E-Government Adoption in Saudi Arabia: The Moderation Influence of Transparency

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***Abstract*—This paper investigates the moderation effect of transparency on the adoption of e-government in Saudi Arabia from the perspective of citizens. A comprehensive review of the related literature leads to the development of a transparency-based conceptual model for better understanding the adoption of e-government. Structural equation modelling is used for analyzing the data collected from the citizens in Saudi Arabia. This leads to the identification of the critical factors including perceived ease of use, perceived usefulness, and computer self-efficacy for the adoption of e-government. Furthermore, the study shows that transparency affects the adoption of e-government through its moderating effect on the relationship between perceived usefulness and e-government adoption. The study contributes to the e-government research by exploring the moderation effect of transparency on e-government adoption.**

***Index Terms*—e-Government, technology adoption, transparency, empirical study**

I. Introduction

Electronic government (e-government) is about the use of Information and Communications Technologies (ICTs) for enhancing the delivery of public services to all the stakeholders [1], [2]. It is widely adopted due to various benefits that e-government has [1]. The adoption of e-government, for example, provides citizens with flexible and convenient means to communicate with public organizations [2]. It can enhance the interaction between citizens and public organizations [3]. Such interaction facilitates accessing to public information and services [4], therefore improving the transparency of public decision making [5] and encouraging the participation of citizens in public administration [5]. As a result, many countries across the world have introduced various e-government initiatives for developing their e-government [6], [7].

Following the global trend, the government of Saudi Arabia has launched its e-government program for improving the delivery of public services [6]. Two plans for the development of e-government have been implemented. The first one focuses on providing citizens with specific public services through e-government [6]. The second one concentrates on improving the effectiveness and efficiency of the delivery of public services [6]. Such plans lead to the introduction of may e-government initiatives such as mobile government, open data portal and e-procurement. Despite the significant progress that has been made in the development of e-government in Saudi Arabia, the adoption of e-government is still limited [6], [8].

Several studies have explored the adoption of e-government in recent years. Carter, *et al.* [9], for example, propose a combined model for exploring the critical factors for the adoption of e-government in the United States and the United Kingdom. Rana, *et al.* [3] investigate the adoption of e-government in India. Rodrigues, *et al.* [10] examine the critical factors for the adoption of e-government in the United Arab Emirates. The majority of these studies have focused on the technological and personal factors for the adoption of e-government [9], [11], [12]. There are, however, other factors that may affect the adoption of e-government that need to be considered [13], [14]. In particular, it is unclear to what extent the transparency of public decision making can influence the adoption of e-government from the perspective of citizens.

The aim of this study is to investigate the influence of the transparency on the adoption of e-government in Saudi Arabia from the perspective of citizens. To achieve this aim, a transparency-based conceptual model is developed through a comprehensive review of the related literature within the technology acceptance framework. Such a model is then tested and validated using structured equation modelling on the survey data collected. This leads to the identification of the critical factors including perceived ease of use, perceived usefulness, and computer self-efficacy for the adoption of e-government. Furthermore, the study shows that transparency affects the adoption of e-government through its moderating effect on the relationship between perceived usefulness and e-government adoption. This study contributes to the e-government research by highlighting the moderation effect of transparency on the adoption of e-government.

In what follows, this study first reviews the existing literature about e-government adoption, leading to the development of a research model for exploring the moderation influence of transparency of public decision making on the adoption of e-government. It then outlines the methodology followed by data analysis and findings. Finally, the conclusion, the limitations and future research of the study are provided.

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II. Literature Review

E-government can be approached from several perspectives. Ebrahim and Irani [15] state that e-government is about the use of ICTs to improve the accessibility of citizens to public information and services. West [16] considers e-government as the use of ICTs for enhancing the delivery of public services. Akman, *et al.* [4] define e-government as the utilization of ICTs for improving the efficiency and effectiveness of public organizations. Sobaci and Eryigit [17] treat e-government as a form of government for improving the democracy and transparency in public organizations. In this study, e-government is about the use of ICTs for improving the availability and accessibility of public information and services to enhance the transparency of public decision making in public organisations [2], [5], [18].

