関西学院大学リポジトリ
Kwansei Gakuin University Repository

Factors Affecting the Adoption of E-government in Saudi Arabia

| URL | http://hdl.handle.net/10236/00027308 |

論 文 内 容 の 要 旨

This dissertation examines an issue that has gained more attention from researchers; that is, how the diffusion of Information Communication Technology (ICT) in government is influenced by factors that affect an individual's decision to adopt the use of the technology. The importance of this topic as an area of research increases as more management related activities are being placed on line, consequently, understanding the challenges that likely confront the adoption of e-government by citizens is critical successful e-government diffusion. Further, in the last decade, e-government has been identified as one of the top priorities for governments across the world. Many governments wanted to capitalize on the potential of revolutionizing the relationship between governments and citizens through emerging web-based technology. Many countries are making efforts for improving e-government to ensure that public institutions are more efficient, effective, accountable and transparent.

This research is a quantitative analysis of primary data collected through an on-line survey in Saudi Arabia. This site was chosen because Saudi Arabia is one of the countries that initiated the process of implementing its concept of e-government, aiming to make the economy based on knowledge instead of being oil production-based economy, and to facilitate the interaction and communication with citizens as well as government agencies. However, Saudi Arabia faced a low level of citizens' participation in e-government activities. This indicates that there is a large gap in the understanding of the engagement of citizens in e-government services. From the citizens' perception, the availability of IT infrastructures is not the only reason for accepting e-government services, but dispositional and social and other factors, play a role in their decision. Therefore, this research investigates an important question concerning what are challenges that are likely to be faced by the Saudi government in the process of e-government diffusion amongst citizens.

This builds upon and advances previous studies that have attempted to examine the main factors influencing the diffusion of e-government by focusing on the direct and indirect factors that affect the citizen's decision to adopt its services. Further the researcher examines these factors from the viewpoint of the citizens. The main research question investigated in this study was; what are the underlying factors that influence the citizens' intention to use e-government services in Saudi Arabia. In order to answer the research question, the researcher developed a conceptual model to explain the relationships between dispositional and social factors and the behavioral intention to use e-government services.

In this research the conceptual model was formed based on literature and theoretical models that have a long tradition in examining the adoption of innovations. In reviewing this research literature, the Diffusion of Innovation Theory of Rogers is examined in relation to the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). Elements of these models are then examined in relation to the Technology Acceptance Model (TAM), to select and define the dispositional factors to be examined in the research. The Unified Theory of Acceptance and Use of Technology (UTAUT), and the perceived trustworthiness factors which were adopted from Carter and Belanger's (2005) technology acceptance model are used to determine the social factors to be examined in this research. The dispositional factors of perceived ease of use (PEOU) and perceived usefulness (PU) were adopted from the TAM; trust in the government (TOG) and trust in the Internet (TOI) were adopted from Carter and Belanger's (2005) model; the social influence was adopted from UTAUT. A new factor was introduced to the conceptual model, which is the level of perceived corruption (PC). The model was moderated by the effect of five control variables that are age, gender, hometown, education level, and occupation.

The hypotheses that were examined in this research are as follows:

H_{1a} The citizens' trust in the government (TOG) has a direct positive relationship with their behavioral intention (BI) toward using e-government.

H_{1b} The trust in the government (TOG) has a positive indirect relationship with the behavioral intention (BI) that is mediated by perceived corruption (PC).

H_2 The citizens' trust in the Internet (TOI) positively affects their behavioral intention (BI) toward using e-government.

H_3 The citizens' trust in the government (TOG) negatively affects their perception of government corruption (PC).

H_4 The citizens' perceptions of corruption (PC) negatively affect their behavioral intention (BI) toward using e-government.

H_5 The citizens' perceptions of the usefulness (PU) positively affect their behavioral intention (BI) to use e-government services.

H_{6a} The citizens' perception of the ease of use (PEOU) has a positive direct influence on their behavioral intention (BI) to use e-government services.

H_{6b} The citizens' perception of the ease of use (PEOU) has a positive indirect influence on their behavioral intention (BI) to use e-government services as mediated by their perception of the usefulness (PU).

H_7 The citizens' perceptions of the ease (PEOU) of use positively affect their perception of the usefulness (PU).

H_{8a} The social influence (SCI, SID) directly affects the citizens' behavioral intentions (BI) to use e-government services.

H_{8b} The social influence (SCI, SID) has a positive indirect effect on the citizens' behavioral intentions (BI) as mediated by their perception of the usefulness (PU).

