungary. It is inspired by the low-level individual acceptance of e-government systems in developing countries. E-government systems cannot boost public service quality until the public uses them. Therefore, this study's key goal is to achieve a deeper understanding of factors affecting the use of e-government services by people. Identifying those variables can increase the probability of growing the acceptance of these programs by deepening awareness of factors that promote or impede the adoption process. The second goal for this analysis is the limited longitudinal e-government implementation studies focused on adopting such services in developing countries like Jordan. Filling this void in literature is also one reason for undertaking this research in a country like Jordan, and compare it to Hungary, which has the same population number and the same size with different cultural and social values.

After the comprehensive literature analysis, this dissertation established a theoretical model, this model combines UTAUT2 with other variables collection of infrastructure and trust. An internet survey was used to empirically validate the proposed model due to the coronavirus pandemic that complicated the physical encounter, so the data were obtained from a random sample of both countries over the internet. After the pilot the researcher excluded a number of vague or unclear questions from the questionnaire, and the researcher also combined some variables and created one theoretical framework contains seven common variables between the two countries , for conducting the final study and making a comparison between the two countries

This analysis showed that the test model clarified the disparity in citizens' intention to utilize e-government services. Interestingly, however, the results found that people's desire to use e-government services is more affected by their perceptions of its effect on their efficiency and ease of using the system and less by social impact. This result also indicates that system trust merits further consideration in e-government adoption research due to its major impact on user intentions, and the two countries should focus on building trust in the system by enhancing system security and privacy.

Moreover, the findings also revealed that success performance and Effort expectations positively affected people's attitude to using e-government facilities in both countries. And finally, the results showed that e-government trust was indeed a powerful predictor of citizens'

adoption. Furthermore, the results revealed that although facilitating conditions did not influence adoption in Jordan, on the other hand facilitating conditions had a substantial positive effect on the adoption of e-government in Hungary.

New Results

1) In the research the model (UTAUT2) was tested and validated in new environment, the public sector, and a non-commercial system such as e-government.
2) Explored the main factors affect the e-government acceptance in Jordan (performance expectancy, effort expectancy, and trust in the system) and in Hungary (performance expectancy, facilitating conditions, and trust in the system).
3) The model was applied in two different countries and the results were similar in many factors such as performance expectancy and trust in system.
4) The new model for the two countries emphasized that trust in the system is an important and fundamental factor for accepting the e-government system.
5) Create a new theoretical model suitable for both countries that can be used in other similar countries. And this study can be referred to as a reference for researchers in the two countries (Jordan and Hungary) to build more on these results.

SUMMARY

The world and the countries, in general, are moving to change the form of government and public sector management from the traditional form that relies on providing services in-person to use the technology and employ it to provide various government services and communicate with citizens and companies completely electronically.

Most of the countries in the world began to implement e-government and move from the traditional form of service provision to the electronic form since the beginning of the 21st century. With the entry of the current year, the importance of e-government has increased dramatically due to the spread of the Coronavirus pandemic in the world and the urgent need to reduce any personal contact between people.

Despite these major changes, e-government programs in many countries failed for many reasons, and the most important reason was the lack of acceptance for this system by the stockholders, so the rate of acceptance and use was one of the challenges troubling officials in the public sector.

Previous studies have developed many theories and models to explore the most important factors that affect the acceptance and adoption of new technological systems such as e-government. However, these theories were often tested in developed countries and to a limited extent and less in developing countries such as Jordan. One of the most important and best models is the UTAUT model, which brings together many previous models and explains the acceptance of technology greatly compared to previous models. However, this model is still tested in different environments and does not cover all the factors that may affect the users' decision to adopt a new system, especially in the public sector.

In this research, the model was expanded with additional variables related to trust and some features of the system and awareness that were not present in the original model and may be influential in the two countries (Jordan and Hungary) to study and explore the most important factors that affect the users' decision to adopt the e-government system.

The results showed similar results in the two countries, so factors such as trust in the system and Performance expectancy are important and directly influence the users' adoption of e-government services in both countries. On the other hand, the differences came in the infrastructure axis, facilitating conditions influential in Hungary and less important and effective in Jordan. Moreover, the results showed that the factor effort expectancy is important and directly influencing the adoption of services in Hungary, but less important and influential in Jordan. Finally, The effect of the mediating variable in the study was variable, as

the results showed that experience plays an important role. The relationship has changed in a positive way between the two variables Performance expectancy and the user's adoption in Hungary. However, in Jordan, this effect is limited to the relationship between effort expectancy and adoption; these differences in results were due to differences in the culture and level of awareness between the population of the two countries and other variables that could be discovered in the future studies to expand this study.

