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A Structural Equation Model (SEM) of Governing Factors Influencing the Implementation of t-Government

Sameer Alshetewi*

School of Computer Science, Engineering and Mathematics, Flinders University, Adelaide, Australia

***Corresponding author:** Alshetewi S, School of Computer Science, Engineering and Mathematics, Flinders University, Adelaide, Australia, Tel: +61 8 8201 3911; E-mail: alshetewi@hotmail.com

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Abstract

Governments around the world have invested significant sums of money on Information and Communication Technology (ICT) to improve the efficiency and effectiveness of services being provided to their citizens. However, they have not achieved the desired results because of the lack of interoperability between different government entities. Therefore, many governments have started shifting away from the original concept of e-Government towards a much more transformational approach that encompasses the entire relationship between different government departments and users of public services, which can be termed as transformational government (t-Government). In this paper a model is proposed for governing factors that impact the implementation of t-Government such as strategy, leadership, stakeholders, citizen centricity and funding in context of Saudi Arabia. Five constructs are hypothesised to be related to implementation of t-Government. To clarify the relationships among these constructs, a structural equation model (SEM) is utilised to examine the model fit with the five hypotheses. The results show that there are positive and significant relationships among the constructs such as the relationships between strategy and t-Government; the relationships between stakeholders and t-Government; the relationships between leadership and t-Government. This study also showed insignificant relationship between citizens' centricity and t-Government and also insignificant relationship between funding and t-Government.

Keywords: t-Government; e-Government; Citizens' centricity

Introduction

Many nations have put in place e-Government applications to enhance the efficiency of the public sector and streamline government systems to enable creating connections between different government organisations. In order to create further efficiencies it has been recommended that countries move towards a goal of transformational government [1,2]. Nowadays, the concept of a transformational government (t-Government) needs to be viewed on an international scale. In order to facilitate more centrally-connected and citizen-centric-government services, and put the needs of individuals and businesses at the center of online processes, many governments have started shifting away from the original concept of e-Government towards a much more transformational approach that considers the entire relationship between different government departments and users of public services, which can be termed as transformational government (t- Government) [3-5]. This paper identifies and analysis the governing factors (strategy, leadership, stakeholders, citizen centric and funding) that influence the implementation of t-Government in Saudi Arabia. The proposed model is empirically tested through an analysis data from 217 surveys from various organisations in Saudi Arabia using Structural Equation Modeling (SEM) technique and utilized AMOS version (22) tools.

The organization of this paper is as follows: Section 2 gives an overview of the governing factors. Section 3 provides the methodology for this study which includes the research model, hypotheses and data collection. Section 4 presents the data analysis and results. Section 5 discusses the results, and Section 6 provides the conclusions of the study.

Background

There is still insufficient research regarding the critical factors that affect transformational government (t-Government) such as technical, organizational and governing factors [6-8]. This section discusses some of the popular governing factors that have been identified (strategy, leadership, stakeholders, funding and citizens centricity) as affecting t-government in more details as follows:

Strategy

Strategies and Regulations are important in any development of e-Government, and one of the most important elements involved in the implementation of t-Government [9], as its establishment inevitably requires major changes in strategic direction, and to modes of paradigm thinking [10,11]. Thus a comprehensive e-Government strategy becomes a major factor when collaboration between government agencies is necessary to ensure the successful presentation of an online service [10-13]. Appropriate regulations are also important for the successful implementation of t-Government, as the absence of such a regulatory framework is one of the more onerous challenges hindering its effective establishment [14-16]. Strategies and regulations are measured through: the importance of e-Government strategy, strategy's plan, strategy's goal, strategy's vision, and strategy's commitment.

Stakeholders

A key factor in the implementation of t-Government projects will be stakeholders: their presence within any e-Government initiative is fundamental to the success of its interoperability [17-19]. Governments need to identify their stakeholders are, and what they