Transparency in the context of e-government refers to the availability of relevant decision-making information and procedures to citizens through e-government [18]. It plays an essential role in driving individual countries for promoting the prosperity, growth and success in different developmental fields [5], [19]. The availability of public information to citizens can improve the accountability, the efficiency and effectiveness of public organizations [5], [18], [19]. It can encourage the participation of citizens in public administration and encourage the development of democracy in these countries. As a result, the transparency of public decision making has attracted much attention worldwide in the development of e-government [18], [19].

The development of e-government is an effective mean for enhancing the transparency of public decision making in public administration [5]. This is because the development of e-government allows public organizations to provide various stakeholders including citizens with relevant public information and decision making procedures [19]. This shows that e-government can create a convenient environment in which public information and procedures can be better accessed [19].

Several studies have investigated the adoption of e-government with the use of various theories [3], [6], [9], [20], [21]. Carter, *et al.* [22], for example, investigate the influence of security on the adoption of tax filing in the United States. Susanto and Aljoza [23] explore the effect of trust on the adoption of e-government in Indonesia. Bataineh and Abu-Shanab [24] study how participation influences the adoption of e-government in Jordan. Almukhlifi, *et al.* [6] explore the influence of culture on the adoption of e-government in Saudi Arabia. These studies have discussed the adoption of e-government from different perspectives. There is, however, lack of studies on the investigation of the influence of the transparency of public decision making on the adoption of e-government in a specific environment.

There are a few studies that have investigated the effect of the transparency on the adoption of e-government in the literature. Al-Jamal and Abu-Shanab [25], for example, study the influence of transparency on e-government adoption in Jordan. Mirchandani, *et al.* [26] investigate the role of transparency in improving the use of e-government in Kuwait. Venkatesh, *et al.* [27] examine the influence of transparency on e-government adoption in Hong Kong. Shahzad, *et al.* [28] explore the influence of transparency on the adoption of mobile government in Pakistan. Despite these efforts, there is an increasing call for better understanding the influence of transparency on the adoption of e-government [27]. In particular, investigating the moderation effect of transparency helps to better understand the circumstances in which the adoption of e-government is determined. To address these issues, this study aims to explore the moderation effect of transparency on the adoption of e-government from the perspective of citizens.

III. Hypotheses Development

The aim of this study is to investigate the influence of transparency of public decision making on the adoption of e-government in Saudi Arabia from the perspective of citizens. To achieve this aim, the Technology Acceptance Model (TAM) [29] is adopted. Such a model states that the Perceived Ease of Use (PEOU) and the Perceived Usefulness (PU) have a fundamental impact on the adoption of a specific technology [29].

TAM is widely used for better understanding the adoption of e-government under various circumstances [30]. This is due to (a) the reliability of TAM for investigating the use of technologies and (b) the easiness of TAM in applications and validation [31]. TAM focuses more on the influence of technological characteristics on the adoption of specific technologies [29].

The adoption of e-government is influenced by various factors including technological issues [6]. This shows that a more comprehensive investigation is necessary as well as suitable with the use of TAM for better understanding the adoption of e-government under specific circumstances [22]. This is in particular true with respect to the perspective of transparency of public decision making as the transparency of public decision making has been becoming an increasingly important issue in the development of e-government in today's dynamic environment [5].

To facilitate investigating the effect of transparency on the adoption of e-government in Saudi Arabia, a conceptual model shown as in Fig. 1 is developed based on a comprehensive review of the related literature.

