Faculty of Information and Communication Technology

A FRAMEWORK FOR ASSESSING PERCEIVED TRUST AND SECURITY IN ELECTRONIC PAYMENTS SYSTEM: A CASE STUDY OF IRAQ

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A FRAMEWORK FOR ASSESSING PERCEIVED TRUST AND SECURITY IN ELECTRONIC PAYMENTS SYSTEM: A CASE STUDY OF IRAQ

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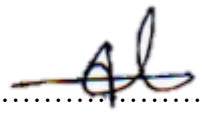
DECLARATION

I declare that this thesis entitled "A Framework for Assessing Perceived Trust and Security in Electronic Payments System: A Case Study of Iraq" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :  ……..

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APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.

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Supervisor Name : ……..

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DEDICATION

I dedicate my project work to my family and my friends. A special feeling of gratitude to my father, and to my beloved mother, who encouraged me and a push for tenacity to improve myself throughout all my walks of life and who has always been with me in overcoming difficult times in my life. His patience is the meaning of love, kindness and gentle soul. Thank you for giving me a chance and I love them.

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ABSTRACT

E-commerce is based on electronic payment systems (EPS) and the growing volume of e-commerce makes EPS more important for both businesses and consumers. The usage of EPS in Iraq is suffering from many difficulties and problems in implementation and consistency although it is considered to be in its main phases of development. Among the problems are about the users' perceived security and trust. Perceived security can be defined as a subjective evaluation of the security of the EPS by the consumer, while perceived trust referred to the belief of consumers that e-payment transactions will be processed according to their expectations. The lack of perceived security and trust has been identified as one of the most vital factors slowing the development of e-commerce. This poses a challenge to the Iraq government in realizing the initiatives of e-services particularly in the EPS initial phase, identification phase, build phase, integration phase, fine tune and expansion phase. However, there has been lack of study to advance the understanding in the subject of citizens' perceived trust and security that affecting the EPS usage in Iraq. This research addresses this gap through an empirical study of perceived trust and security factors in impacting EPS usage in Iraq. In this research a framework is designed to describe the determinant factors of perceived trust and security, its relationship, and the subsequent effect on the EPS use. In order to understand the level of trust in Iraq, a survey was conducted among citizen of Iraqi with different academic levels in regard to trust and security factors. The determinant factors are obtained based on previous research theories, which are: transaction procedure, technical protection, perceived privacy, perceived security, perceived usefulness, and perceived ease of use of EPS. A sample of 422 respondents was analysed through structural equation modelling (SEM); the findings indicate that both perceived trust and security factors have a significant influence on EPS use. The effect of perceived trust on the use of EPS, emphasized as a regression coefficient in the results, has been found to be a strong one. This research contributes to the area of trust and security perception in e-commerce with particular interest on Iraq. The results of this study will be a point-out of the basics framework of trust and security perceptions for electronic payment systems in Iraq. The findings will help the current implementation challenges; in order to conform to the electronic payment systems requirements towards establishments of e-services in Iraq.