LIST OF PUBLICATION

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List of publications related to the dissertation

Articles, studies (5)

1. **Aburumman, N. M. A.**: Extracting the factors that affecting the hungarian citizens' adoption of e-government services from the viewpoint of university students: extended UTAUT2 model. *Cross-Cultural Management Journal. 23*, 131-144, 2021. ISSN: 2286-0452.
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6. Fraij, J. K. I., **Aburumman, N. M. A.**: How Does Telework Act As A Solution To The Public Sector In The Time Of Pandemic?
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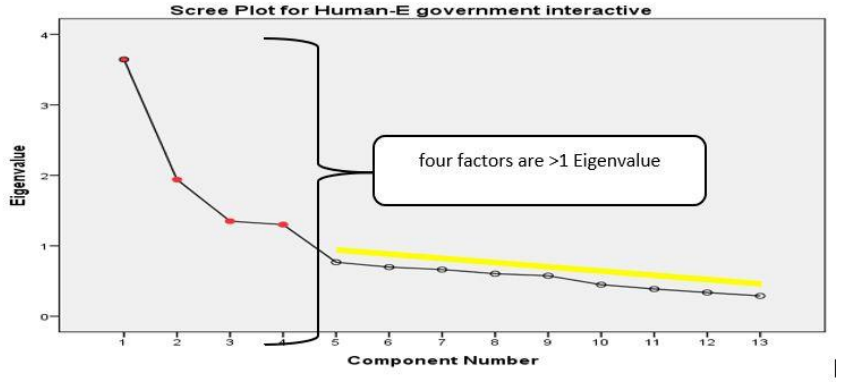
APPENDICES 1



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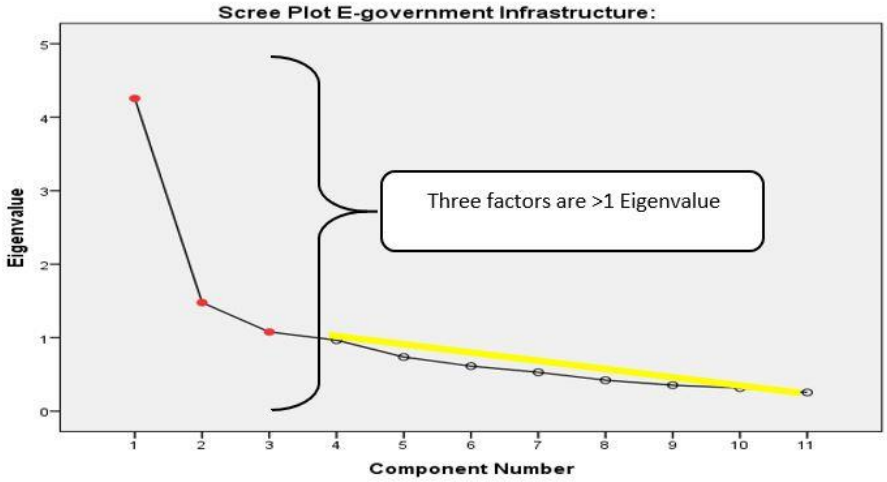

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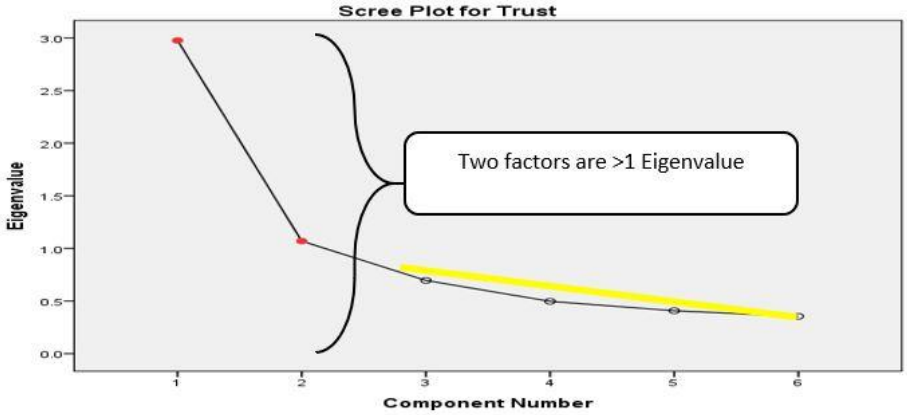