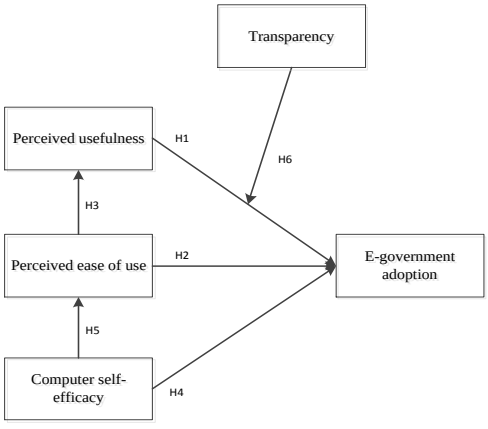

Figure 1. A research model.

Perceived Usefulness (PU) is about the degree to which citizens believe that adopting e-government can provides them with expected benefits [32]. It is often dependent upon the convenience of using e-government, the amount of time for processing public services, the effectiveness of conducting public services, the ability to make conducting public services easier, and the overall usefulness of e-government from the perspective of citizens [33].

PU has a positive effect on the adoption of e-government [34]. It plays a critical role in encouraging citizens to conduct public services through the use of e-government [35]. The greater the PU is about, the more likely the adoption of e-government is [36]. citizens adopt e-government for accessing and using public services because they consider that the use of e-government can bring them with tangible benefits including the reduction of the cost and the saving of efforts and time [35]. A better understanding of PU of e-government would lead to an improved adoption of e-government [36]. Based on the above discussion, the following hypothesis is developed.

H_1: PU positively affects the adoption of e-government.

Perceived Ease of Use (PEOU) is about how much effort that is required in using e-government from the perspective of individual citizens [29]. It is usually assessed by the easiness of learning, the easiness to become skilful at using e-government, the availability of instructions, the availability of e-government websites, and the clarity and understandability of e-government websites [29] in a specific situation.

The enhancement of PEOU can encourage citizens to adopt e-government [36]. It is the first perception of citizens when they decide using a new technology [36]. When citizens find it easy to use e-government, their decisions to adopt e-government would be improved [37]. Improving PEOU can encourage citizens to use e-government [37]. Based on the above discussion, the following hypothesis is developed.

H_2: PEOU positively affects the adoption of e-government.

PEOU often improve the benefits of the adoption of e-government [9]. Citizens tend to evaluate the value of e-government based on its perceived easiness of use. Any problems occurred when using e-government may hinder the utilization of e-government[36]. If citizens find the use of e-government is easy, they would be more likely to use e-government [38]. Based on the above discussion, the following hypothesis is developed.

H_3: PEOU positively affects PU.

Computer Self-Efficacy (CSE) refers to what extent citizens are confident in their ability to conduct public services with the adoption of e-government [39]. It incorporates three dimensions including magnitude, strength, and generalizability [40]. Magnitude refers to the level of capability that is required to conduct public services through e-government [41]. Strength is about the confidence that citizens have regarding their ability to conduct public services through the use of e-government [41]. Generalizability is about the degree to which citizens' judgments about their ability are limited to a specific domain of activities [40].

CSE has a positive influence on the adoption of e-government [42]. Citizens with sufficient levels of CSE are more likely to conduct public services through the use of e-government [36]. On the other hand, citizens with the minimum levels of CSE can find it difficult to use e-government. CSE reflects citizens' confidence about their skills and abilities for conducting online services through e-government [36]. Such skills can make citizens more confident in using e-government. Based on the above discussion, the following hypothesis is developed.

H_4: CSE positively affects the adoption of e-government.

A high level of CSE often helps citizens use e-government easily [43]. If a citizen is confident in his capability in using computers, she/he is more likely to conduct public services through the use of e-government. citizens who are confident to use computers often believe that they need spend less effort to use e-government [44]. Such feeling of confidence can lead to overcome any difficulties in using e-government. Based on the above discussion, the following hypothesis is developed.

H_5: CSE positively affects PEOU.