ABSTRAK

E-dagang adalah terma yang berasaskan kepada sistem pembayaran elektronik (SPE), dan dengan jumlah e-dagang yang semakin meningkat, ini menjadikan SPE semakin penting kepada peniaga dan pengguna. Penggunaan EPS di Iraq mengalami banyak masalah dalam pelaksanaannya walaupun penggunaannya boleh dikatakan di dalam fasa utama pembangunan e-servis. Antara masalah yang dialami adalah berkenaan dengan kebolehpercayaan dan keselamatan SPE. Faktor keselamatan boleh ditakrifkan sebagai penilaian subjektif terhadap keselamatan EPS oleh pengguna, sementara faktor kebolehpercayaan merujuk kepada tahap kepercayaan pengguna terhadap transaksi e-pembayaran tersebut adalah bertepatan dengan jangkaan mereka. Kelemahan dalam faktor keselamatan dan kebolehpercayaan telah dikenalpasti sebagai salah satu faktor yang dominan dalam mempengaruhi pembangunan e-dagang. Ini menimbulkan cabaran kepada kerajaan Iraq dalam merealisasikan inisiatif e-perkhidmatan mereka khususnya dalam fasa awal EPS, fasa pengenalan, fasa pembinaan, fasa integrasi, dan fasa pengembangan. Walau bagaimanapun, kajian untuk mengenalpasti pemahaman rakyat Iraq dalam faktor kebolehpercayaan dan keselamatan SPE di Iraq masih kurang. Projek penyelidikan ini akan menangani isu ini melalui kajian empirikal berkenaan dengan kebolehpercayaan dan faktor keselamatan dalam penggunaan EPS di Iraq. Menerusi penyelidikan ini, satu kerangka kerja dibina untuk mewakili faktor utama bagi kebolehpercayaan dan keselamatan SPE, hubungan antara keduanya, dan kesannya terhadap penggunaan EPS. Untuk itu, satu tinjauan berkenaan dengan kebolehpercayaan dan keselamatan dalam penggunaan EPS telah dijalankan di kalangan warganegara Iraq dengan tahap akademik yang berbeza. Faktor-faktor penentu bagi kebolehpercayaan dan keselamatan diperoleh dari teori penyelidikan terdahulu, iaitu: prosedur transaksi, perlindungan teknikal, tahap privasi, tahap keselamatan, dan tahap kemudahan penggunaan EPS. Sebanyak 422 sampel responden telah dianalisis melalui Pemodelan Persamaan Struktur (SEM); hasil analisis menunjukkan bahawa kedua-dua faktor iaitu kebolehpercayaan dan faktor keselamatan dilihat mempunyai pengaruh yang signifikan terhadap kegunaan EPS. Ini dapat dilihat menerusi koefisien regresi yang kukuh di dalam keputusan analisis yang telah dijalankan. Penyelidikan ini adalah menyumbang kepada badan pengetahuan dalam bidang kebolehpercayaan dan persepsi keselamatan dalam e-dagang di Iraq. Keputusan kajian ini boleh digunakan sebagai asas kerangka dalam menjelaskan faktor kebolehpercayaan dan persepsi keselamatan untuk sistem pembayaran elektronik di Iraq. Hasil penyelidikan ini juga akan membantu Iraq dalam cabaran pelaksanaan e-servis; terutama dalam memenuhi keperluan sistem pembayaran elektronik yang akan membawa kepada perkara-perkara lain dalam e-servis di Iraq.

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ACH	-	Automatic Clearing House
B2B	-	Business-To-Business
B2C	-	Business-To-Customer
C2C	-	Consumer-To-Consumer
CBI	-	Central Bank of Iraq
EPS	-	Electronic Payment Systems
EU	-	EPS Use
GT	-	Grounded Theory
ICT	-	Information and Communication Technologies
IS	-	Information Systems
P2P	-	Peer-To-Peer
PDA	-	Personal Digital Assistants
PEU	-	Perceived Ease of Use
PP	-	Perceived Privacy
PS	-	Perceived Security
PT	-	Perceived Trust
PU	-	Perceived Usefulness
SEM	-	Structural Equation Modelling
TAM	-	Technology Acceptance Model
TEP	-	Technical Protection

TP - Transaction Procedure

TRA - Theory of Reasoned Action

UN - United Nation

UNDP - United Nation Development Program

LIST OF PUBLICATIONS

Thiab, A.S., and Yusoh, Z.I.M., 2018. Developing a Framework for Electronic Payment Systems, Trust and Security in Iraq. *Journal of Engineering and Applied Sciences*, 13, pp. 4482-4492.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Iraq is a post-conflict society as a developing country. There is limited Internet use, where large mobile phones are only used in urban areas by younger generations. There is little insight into Internet technology and its use in electronic commerce. Baghdad is an Iraqi federal region which exercises executive power in accordance with the laws of the Iraqi Parliament. Due to the country's political and economic situation, e-communication infrastructure is not well established and this has caused many e-services, including e-payment, real problems. E-payment is an electronic transaction between payer and payer using e-payment mechanisms. Customers can therefore manage their transactions and account remotely using technologies such as web applications (Velmurgan, 2008). In this study, the main challenges and barriers in the provision of e-payment services in Iraq focusing on trust and security will be investigated and a framework for the use of the electronic payment system (EPS) focusing on trust and security perception will be proposed, which will help the government to overcome some of these problems.