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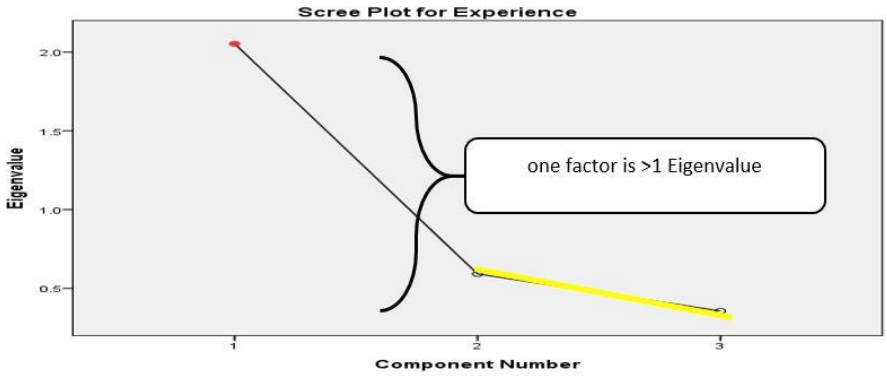

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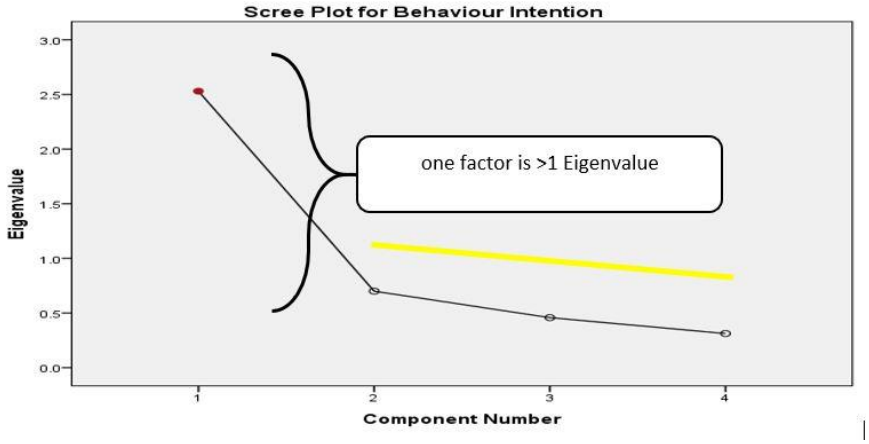

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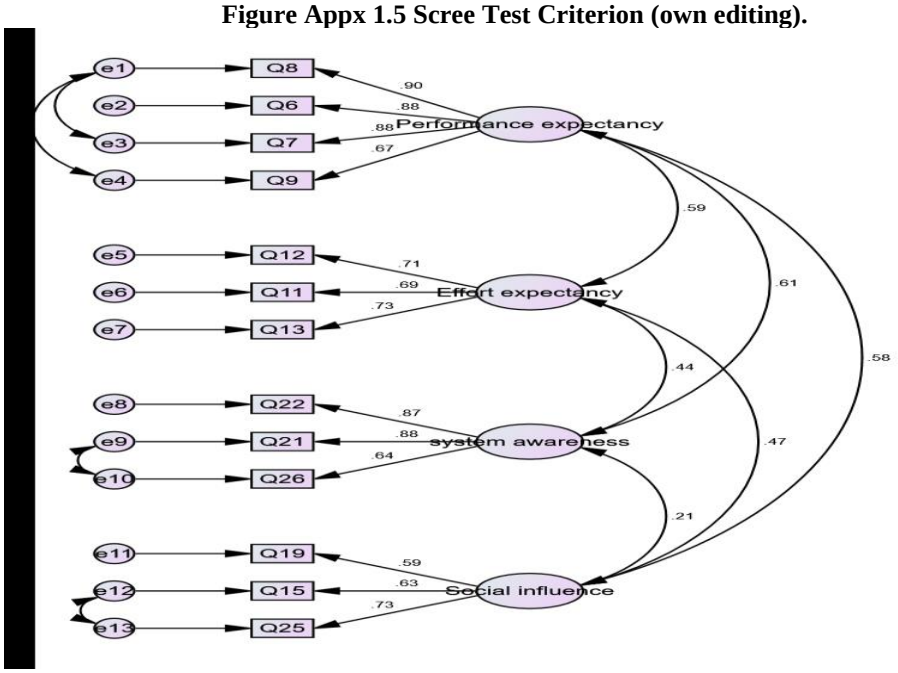