Transparency (TRA) of public decision making refers to the availability of relevant decision-making information and procedures to citizens through e-government [18]. It is measured by the online availability of policy drafts by public organizations for consultation, the availability of tenders, the availability of organizational charts and contact information of public staff, the availability of public organizations' budget and expenses online, and the availability of public organizations' annual plan and progress online [1], [45].

TRA can encourage citizens to adopt e-government [25]. It is associated with the adoption of e-government, where the utilization of e-government is often relies on the effective interaction between public organisations and citizens [46]. The more transparent the decision making is, the more likely the adoption of e-government is about. With the availability of public information and procedures, citizens can find e-government useful. The availability of public information and procedures would improve the utilization of e-government as they can find the desired information online [47]. Based on the above discussion, the following hypothesis is developed.

H_6: TRA positively moderates the relationship between PU and the adoption of e-government.

IV. Research Methodology

The aim of this study is to investigate the influence of the transparency on the adoption of e-government in Saudi Arabia from the perspective of citizens. To achieve this aim, a quantitative methodology is applied in this study due to the confirmation nature of the main research question. The adoption of such a methodology allows the study to test and validate the relationship proposed in the research model developed above in Fig. 1.

A survey is used for collecting data from citizens in Saudi Arabia. The survey is pre-tested with academic experts in the relevant field. Feedbacks have been incorporated in revising the survey for ensuring the content validity of the model's constructs. Items that are used in this study for measuring the constructs are adopted from the existing literature of e-governemnt shown as in Table I. A seven point of the Likert scale is adopted for obtaining respondents' opinions with respect to specific measurmenet items in the study.

The survey has been distributed to the citizens in Saudi Arabia. A total of 501 responses have been received. The number of responses is reduced to 478 after excluding 23 responses due to missing data and outliers.

Table II presents the demographic profile of the participants in the survey. Overall 88.1% of the participants are male. Most respondents' ages are ranged between 31 to 45 years old. There are 35.6% of the participants who have a bachelor's degree. Furthermore, about 59.6% of the participants are government employees. An analysis of such demographic statistics of the participants in the survey shows that the collected surveys is a typical representation of the population in the country with respect to the adoption of e-government.

The demographic profiles of the participants indicate the diversification of the participants in terms of the frequency of using e-government. There are about 40% of the participants who use e-government once every few months. There are 23.2% of the participants who utilize e-government a few times a month. This is in direct contrast to about 18.8% of the participants using e-government a few times a week, 8.8% using e-government at least once a day, and 9.2% never use e-government. Overall, the aforementioned description of the participants' profiles ensures the generalizability of the data collected from citizens in Saudi Arabia.

TABLE I. OVERVIEW OF THE ITEMS USED IN THIS RESEARCH

Factors	Items	References
PU	PU1-Using e-government is a convenient way to conduct public services	[29], [32]
	PU2-Using e-government would help conducting public services quickly	
	PU3- E-government websites make it easier for public to communicate with public organizations	
	PU4- I would find the use of e-government is useful	
	PU5- Using e-government would enhance public services effectiveness	
PEOU	PEOU1- It is easy to become skillful at using e-government websites	[29], [32]
	PEOU2- Using e-government websites does not require a lot of effort to learn	
	PEOU3- It is easy to get websites of public organizations to do what I want it to do	
	PEOU4- E-government websites are clear and understandable to interact with	
	PEOU5- Instructions provided online help public to learn how to use e-government websites easily	
CSE	CSE1- I am confident of using e-government websites if I have the online instructions	[40]
	CSE2- I am confident of using e-government websites if I only have the online "help" function.	
	CSE3- I am confident of using e-government websites if I have never used such a system before	
	CSE4- I am confident of using e-government websites if I have just seen someone using it before trying it myself	
	CSE5- I am confident of using e-government websites if there is no one around to show me how to do it	
TRA	TRA1- Public organizations disclose their budget /expenses online to show accountability of their expenses	[1], [45].
	TRA2- Public policy drafts, laws or regulations are published online for public consultation	
	TRA3- Public organizations publish tenders online	
	TRA4- Public organizations display organizational charts, duties and responsibilities of public sector staff online	
	TRA5- Public organizations display staffs contact information online	
	TRA6- Public organizations disclose their annual plan and progress online to show their accountability of achieving public goals	
Adoption	ADOP1- I use e-government for conducting public services	[9], [48]
	ADOP2- I use e-government for gathering public information	
	ADOP3- I use e-government on a regular basis	