want, to succeed in e-government implementation, and achieve the maturity of e-Government [20]. Rowley [21] argued that the classification of stakeholders are often implicit in categorizations of e-Government such as (G2G), (G2C), (G2B), and (G2E), or they offered by a number of authors. For example, Heeks [22] classified stakeholders to Non-profits, other agencies, citizens/customers, businesses, communities, government. Orange [23], Burke et al. [24] classified stakeholders to Politicians, staff, public, project managers, design developers, other government agencies. United Nations [25] classified stakeholders to Public administrators, programmers, end-users, politicians. As this study only focuses on (G2G) e-Government categorization, it concern only about internal stakeholder in government organisations. According to Al-Rashidi [26] Internal stakeholders are political stakeholders, organizational stakeholders, and technological stakeholders such as Public administrators (employees), Other government agencies, Politicians, E-Government project managers, Design and IT developers, and naturally, co-operation between these categories of stakeholder is critically important to the successful implementation of t-Government projects [27,28]. Cui et al. [29], Hu considers that cross-agency cooperation has the potential to transform the way that governments work, share information, and deliver services to external and internal clients. According to Ebrahim and Irani [30], implementing interoperability involvers many stakeholders at different government level and coordination between these stakeholders is important. In this study, participating stakeholders are measured by: stakeholder's involvement, stakeholder's management, and stakeholder's coordination.

Leadership

Leadership always plays a significant role to any group endeavor, and is thus the quality of the leadership employed will have a significant impact on the successful implementation of t-Government, particularly in e-Government projects requiring a high level of interoperability [19,24]. t-Government projects are long-term: consequently the quality of leadership is crucial [31]: strong leaders are required to overcome the inherent challenges involved. Researchers have identified both vision and leadership as the main drivers of successful e-Government [11,18,32], consequently, and according to many studies, [27,33,34], Effective leadership of this kind is a major contributory factor to the successful implementation of t-Government. The effectiveness of any leadership derives from its quality. Altameem and Prybutok [34], Zhang et al. [15] state that effective leaders express more complex and contradictory behaviour than ineffective leaders. Zairi [35] claims that "Nowadays leadership is considered as a must for survival. It comes from the level of inspiration, commitment generated and corporate determination to perform". Thus a particular challenge to government as top manager of a project is the selection of a strong political leader with both IT and management skills capable of leading the project to a successful completion [11,18,36]. In this study leadership is measured by: leadership support, leadership style, and the influence of strong leadership.

Citizen centricity

A citizen centric involves the provision of services from the end-user's point of view rather than the perspective of the government department [36-39]. A t-Government project should have a citizen centric perception. However, citizen-centric service delivery is a complex issue with many perspectives that need to be considered at the very beginning of a transformation project. The provision of citizen-centric service has been identified by some researchers as a critical success factor [38]. Therefore, t-Government should be provided in a way that enable citizens to easily access information and complete their transactions. In order to assess the level of success of the provision of citizen centric services end-user satisfaction should be regularly measured [36-39]. Citizens' centricity is measured in this study by: citizen centric legislation, citizen's measurement and citizen's satisfaction.

Funding

e-Government initiatives being long-term, they require long-term financial support from the Government, which can become a major challenge if that funding has to come from a government where political influence may interfere with decisions taken by high level officials [19,40]. Moreover, Gottipati [41] argues that the way e-government projects are being reviewed and funded in the Arabian gulf is that such projects appear to seen as budget-based instead of seeing those projects as project-based budgets. Thus funding is inevitably a crucial factor in the implementation of t-Government, as a lack of adequate, consistent financial backing will become a major challenge to the successful implementation of any e-Government project [42]. Adequate funding supports the necessary integration of government organisations by facilitating the development of infrastructure (such as building, technology, human resources) required to implement t -Government, and ensures that goals and targets are met on time. Its impact on e-Government interoperability is also positive [19]. Fund is measured in this study through fund amount, measurement mechanism, fund management, and fund controlling.

Methodology

Research model

The objective of this study is to identify governing factors that influence the implementation of t-Government in Saudi Arabia. The research model of the study is presented below in Figure 1. The constructs included in the research model, were drawn from the variables used from a review of the relevant literature Tables 1 and 2.

Constructs	Items	References
Strategy & Regulations	e-Gov strategy	[9,43]
	Commitment	[10,44]
	Plan	[10,31]
	Goal	[10,19,28]
	Vision	[10]
Leadership	Support	[10,45-47]
	Style	[11,24,28,31,46,48]
	Strong leader	[28,46,49,50]
Stakeholders	Involvement	[28,46,51-54]
	Identification	[21,51,52]
	Management	[51,55]
	Cooperation	[11,29,46,51,52]

Fund	Amount	[42,43,47,56,57]
	Measurement mechanism	[58]
	Management	[58-60]
	Controlling	[19,58,59]

Table 1: Governing Factors Influencing t-Government implementation from the Literature.