H_{8c} The social influence (SCI, SID) has a positive indirect effect on the citizens' behavioral intentions (BI) as mediated by their trust in government (TOG) and their perception of the corruption (PC).

H_9 The social influence (SCI, SID) affects the citizens' trust in the government (TOG).

H_{10} The social influence (SCI, SID) affects the citizens' perspective of the usefulness (PU) of the e-government services.

A quantitative approach was applied to test the conceptual model and hypotheses empirically in order to produce a final empirical model that showed the interrelationship among the constructs. In order to measure the constructs, a survey questionnaire was developed. The items in the survey were developed from the extensive literature review of TAM, UTAUT, which included items related to perceived usefulness (PU), perceived ease of use (PEOU), social

influence (SI), trustworthiness (TOG, TOI) and perceived corruption (PC). Before distributing the survey, a pilot survey was conducted to test whether potential respondents are able to follow the directions of the questionnaire as indicated. Then, an online survey questionnaire was conducted on a broad diversity of Saudi Arabia's citizens; the questionnaire was hosted by Google Forms.

A total of 349 responses were collected through a convenience sampling technique. 227 of participant of the survey were e-government users, while 122 were e-government non-users. Several statistical techniques were conducted to analyze the quantitative data set for the users and the non-users of e-government services.

In this dissertation the hypotheses were examined using the 227 respondents who were e-government users of services provided by the government. In this research, initially a demographic analysis of the sample was conducted was conducted. Then, reliability analysis using Cronbach's alpha was applied to confirm the consistency of the measurement for each of the variables. After the reliability analysis, a validity analysis using exploratory factor analysis was applied to reduce dimensionality and to solve any multicollinearity problem of the variables. Then, to test the hypotheses of this study, multiple regression analysis was used to test the direct relationships in the model and mediation analysis was used to test the indirect relationships in the model. The analyses were carried out using the SPSS (version 24) program. The mediation analysis was conducted using the PROCESS macro tool (version 2.16) in SPSS.

In this study the results of the reliability analysis showed that all constructs, TOI, TOG, PC, PU, PEOU, and SI, had a high Cronbach's alpha greater than the recommended value of 0.80. These results indicated that all variables had a significant load on their respective factors. The Cronbach's alpha for the dependent variable, behavioral intention to use e-government services was initially found to be low (0.509), and one item related to mandatory use was dropped. The subsequent Cronbach's alpha was increased to 0.907. This analysis developed a dependent variable that related to voluntary use of e-government services. This behavioral intention variable (BI) was the one used in all the analyses conducted to examine the hypotheses. Subsequently, in the exploratory factor analysis, the KMO for all variables had a high homogeneity of the variances with values greater than the acceptable level (KMO>0.5 and Bartlett's Test were all significant). The total variance explained for each of the variables was between 64.1% and 84.3%, which is greater than the acceptable level of 50%. The variables TOI, TOG, PC, PU, and PEOU were explained by one component for each variable. This component explains most of the variance of each variable. Within the exploratory factor analysis, the one exception was the variable of SI, which was explained by two components. It was determined by the researcher that the first component referred to the social circle influence (SCI), which explains the influence of the family and friends. The researcher then determined that the second component referred to the social influence on the decision (SID), such as the other people's influence on the decision to use e-government services. In the multiple regression analysis and mediation analysis that were subsequently conducted, the SCI and SID were used.

In the multiple regression analyses conducted in this research, the overall regression was significant and the adjusted R-squared was 0.631 for the full model with the control variable included. Among the control variables, only the education level was found to be significant. The results of the hypotheses testing indicated that TOI, PEOU, and PU are significant direct determinants for the citizens' intention to use e-government services if the use was voluntary, at a significance level of $p<0.05$. Specifically, PEOU and PU have a positive influence on BI. This indicates that H_5 and H_{6a} were supported. It was also found that contrary to the prediction for the TOI variable, it has a significant but negative influence on BI. This indicated that H_2 was not supported since it proposed a positive relationship between TOI and BI. The researcher indicated that a hacking scandal had occurred just prior to the release of the survey and this might account for the reverse result. It was also found that direct relationships were not significant for TOG, PC, SCI and SID. Consequently, hypotheses H_{1a}, H_4, H_{8a}, were not supported.