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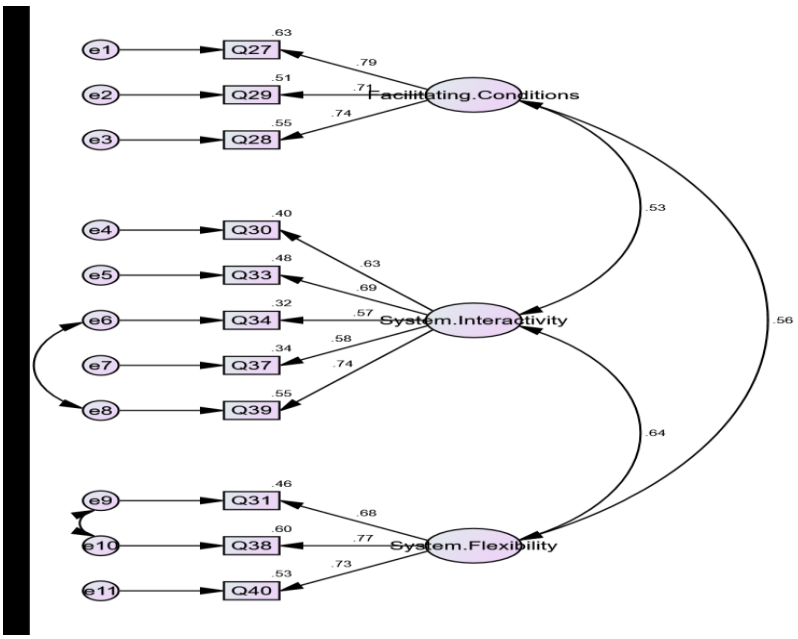

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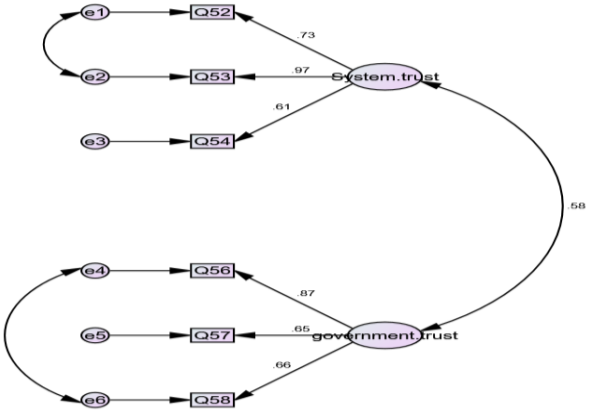

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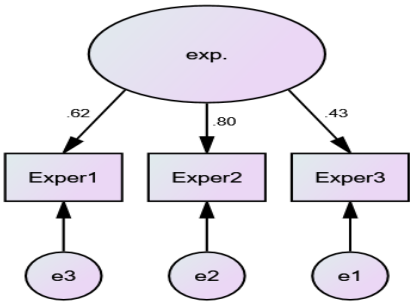

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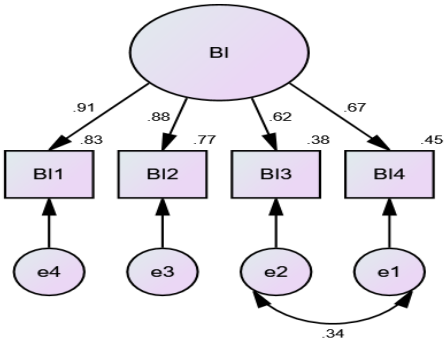