TABLE II. DEMOGRAPHIC PROFILES OF PARTICIPANTS

Demographic Variables		Frequency	Percent
Gender	Male	421	88.1
	Female	57	11.9
Age	18-20	15	3.1
	21-30	109	22.8
	31-45	254	53.1
	46-60	84	17.6
	> 60	16	3.3
Education Level	No formal school	1	.2
	Secondary school	4	.8
	High School	50	10.5
	Diploma/Advanced Diploma	169	35.4
	Bachelor Degree	170	35.6
	Master Degree	69	14.4
	Doctoral Degree	15	3.1
Occupation	Student	39	8.2
	Government employee	285	59.6
	Private sector employee	78	16.3
	Self-employed	25	5.2
	Unemployed	22	4.6
	Retired	29	6.1
Frequency of Using E-government	Very often (e.g. at least once a day)	42	8.8
	Often(e.g. a few times a week)	90	18.8
	Not very often (e.g. a few times a month)	111	23.2
	Not at all often (e.g. once every few months)	191	40.0
	Never	44	9.2

V. Results and Findings

This study uses structural equation modelling for testing and validating the relationships between the constructs proposed in the research model in Fig. 1. The use of structural equation modelling is appropriate for this study because structural equation modelling is able to simultaneously examine the multiple relationship among constructs when validating the proposed research model [49]. Two processes in structured equation modelling analysis are followed in this study including the measurement model analysis and the structural model analysis [50].

A. The Measurement Model

The measurement model analysis aims to examine whether the used items represent the constructs included in the research model [50]. It is validated through assessing (a) constructs reliability, (b) convergent validity, (c) the goodness of model fit (GOF), and (d) discriminant validity.

Construct reliability refers to the degree in which multiple items of a single construct are consistent [50]. To examine the constructs reliability, Cronbach's alpha (α) is used. The Cronbach's alpha (α) shown as in Table III shows that the Cronbach's alpha value of each construct is higher than 0.7. This means that all the constructs have passed the constructs reliability test [50].

TABLE III. Summary of Construct Reliability and Factor Loading

	Factor Loading					α
	1	2	3	4	5	
PEOU1	.72					.90
PEOU2	.75					
PEOU3	.76					
PEOU4	.70					
PEOU5	.68					
PU1		.82				.91
PU2		.79				
PU3		.80				
PU4		.80				
PU5		.83				
CSE1			.80			.91
CSE2			.83			
CSE3			.82			
CSE4			.80			
CSE5			.77			
ADOP1				.74		.81
ADOP2				.81		
ADOP3				.80		
TRA1					.79	.91
TRA2					.82	
TRA3					.83	
TRA4					.84	
TRA5					.76	
TRA6					.82	

Convergent validity refers to the degree in which several items converge together to measure a single construct [50]. For assessing the convergent validity, the factor loading and the Average Variance Extracted (AVE) of each construct are assessed. An analysis of the results in Table III shows that the factor loading values of all the constructs are greater than the accepted value of 0.5 [50]. It further indicates that the AVE values of all the constructs are greater than the accepted value of 0.5 shown as in Table V [50]. As a result, the convergent validity of the constructs is supported.