The researcher then examined the indirect effects hypothesized in the model. This analysis was conducted using the mediation analysis PROCESS macro tool (version 2.16) in SPSS. In the mediation analyses it was found that hypothesis H_{6b} was supported in that PEOU was found to have an indirect positive influence on BI when mediated by PU. Hypothesis H_{8b} was supported since the two social influence variables SCI and SID were found to have indirect positive influence on BI when mediated by the PU variable. The SCI and SID variables were found to be indirect determinants on the citizens' intention (BI) to use e-government when the use was voluntary, when mediated by TOG and PC, indicating support for H_{8c} hypothesis. The results of the mediation analysis show that all these relationships are significant at a significance level of 0.05 or better.

Moreover, the analyses conducted in this study found that the citizens' trust in the government (TOG) influences their trust in the Internet (TOI); meanwhile, their perceptions of the ease of using the services (PEOU) influence their perceptions of the service's usefulness (PU). These results support H_3 and H_7. In addition, the social influence (SI) has a strong effect on most of the constructs, PEOU, PU, PC, and TOG, but does not affect directly the citizens' behavioral intention (BI) in a voluntary environment. These results support H_9 and H_{10}.

The following tables show a summary of the hypotheses testing results, based on the relationships between all constructs and the behavioral intention to use e-government services in a voluntary environment.

Hypotheses Testing (Direct Relationships)

Hypothesis	Path	Coefficient	Sig	Hypothesis testing result
H_{1a}	TOG→BI	0.043	0.530	Not supported
H_2	TOI→BI	-0.160	0.016	Not supported
H_3	TOG→PC	0.659	0.000	Supported
H_4	PC→BI	0.008	0.903	Not supported
H_5	PU→BI	0.750	0.000	Supported
H_{6a}	PEOU→BI	0.441	0.042	Supported
H_7	PEOU→PU	0.748	0.000	Supported
H_{8a}	SCI→BI	-0.012	0.790	Not supported
	SID→BI	0.002	0.961	Not supported
H_9	SCI→TOG	0.1619	0.0148	Supported
	SID→TOG	0.5038	0.000	Supported
H_{10}	SCI→PU	0.2796	0.000	Supported
	SID→PU	0.5100	0.000	Supported

Hypothesis Testing (Indirect Relationships)

Hypothesis	Path	Hypothesis testing result
H_{1b}	TOG→PC→BI	Supported
H_{6b}	PEOU→PU→BI	Supported
H_{8b}	SCI→PU→BI SID→PU→BI	Supported
H_{8c}	SCI→TOG→PC→BI SID→TOG→PC→BI	Supported

Overall, the results of the multiple regression and mediating analyses conducted in this study indicated that the factors that are related to the performance of the e-government such as perceived usefulness (PU) and perceived ease of use (PEOU) have a direct impact on the citizens' decision, while the factors that are not related to the e-government's performance, such as the social influence variables, SCI and SID, the trust variables, TOG and TOI and the perceived corruption variable PC, have an indirect impact on the citizen's decision to adopt e-government services when the adoption was voluntary.

The researcher conducted further analyses to understand the citizens' intention to adopt e-government services from different aspect, when the adoption is mandatory. As was indicated in the previous discussion on the Cronbach's alpha analysis of the dependent variable, the item concerning mandatory use was dropped. This item was used as the dependent variable for the additional analysis on mandatory use. The results of the regression analysis showed that PU, PEOU and SCI as well as all the control variables (age, gender, hometown, education level, occupation), had a significant influence on predicting the behavioral intention to the mandatory use of e-government at level of $p<0.05$, except gender and occupation at a significance level of $p<0.10$.

A further set of analysis was conducted for the 122 non-user portion of the sample. The researcher conducted a descriptive analysis of the e-government's non-users. The results indicated that the perceived ease of use (PEOU) could be the most influential factor on the citizens' behavioral intention.

The researcher concludes that the results of this study indicate that the citizens' successful adoption of e-government in a country such as Saudi Arabia depends on their expectation of the services that are provided by the government as well as the government's efforts to improve e-government services. Therefore, the results of this study could be important for decision makers in the government to reach more citizens in that this study indicates those citizens' perceptions have a direct influence on intention to use and that other social factors have an indirect, but substantial influence on behavioral intention to use the services. Further the researcher concludes that the Saudi Arabian government's efforts in the recent years to develop an IT-based economy, will be inadequate unless the government to undertakes more efforts to understand the citizens' needs, as these needs drive the improvement of the technology.

A further contribution of this study also addressed a gap in the research knowledge concerning adoption since it is examined both the e-government users for both voluntary and mandatory services and non-users. It is the first study to draw attention to examine both the voluntary and the mandatory use categories, which fills a gap that previous research literature has not considered. Another contribution of this study takes the first steps to examine the differences between users and non-users of e-government services.