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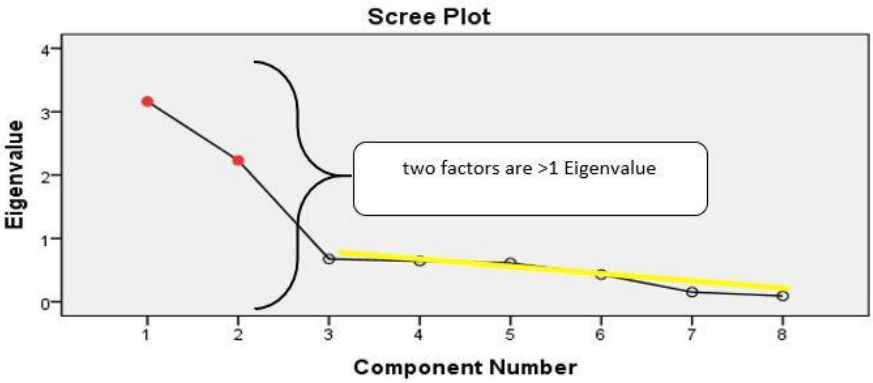

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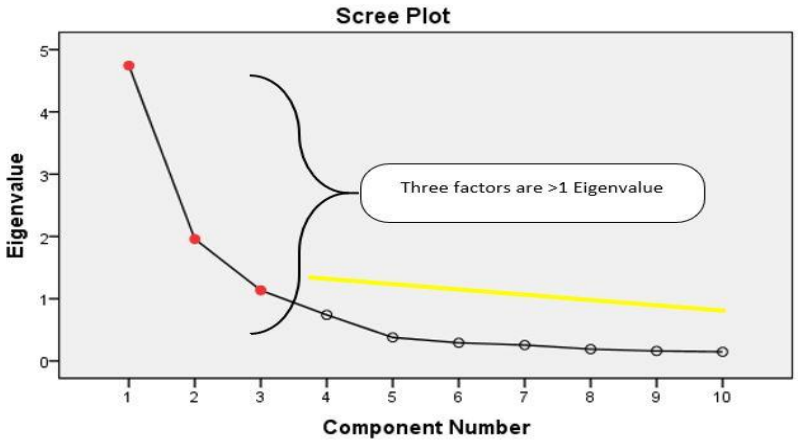

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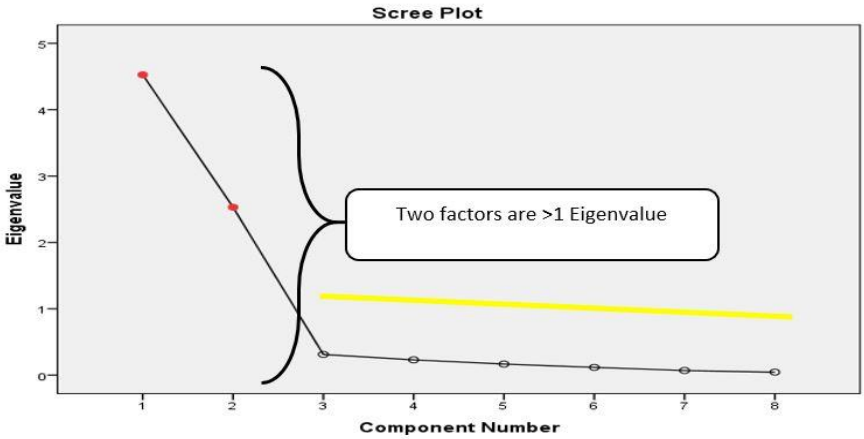

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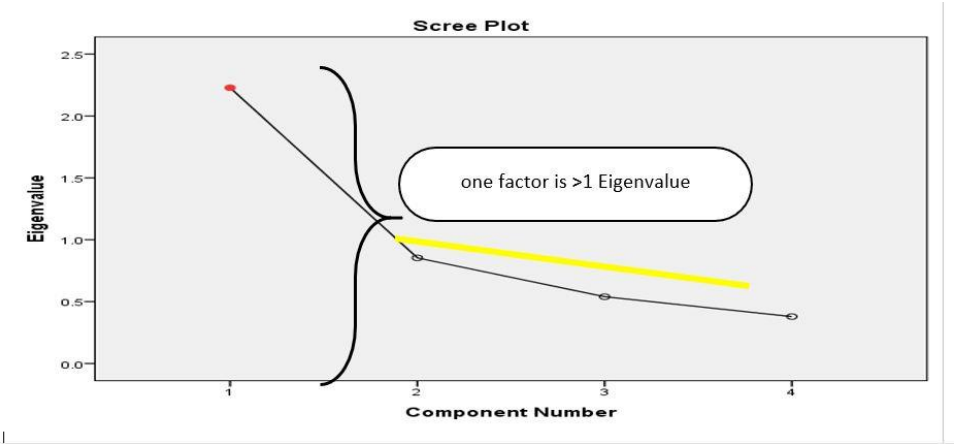