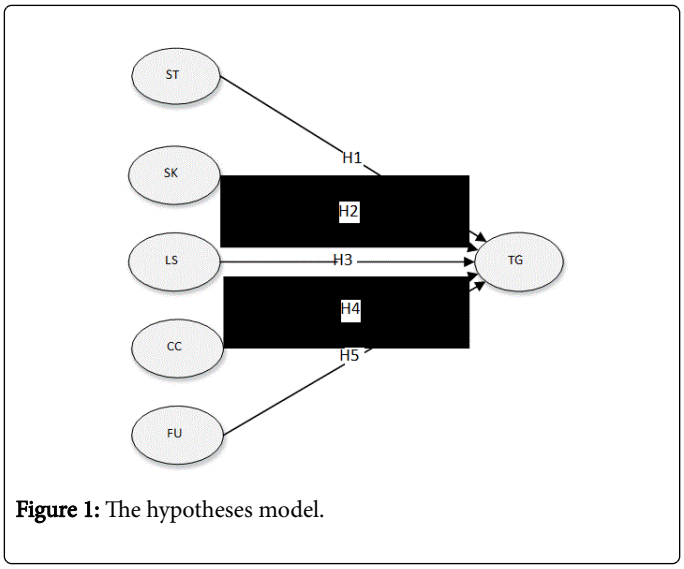

Figure 1: The hypotheses model.

Research hypotheses

No	Hypotheses
H1	Strategy positively influence the implementation of t-Government
H2	Stakeholders positively influence the implementation of t-Government
H3	Leadership positively influences the implementation of t-Government
H4	Citizens Centricity positively influences the implementation of t-Government
H5	Funding positively influences the implementation of t-Government

Table 2: Research hypotheses.

Data collection

This study uses a quantitative research approach with methods that include a survey. The survey was divided into different sections to enable respondents to very understand it and a Likert scale with six levels of possible answers was used (from Strongly Agree to Strongly Disagree). Survey was conducted in Saudi Arabia from December 2013 to April 2014. 1194 survey questionnaires are distributed to 166 organisations. From this 917 people have viewed the survey, and 477 people have responded. From the balance, 258 responses are incomplete (more than 70% of the questions are unanswered) and hence unusable. The number of completed responses is 217.

Data Analysis and Result

Statistical Packages for Social Science (SPSS) version (22) was used to analyse the data collected through the surveys. The study applied the Structural Equation Modelling (SEM) technique and utilized AMOS version (22) tools to test the hypotheses among the variables in the model. Structural equation modelling (SEM) is a statistical technique that allows the researcher to examine multiple interrelated dependence relationships in a single model. SEM is a popular approach in social science research. It is popular analysis technique because it has flexibility for interpreting the theory to be tested and the sample data. The following section will illustrate the analysis of the study in more detail.

Descriptive statistical perspective

In the questionnaire 5 demographic questions were used to capture demographic information: age, education level, occupation, organisation size, and the number of G2G services. More than (72.9 percent) of the respondents were between 31 and 45 years old and more than (88 percent) have hold a Bachelor's or postgraduate degree. More than (41 percent) of the respondents are manager, more than (55 percent) of the respondents come from organisation have more than 500 employee, and (53 percent) of the respondents come from organisation have from (1-5) G2G services. The demographic information about the respondent is summarised in Table 3.

Demographic Variables		Frequency	Percent %
Age group	20 - 25	7	3.2
	26 - 30	26	12.0
	31 - 35	52	24.0
	36 - 40	36	16.6
	41 - 45	37	17.1
	46 - 50	25	11.5
	51 - 55	26	12.0
	More than 55	8	3.7
Education level	High school	3	1.4
	Diploma	24	11.1
	Bachelor	87	40.1
	High Diploma	13	6.0
	Master	74	34.1
	Doctorate	16	7.4
Occupation	Manager	26	12.0
	Dept Manager	64	29.5
	System-analysis	60	27.6
	Technician	13	6.0
	Others	54	24.9
Employee number	Less than 100	31	14.3
	101 - 500	65	30.0

	501 - 1000	35	16.1
	1001 - 2000	25	11.5
	2001 - 5000	20	9.2
	More than 5000	41	18.9
Numbers of G2G services	1 - 5	115	53
	6 - 10	61	28.1
	11 -15	5	2.30
	16 - 20	6	2.76
	None	30	13.82

Table 3: The demographic information.