Based upon the findings of the study as presented in the dissertation the researcher proposes two new models

for future study. The first model would examine the adoption of e-government services by citizens in a mandatory environment. The researcher proposes to include the factor of Perceived Behavioral Control (PBC). This factor is adopted from the Theory of Planned Behavior (TPB) as first studied by Ajzen (1985). The researcher indicates that this factor becomes a critical component in predicting the citizens' intention to adopt e-government services, especially in a mandatory environment when the citizens have no full control of their behavior. The second model proposed for future research the adoption of e-government services by governmental employees in a mandatory environment. The second model can be studied in the context of employees' adoption of e-government. In this model two additional factors were proposed. These factors are the perceived behavioral control and the employees' training. The researcher indicates that the factor of employees' training was proposed due to the fact that training can positively affect the attitudes of employees toward adopting new technology in general. The researcher indicates that this model can be studied in the context of the adoption of new technology within an organization in general, not only on the e-government's adoption context. In this model, the social influence refers to the social circle and colleagues.

<div align="center">

論 文 審 査 結 果 の 要 旨

</div>

We the committee, find that the research conducted by Ms. Akbar Hanaa Hussain A and presented in her dissertation document and her defense fulfills the requirements for the Ph.D. degree and that Ms.. Akbar Hanaa Hussain A has successfully defended her dissertation. We, the committee therefore conclude that Ms. Akbar Hanaa Hussain A should be granted the Ph.D. degree.

We find that her dissertation research has successfully addressed several major research questions in the fields of management and diffusion of innovation studies, especially approaches to adoption of innovations. She has approached the development and examination of these research questions with methodological rigor and has empirically analyzed these questions by statistical analysis of propositions related to each research question. The contributions her research makes to these fields are described below.

Her literature review developed the conceptual antecedents for her model and the model presented a comprehensive framework for relating independent variables that are dispositional (perceived usefulness and perceived ease of use), and social (Social Influence, Trust of Government, Trust in the Internet, and Perceived Corruption), and controlling for moderating variables (age, gender, hometown, education level, occupation) in order to examine how these variables influenced a person's behavioral intention to use e-government services. Her conceptual work describes the use of several prominent theoretical models that describe the adoption process. In particular the use of the TAM and UTAUT models guided much of her conceptual development. She extended these models by adding two variables related to trust. The first was trust of government and the second was trust of the Internet. She also extended the model by introducing a variable related to perceived corruption. Her empirical testing of the model validates the use of these variables in future examinations of the adoption of innovations when confronted with voluntary use of an innovation such as e-government services.

Her extensive empirical testing of her model also provides contributions to the field. Through her use of both multiple regression and mediating analysis, she was able to determine the direct and indirect effects of the independent variables on her behavioral intention dependent variable. Her use of mediating analysis is to be commended, since she undertook this approach on her own initiative. She further extended her empirical examination of her model by examining both voluntary and mandatory use contexts. She also took the first steps in examining the underlying reasons for non-use by citizens. All of these analyses provide substantial conceptual and empirical contributions to the field of

management and understanding of the adoption of innovations.

She provides a clear set of expectations for future research and provides adequate understanding of the conceptual, empirical and practitioner oriented implications of her research. In examining her dissertation, if there were one area that should be improved in the future, it would be to expand her data collection strategy to include a non-web based approach to circulating her well-developed questionnaire. Since her results were collected through an on-line survey, her conclusions are limited to those of the population that are on-line. This recommendation is particularly relevant if she pursues her current research into non-users and attempts to use inferential statistics. We do not see this as a deficiency of her current research but only as a recommendation for future research.

We strongly suggest that Ms. Akbar Hanaa Hussain A continue her research and collect more data as time permits. The 227 survey responses from users that she received for her current research was adequate for the current study and her use of mediating analysis was able to test in more detail her conceptual model, however it did not permit the testing of the whole model simultaneously. Her model is open to a simultaneous equation modeling (SEM) evaluation, but will require more data than currently available in her data set. If such a simultaneous testing of her model were undertaken, we believe that this would provide a provocative and powerful further contribution to the adoption of innovation field of study. We are confident that in the future, with more data Ms. Akbar Hanaa Hussain A will be able to conduct a simultaneous equation examination of the model

We make the above suggestions and recommendations as part of our guidance for future research and we find that the current research as presented makes a substantial contribution to the field of innovation studies and is sufficient to grant the Ph.D. degree.