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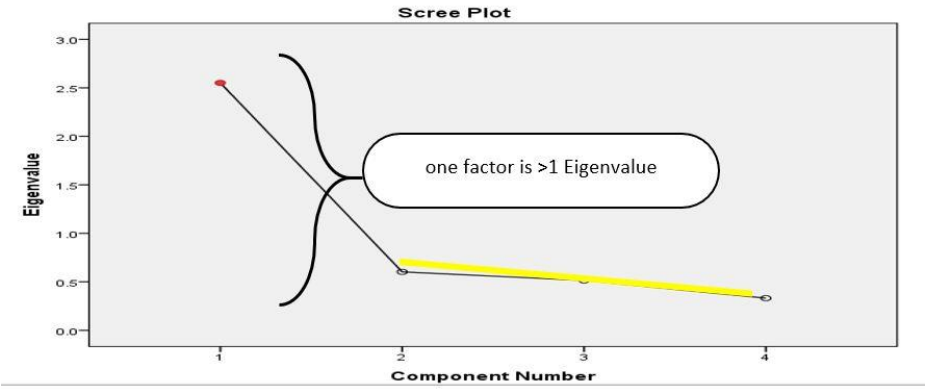

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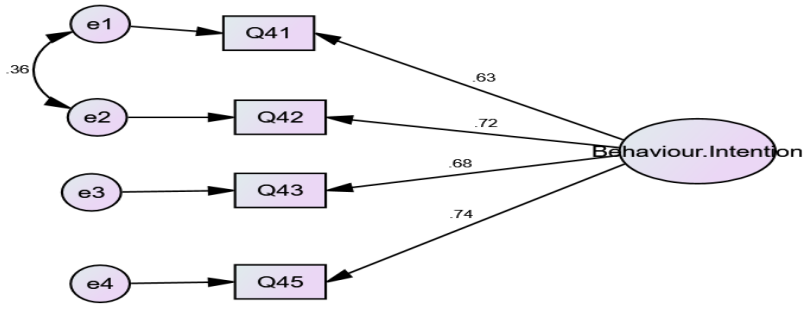

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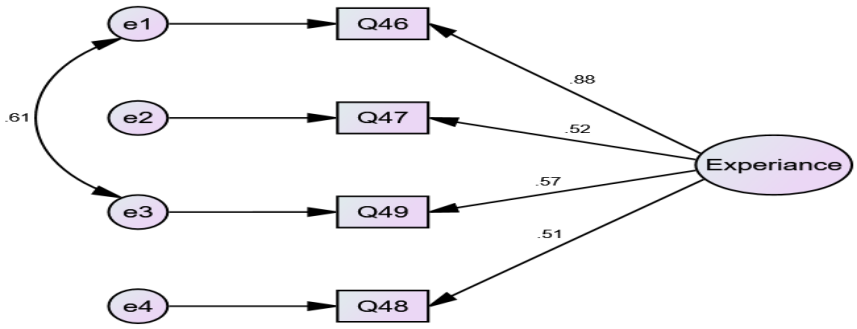

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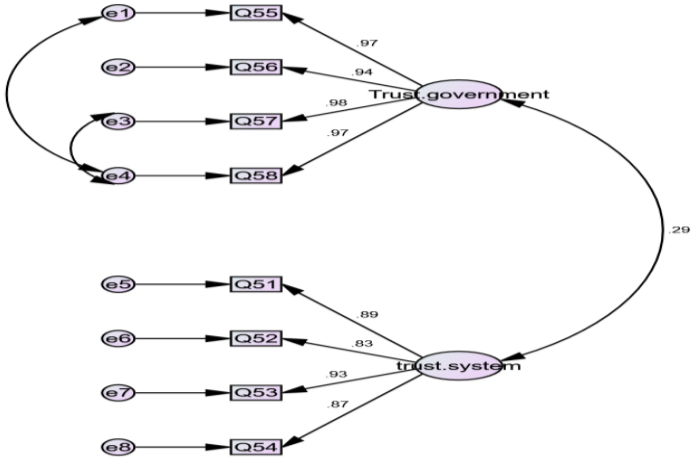