Provision of e-payment services is directly affected by the state of banking infrastructure; a well-established banking system can facilitate the provision of e-payment service more efficiently. The state of banking infrastructure is not well established in Iraq. Currently there are few branches of Central Bank of Iraq (CBI) in Iraq. The CBI offices are responsible for bank regulations in their respective governorates. According to the

official CBI website there are more than 56 banks in Iraq which are categorized into four categories, State Banks, Private Banks, Islamic Private Banks, and Foreign Banks. Currently, there are some EPS systems that have been established by CBI such as Real Time Gross Settlement System (RTGS), Automatic Clearing House (ACH) and Government Securities Registration system (GSRS). To date, there are 44 banks registered in RTGS system, 17 banks registered in ACH, 11 banks registered in CEP, and 25 banks registered in GSRS. Among all the systems, RTGS is the only system where the e-payment is actively used. It is important to mention that RTGS system is for managing settlements between CBI and other banks in Iraq and it is not for public's use.

The primary purpose of this research is to investigate Iraqi citizens ' perceptions of trust and security in e-commerce and the factors affecting the trust and security aspects of electronic payment systems. This research also attempts to identify the barriers that hinder the diffusion of electronic payment systems, which in developing countries are often underestimated. This research contributes to the knowledge of confidence and security in e-commerce with a special interest in Iraq. The results of this work are limited by the sample and the geographical limits, but the results achieved have many implications for policymakers in Iraq.

1.2 Research background

Laudon and Traver (2015) describe e-commerce as online trade, using web and mobile applications to facilitate transactions between producers, traders, retailers and customers (Laudon and Traver, 2015). Therefore, e-commerce companies offer customers a platform to generate revenues and profits. Laudon and Traver (2013) also summarize the three phases of e-commerce development over the next 20 years: the establishment of e-commerce between 1995 and 2000; the consolidation of retail and e-commerce between

2000 and 2007; and the establishment between 2007 and 2015 of e-commerce retail, service and content (Laudon and Traver, 2013). There are currently five types of e-commerce: B2C e-commerce, B2B e-commerce, C2C e-commerce, mobile e-commerce, social e-commerce and commerce.

E-commerce is based on electronic payment systems (EPS) and the growing volume of electronic commerce makes EPS both businesses and consumers more important (Kim et. al., 2010b). EPS is used to complete e-commerce transactions and is defined as any payment system that makes secure e-commerce transactions between individuals and organizations easier (Lim et. al., 2007). EPS seeks to improve the accessibility of customers electronically for different purposes. The growth and acceptance of electric money, which leads to various forms of the system, has increased the use of the system through various instruments. Due to its unique capabilities, EPS not only affects customers' attitudes to use this system in their usual lives, but also effectively contributes to the growth of e-commerce. However, the EPS is still under-described in developing countries, especially Iraq, with limited training and implementation, especially in the public and private sectors.

Iraq realizes the significance of the EPS concept and the role of EPS to serve the Iraqi citizens. According to the United Nations (2012), the level of EPS usage is generally low. As it is known, there are several models for EPS development around the world, each one of them with different phases of development. For the Iraq, the United Nation (UN) five stages model for e-services was chosen due to the fact that the UN support and supervised this project and the United Nation Development Program (UNDP) work together with the Iraqi government. It is at Stage 2 of implementation. It was a strategically plan of five phases to develop the project of Iraq. Figure 1.1 shows the pathway to Iraq Development Program.