GOF assesses the validity of all constructs included in the research model through several fitness indices. Such indices include the ration of $\chi 2$ to degrees of freedom ($\chi 2$/df), comparative fit index (CFI), goodness of fit index (GFI), adjusted GFI (AGFI), tucker-lewis index (TLI), normed fit index (NFI), standardized root mean residual (SRMR), root mean square error of approximation (RMSEA), and probability of close fit (PCLOSE) [6], [50]. In examining GOF, the analysis of one factor congeneric model for each construct is performed through the confirmatory factor analysis. This leads to the dropping of five items including PU3, PEOU2, CSE2, TRA1, and TRA6 in the model tuning process. This leads to the final valid measurement model with the acceptable GOF shown as in Table IV.

TABLE IV. Summary of GOF Values

Fitness Indices	CSE	PEOU	PU	TRA	ADOP	Full Model
P	.18	.93	.68	.63	.62	0
$\chi 2$/df	1.69	.06	.16	.45	.23	1.45
CFI	.99	1	1	1	1	.98
GFI	.99	1	1	.99	1	.95
AGFI	.98	.99	.99	.99	.99	.94
TLI	.99	1	1	1	1	.98
NFI	.99	1	1	.99	1	.96
SRMR	.00	.00	.00	.00	.00	.02
RMSEA	.03	0	0	0	0	.03
PCLOSE	.50	.98	.82	.85	.78	1

Discriminant validity refers to the degree in which each construct is uncorrelated and distinct from others [50]. It is examined through comparing the square root of the AVE for each single construct with other constructs [51]. To support the discriminant validity of each construct, the square root of the AVE value for each construct should exceed the correlation value of other constructs [50]. As a result, the discriminant validity of the constructs is supported as shown in Table V.

TABLE V. The Constructs Correlation

	AVE	CSE	PEOU	PU	TRA	ADOP
CSE	**.66**	**.81**				
PEOU	**.63**	.62	**.79**			
PU	**.74**	.48	.63	**.86**		
TRA	**.64**	.18	.47	.28	**.80**	
ADOP	**.59**	.52	.56	.60	.33	**.77**

B. The Structural Model

The structural model represents the strength of the path between the constructs [50]. It is assessed through the magnitude of variance explained for each dependent variable (R^2) and the paths coefficient [52]. The research model includes five constructs and six hypotheses. The R^2 values for each construct and the path coefficient for each hypothesis are presented in Fig. 2. In terms of the magnitude of variance explained, the research model accounts for 42% of the variance in PU, 41% of the

variance in PEOU, and 46% of the variance in e-government adoption.

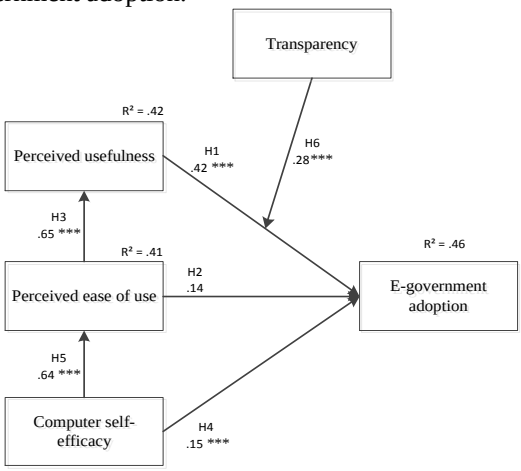

Figure 2. The structural model.

The results of the data analysis show that all hypotheses in this study are supported except H_2. PU has a significant positive influence on the adoption of e-government (path coefficient = 0.42, $p < 0.01$), supporting H_1. PEOU has no effect on e-government adoption (path coefficient = 0.14, $p > 0.05$), rejecting H_2. PEOU has a significant positive influence on PU (path coefficient = .65, $p < 0.01$), supporting H_3. CSE has a significant positive influence on the adoption of e-government (path coefficient = 0.15, $p < 0.01$), supporting H_4. CSE has a significant positive influence on PEOU (path coefficient = 0.64, $p < 0.01$), supporting H_5. The results, furthermore, reveal that the interaction between the transparency and PU is positively significant (path coefficient = 0.28, $p < 0.01$), supporting H_6.