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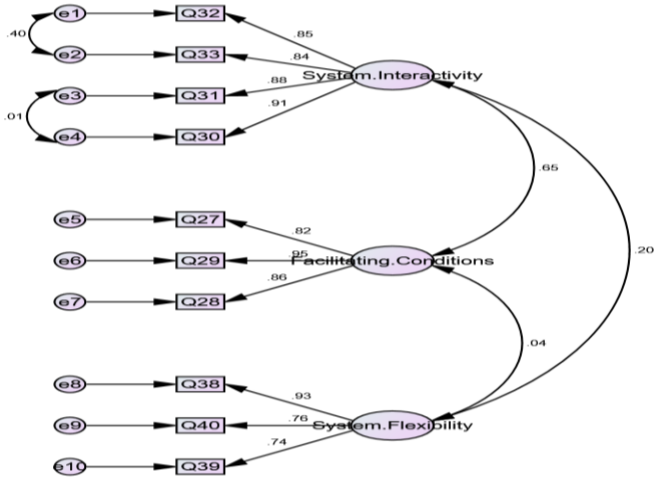

Figure Appx 1.19 path analysis for E-government Infrastructure (own editing).

Figure Appx 1.20 path analysis for Human-E government interaction (own editing).

APPENDICES 2

Table Appx 2.1 Hungarian respondent's correlation matrix determinants for factors (own editing)

Factors	Test name	Value	Criteria	Judgment
Human-E government interaction	Determinant	0.010	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	Less than 0.05	**Accepted***
	KMO-test	0.739	Greater than 0.50	**Accepted***
E-government Infrastructure	Determinant	0.019	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	Less than 0.05	**Accepted***
	KMO-test	0.806	Greater than 0.50	**Accepted***
Trust	Determinant	0.159	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	Less than 0.05	**Accepted***
	KMO-test	0.775	Greater than 0.5	**Accepted***
Experience	Determinant	0.432	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	Less than 0.05	**Accepted***
	KMO-test	0.659	Greater than 0.5	**Accepted***
Behaviour Intention	Determinant	0.253	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	Less than 0.05	**Accepted***
	KMO-test	0.757	Greater than 0.50	**Accepted***

Table Appx 2.2 Jordan respondent's correlation matrix determinants for factors (own editing)

Factors	Test name	Value	Criteria	Judgment
Human-E government interaction	Determinant	0.011	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	P<0.05	**Accepted***
	(KMO-test)	0.789	Greater than 0.50	**Accepted***
E-government Infrastructure	Determinant	0.001	Greater than 0.00001	**Accepted***
	Bartlett's test	0.02	P<0.05	**Accepted***
	(KMO-test)	0.826	Greater than 0.50	**Accepted***
Trust	Determinant	0.0005	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	P<0.05	**Accepted***
	(KMO-test)	0.840	Greater than 0.5	**Accepted***
Experience	Determinant	0.389	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	P<0.05	**Accepted***
	(KMO-test)	0.688	Greater than 0.5	**Accepted***
Behaviour Intention	Determinant	0.262	Greater than 0.00001	**Accepted***
	Bartlett's test	0.000	P<0.05	**Accepted***
	(KMO-test)	0.773	Greater than 0.50	**Accepted***

Questionnaire

Dear Participants,

You are kindly requested to respond to all the statements in this questionnaire which includes three sections. The first section is an introduction the second one is demographic data and the third section is related to the participants' view about the use and acceptance of e-government. The questionnaire is a part of doctoral research entitled as "Factors Affecting Users' Acceptance of E-Government: A comparative Study between Hungary and Jordan".

Best regards,

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Your answers will be treated with absolute confidentiality and will be only used for research purposes.

Thank you for taking the time to complete this survey.

Your participation is highly appreciated and will contribute to the fulfillment of this research.

APPENDICES 3

Section 2: Questions' items (13 Parts)

In this section for most questions simply circle the number that corresponds to your opinion, as in the example below.