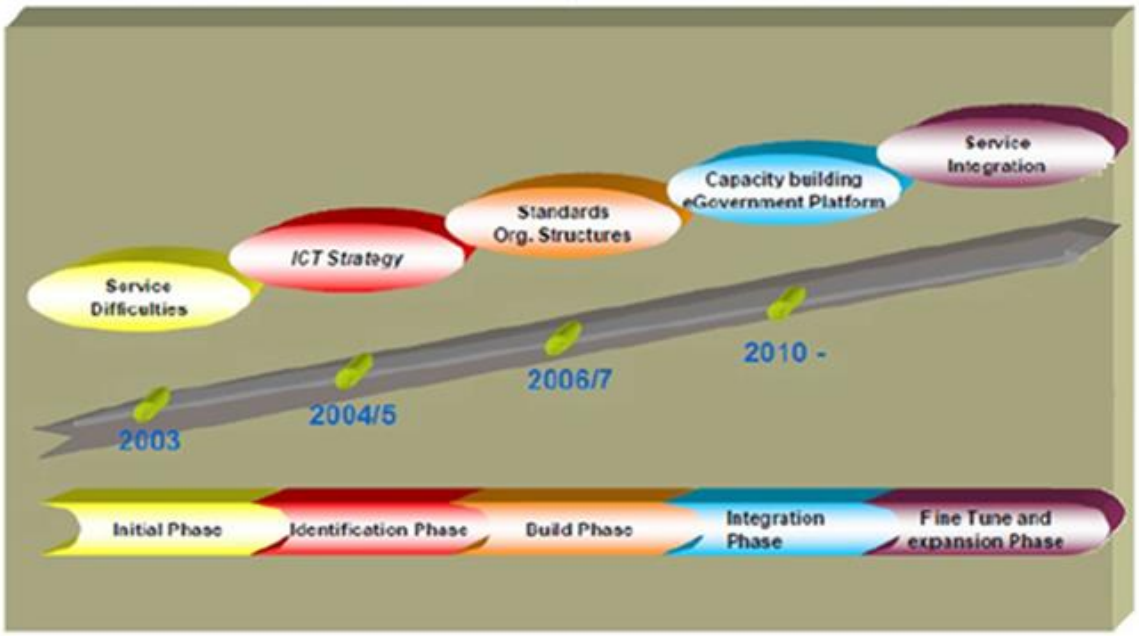

Figure 1.1: Pathway to Iraq Development Program

(Sharief et. al., 2007)

At the initial phase in Iraq, only the basics where established in its minimum representation which was the e-office. It was in 2010 that the Iraqi government decided to link five ministries to the Prime Minister's office (Alrahman, 2011). According to this, the Ministry of Science and Technology committed to provide each of these ministries with an e-office. According to Abdulwahida et. al. (2014), the Iraq is still at second phase of development, which is the interaction phase (Abdulwahid et. al., 2014).

The current situation of EPS in Iraq already is suffering from many difficulties and problems in implementation and consistency although it is considered to be in its primary phases of development. The lack of implementation of e-commerce and EPS in Iraq comes from different points and dimensions. Al-Taie and Kadhim (2013) has categorized the issues into nine categories which are technical issues, social and cultural issues, social and economic issues, social and psychological issues, political and legal issues, consumer

awareness, corporate awareness, economy's performance, and lack of certificate authority (Al-Taie and Kadhim, 2013). Apart from these nine issues, Al-Taie and Kadim (2013) also listed several global issues including the technical security issue, privacy, trust, social engineering and integrity, authentication and non-repudiation (Al-Taie and Kadhim, 2013).

For the local Iraq's issues on e-commerce, the first category described the technical issue concerned on the lack of ICT and telecommunication infrastructures in Iraq in providing the e-services. The second issue - social and cultural issues is about the nature of Iraq's citizen in conducting business as well as the language barrier. Economic situation, educational system and payment system is the main concern under social and economic issues, while Iraqi resistance to change, territorial behaviour and generation gap is the hurdle for social and psychological issues. Political and legal issue category is about the government initiatives, implementation and procedures. Consumer and corporate awareness cover awareness issues from the users and suppliers of the e-services. The economy performance issue discusses the balance of economy power between private and government sector in Iraq, and the last category, the lack of certificate authority is on the non-existence of such mechanism in Iraq.

The similar issues also have been highlighted in other literature that covers the Arab world, in which Iraq is included. All these works depict that there are crucial needs in understanding the situation of Iraq in the aspect of e-commerce and EPS, in order to make it works. The challenges lie in these issues are different from other countries, thus, the existing solutions that are proposed for others can't be fully apply. This study addressed one specific part of the issues, that is, the EPS use in the aspect of perceived trust and security in Iraq. The details of the problem are presented in the next section.