Reliability verification

This study used Cronbach's alpha to measure the internal consistency [48], outline that internal consistency is a commonly used technique to assess the reliability by using Cronbach's alpha. Also, Black et al. [49], Hair Jr. suggests that the reliability test should be conducted before the construct validity analysis is commenced. Constructs are considered reliable when Cronbach's alpha is 0.70 or higher. As shown in Table 4, all estimated values of the constructs were above the recommended value (0.70) which indicates that there is a strong reliability and high internal consistency in measuring relationships in the model.

Construct	No of Items	Cronbach's Alpha
ST	5	0.947
SK	3	0.946
CC	3	0.779
LS	3	0.975
FU	4	0.850
TG	3	0.920

Table 4: Cronbach alpha reliability results.

Validity test

All the constructs were shown to have a composite reliability greater than the threshold level of 0.60 and their Average Variance Extracted (AVE) is also greater than the threshold level of 0.50 as shown in Table 5. Also, all the indicators (factors) had significant loadings greater than 0.50 ($p < 0.001$) on their respective constructs as shown in Table 6.

Since their factor loadings were meaningful and highly significant, they were retained in the measurement model. Moreover, Average Variance Extracted (AVE) is greater than the squared correlation of constructs show in Table 7. These results indicated that the measurement model possessed substantial convergent validity and unidimensionality [49].

	CR	AVE
SK	0.948	0.859
ST	0.947	0.783
CC	0.824	0.621
LS	0.976	0.932
TG	0.921	0.797
FU	0.927	0.762

Table 5: Convergent validity results.

Factors	Items	Estimate
SK	STAK_4	0.981
	STAK_2	0.897
	STAK_1	0.899
ST	LE_2	0.855
	LE_1	0.94
	STA_3	0.874
	STA_2	0.871
	STA_4	0.882
CC	C_3	0.644
	C_2	0.678
	C_1	0.992
LS	L_3	0.984
	L_2	0.915
	L_1	0.996
FU	F_1	0.979
	F_2	0.816

Table 6: Constructs factor loading.

	SK	ST	CC	LS	TG	FU
SK	0.927					
ST	0.511	0.885				
CC	0.175	0.11	0.788			
LS	0.404	0.257	0.138	0.966		
TG	0.26	0.025	0.033	0.247	0.893	
FU	0.045	0.012	0.168	-0.061	0.053	0.873

Table 7: Discriminant validity: Average Variance Extracted (AVE) with squared correlation of construct.

Hypothesis Testing Results

Testing of hypotheses aims to determine which independent variables provide a statistically meaningful relationship to the dependent variables [49]. This study tested the hypotheses using SEM.

SEM provides information about the hypothesized impact both, directly from one variable to another and via other variables positioned between the other two. This study was conducted using AMOS 22.0.

Hypotheses	Path coefficient	C.R.	P value	Result
TG<---ST	0.15	2.151	0.03*	Supported
TG<---SK	0.25	3.753	***	Supported
TG <---LS	0.19	2.866	0.004*	Supported
TG<---CC	0.03	0.514	N.S	Not supported
TG<---FU	0.06	0.955	N.S	Not supported
* p < 0.05; ** p < 0.01; *** p < 0.001				

Table 8: Hypothesis testing results.

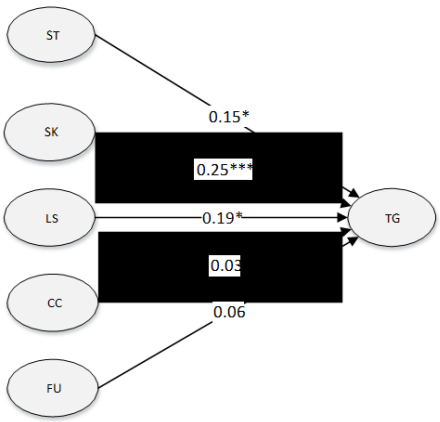

Figure 2: Path coefficients for the proposed structural model.

The statistics of the model based on the SEM output are: RMSEA 0.053, Chi -square/df 1.61, CFI 0.975, TLI 0.971. These values are shown in Figure 2, within the threshold limits prescribed by Black et al. [49], Hair Jr. and Kline [49,50]. Table 8 represents the results of testing the current study hypotheses. The 'Result' column indicates whether that hypothesis was: supported or not supported depending on the result of the p value.