Example:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
E-government enables me to obtain Government service with convenient hours of operation (7 days, 24 hours)	1	2	3	(4)	5

Part 1: Performance expectancy

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
6	I find E-government useful in my daily life.	1	2	3	4	5
7	Using E-government services help me to accomplish things more quickly.	1	2	3	4	5
8	Using E-government services save my money.	1	2	3	4	5
9	Using E-government services increases my productivity.	1	2	3	4	5

Part 2: Effort expectancy

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
10	It is easy for me to become competences at using E-government services.	1	2	3	4	5
11	I find E-government services easy to use.	1	2	3	4	5
12	It would be easy to explore E-government websites.	1	2	3	4	5
13	Interactions with E-government websites would be clear and understandable for me.	1	2	3	4	5
14	Learning how to use E-government services is easy for me.	1	2	3	4	5

Part 3: Social influence

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
15	People advice me that I should use E-government services.	1	2	3	4	5
16	I would use online E-government services if people who are important to me also used them.	1	2	3	4	5
17	People around me who use the E-government services have more prestige.	1	2	3	4	5
18	I would use online government services if I need to.	1	2	3	4	5
19	People, who I respect their opinions, prefer if I use E-government services.	1	2	3	4	5

Part 4: Awareness of the system

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
20	I have enough knowledge and information about the importance of E-government.	1	2	3	4	5
21	I am aware of the E-government services provided by the government.	1	2	3	4	5
22	I find it difficult to use e-government services due to lack of information and awareness campaigns.	1	2	3	4	5
23	Overall, I am not satisfied with the awareness campaigns (TV, radio, newspapers, banners in government agencies websites, and in shopping malls) level obtained from e-government officials.	1	2	3	4	5

Part 5: Habit

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
24	The use of E-government has become a habit for me.	1	2	3	4	5
25	I should use the E-government services.	1	2	3	4	5

26	Using E-government services has become natural to me.	1	2	3	4	5

Part 6: E-government Infrastructure

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
27	I have the necessary resources to use E-government services.	1	2	3	4	5
28	I can get help from others when I have difficulties using E-government services.	1	2	3	4	5
29	E-government is compatible with other technologies I use.	1	2	3	4	5

Part 7: System Interactivity

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
30	E-government portals enable me to interact with officials.	1	2	3	4	5
31	The communication tools (e-mails, chat room, forum, etc) in E-government are active.	1	2	3	4	5
32	Using communication tools will be beneficial for me.	1	2	3	4	5
33	E-government enables me to send questions and receive answers.	1	2	3	4	5

Part 8: System Enjoyment

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
34	E-government portals are attractive to use .	1	2	3	4	5
35	The actual process of using E-government portals would be wise.	1	2	3	4	5
36	The actual process of using E-government portals would be pleasant.	1	2	3	4	5
37	Using E-government would make the services more interesting.	1	2	3	4	5

Part 9: System Flexibility

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
38	E-government portals allow me to use services according to my available time.	1	2	3	4	5
39	E-government portals allow me to use services from any place comfortably.	1	2	3	4	5
40	In terms of time and location E-government portals are flexible.	1	2	3	4	5

Part 10: Behaviour Intention

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
41	I plan to continue using E-government services.	1	2	3	4	5
42	I will always try to use E-government services in my daily life.	1	2	3	4	5
43	I use E-government portals services frequently	1	2	3	4	5
44	I prefer to avoid E-government portals and going personally to complete the transactions	1	2	3	4	5
45	I plan to use e-government services in the future.	1	2	3	4	5

Part 11: Experience

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
46	I frequently visit E-government portals for information gathering.	1	2	3	4	5
47	I frequently use E-government for my job.	1	2	3	4	5
48	I have used similar websites or systems before this one to perform the tasks.	1	2	3	4	5
49	I am pleased with the experience spent with e-government portals.	1	2	3	4	5
50	My experience with other systems like E-government was pleasing.	1	2	3	4	5

Part 12: Trust

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
51	E-government portals have enough safeguards (e.g. security policy) to make me feel comfortable using it to access government services.	1	2	3	4	5
52	I feel assured that legal and technological structures adequately protect me from any problems on using E-government portals	1	2	3	4	5
53	In general, E-government portals are now a robust and safe environment to access government services.	1	2	3	4	5
54	In my opinion, E-government portals are trustworthy.	1	2	3	4	5

Part 13: Trust in the government

no.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
55	In my opinion, Government agencies are trustworthy	1	2	3	4	5
56	I believe in the capability of the agencies to perform online transactions faithfully.	1	2	3	4	5
57	I truly believe in the ability of the staff, dealing with E-Government, on implementing the online services in a confidential manner	1	2	3	4	5
58	I think government agencies have the resources to perform dependable and reliable online services.	1	2	3	4	5

Feel free to add any additional comments

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Thank you for your time and effort!