The results of the study confirm that PU improves e-government adoption. The more benefits the e-government has, the more likely the citizens are going to use e-government. If citizens find the use of e-government is more convenient than visiting public organisations physically, they would adopt e-government for conducting public services. This implies that citizens would not adopt e-government without perceiving the advantages of using e-government [6]. This finding is in line with the findings of previous studies that indicate the significant effect of PU on the adoption of e-government [6], [35], [36].

PEOU is shown to have no effect on the adoption of e-government. It suggests that the adoption of e-government is not dependent on PEOU. This can be due to the age range and the education level of the sample recruited for this study. Around 80% of the participants are ranged between 21 to 45 years old. They hold a diploma degree and above. The sample with such characteristics often would not find the use of technologies difficult as they witness the technological revolution and they update themselves with new innovations all the time. This finding is in line with that of Susanto and Aljoza [23] that indicates that the easiness of using e-government does not improve the adoption of e-government. The results, however, show that PU helps to improve the perceived benefits of e-government adoption. It suggests that any complexity when using e-government may limit the benefits of e-government. This finding is in line with that of Susanto and Aljoza [23] who finds that citizens would not recognise the usefulness of e-government if the use of e-government is difficult.

CSE is confirmed to improve the adoption of e-government and PEOU. It suggests that the more confident the citizens are about using computers, the more likely they use e-government, thus improving their perception on the easiness of using e-government. Citizens would adopt e-government even if they use it for the first time when the use of e-government is deemed to be easy. They are confident that their skills about dealing with new innovations would encourage them to adopt e-government without difficulties [42]. Previous studies show different findings about the influence of CSE on e-government adoption. Almukhlifi, *et al.* [6], for example, find that CSE improves the adoption of e-government. Shareef, *et al.* [37], however, confirm that CSE does not influence the adoption e-government. Such contrast findings are due to the fact that citizens' skills and knowledge towards the adoption of e-government may differ according to the context of e-government development [53].

The role of transparency of public decision making in moderating the relationship between PU and e-government adoption is confirmed in this study. It suggests that transparency of public decision making strengthens the positive relationship between PU and e-government adoption. The transparency of public decision making can help citizens to better understand the benefits of using e-government. If public organisations publish the duties, responsibilities, tenders, and staff contact information online, citizens can utilities such information to conduct public services through the adoption of e-government in a quick, convenient, and effective manner. Such findings suggest that public organisations should ensure the transparency of public decision making for improving the adoption of e-government.

This research contributes to the e-government research in two key ways. Theoretically, this research brings to the literature of e-government the potential synergistic effects of transparency of public decision making on e-government adoption. This study is the first study that addresses the moderation influence of transparency on the relationships between PU and the adoption of e-government. The investigation of the moderation influence of transparency of public decision making on the adoption of e-government can provide insights into the circumstances under which how the perceived usefulness of e-government can improve the adoption of e-government. Practically, investigating the role of transparency of public decision making in the adoption of e-government can be useful for public organisations in Saudi Arabia to improve the development of e-government.

VI. Conclusion

This study uses structured equation modelling to test and validate a hypothesized model for investigating the influence of transparency of public decision making on the adoption of e-government in Saudi Arabia from the perspective of citizens. The results reveal that PU, PEOU, and CSE could encourage citizens to adopt e-government in Saudi Arabia. Furthermore, the transparency of public decision making is found to significantly affect the adoption of e-government through its moderating influence on the relationship between PU and e-government adoption. Such results underscore the importance of the transparency of public decision making for the development of e-government under various circumstances.

There are some limitations in this study that can be addressed in future. First, this research only considers the perception of citizens. It has not covered the opinions of other stakeholders. Second, the results of this research have been validated in Saudi Arabia. Replicating this research in different countries could yield the generalizability of the study findings. Third, others factors could be incorporated in the research model to further understand the moderation role of the transparency of public decision making in improving the adoption of e-government.

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