Discussion

The aim of this study is to test how governing factors namely strategy, stakeholders, leadership, citizens' centricity and funding to the implementation of t-Government among (n = 217) from different organisations in Saudi Arabia. The SEM analysis data supported the analysis and results of the SEM were summarized as follows:

Strategy positively influences the implementation of t-Government

Strategy indicated a significant positive impact on the change towards a t-Government. This hypothesis is supported in not only this study but other studies conducted previously. [10,11,19,28,43-45,51-53] reported the impact of the strategy to the implementation of t -Government. Based on this result, decision-makers, and e-Government officials should pay attention to the e-Government strategy for the transformation to a t-Government. It should be translated into an effective and clear roadmap that can be easily interpreted and committed to by all government organisations.

Stakeholders positively influence the implementation of t-Government

This hypothesis is supported in this study and is consistent with previous studies [19,15,28,54-57] found the impact of stakeholders on the implementation of t-Government. Based on this result, it is clearly understandable that decision-makers and e-Government officials should pay attention to the existence of involvement, commitment, management and cooperation of the stakeholders toward the success of the implementation of t-Government.

Leaderships positively influences the implementation of t-Government

This hypothesis is supported in this study and is consistent with previous studies [9,10,19,28,58]. Therefore, decision-makers, and e-Government officials should pay more attention to leadership support, interaction and cooperation with sufficient knowledge and style on the implementation of t-Government.

Citizens' Centricity positively influences the implementation of t-Government

This hypothesis is not supported in this context and is inconsistent with previous studies [30,36,38,39] pointed out the impact of Citizen Centric on the change towards a t-Government. The reason for that could be the lack of regular reviewing and measuring of citizen satisfaction, and participation issues have not been adequately addressed. According to [2], the United Nations e-Government Survey uses a three stage model to assess the e-participation index (EPI). The first stage: 1) e-information measures how participants access public information and information upon demand, 2) e-consultation measures the engagement of contributions of people on public policies and services and 3) e-decision-making to measure the empowerment of people on designing the service delivery. The e -participation index (EPI) indicates Saudi Arabia achieved 85.19% in stage 1, 27.27% in stage 2, and 11.11% in stage 3 which means there is a gap in citizen centric focus. Therefore, decision-makers, and e-Government officials should pay more attention to citizen satisfaction, service quality and should be regularly measured.

Funding positively influences the implementation of t-Government.

This hypothesis is not supported in this context, and it is inconsistent with previous studies [42,43,52,60] who pointed out that there is an impact of funding towards t-Government. The reason for that could be the support from the custodian of the two holy mosques King Abdullah to the transformation to e-Government projects. Therefore, funding is not an obstacle by itself the implementation of t-Government, and more effort should be considered to create plans and strategies to fund e-Government projects and to further monitor this funds.

Conclusion

The aim of this study is to identify and test empirically the factors that affect implementation of t-Government from multiple perspectives. It provides a model to assess the success factors to the implementation of t -Government in Saudi Arabia. Also, it identifies

the most important factors in this context, in terms of evaluating the success of the change to t-Government in Saudi Arabia.

Based on the data collected and the results of the analysis, this study showed positive and significant relationships between factors such as the relationships between strategy and t-Government (H1); the relationships between stakeholders and t-Government (H2); and the relationships between leadership and t-Government (H3). Also, it indicated that there is insignificant relationship between citizens' centricity and t-Government (H4); and insignificant relationship between funding and t-Government (H5).

The results of this study generate some useful implications for decision-makers, and government officials in developing countries in general and especially Saudi Arabia, with important guidelines in understanding how different factors affect the transition to a transformational government. Since the Saudi government and many other governments face the problem of a low level of e-government integration [2], it is hoped that the results this study will support decision-makers, and government officials in increasing the level of success of t-Government.

To summarise, this study has attempted to offer a better understanding of the relevant factors that may influence the change toward t-Government through an analysis of the literature and a survey. This study is based on 217 respondents and due to its limited size and exclusive focus on Saudi Arabia future studies can be conducted in future to verify the results and also tests the factors in other cultural contexts. In addition, future research can expand this study by including the effect of different factors such as organisational and technical factors that may impact the implementation of t-Government in Saudi Arabia.

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