COSTS OF TRANSACTIONAL E-GOVERNMENT SYSTEMS

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Abstract

Passing through the different stages of e-government systems, the transactional stage could be considered as one of the most important in the implementation of an e-government system because it represents the highest level of interaction within organisations and between customers and government organisations. The importance of the transactional stage of the e-government system and its positive impact refers to not only to making the delivery of external services quicker, but also to increasing the efficiency of internal government processes. Consequently, government organisations might seek to reach this stage. However, in order to reach the transactional stage of e-government, there are various dimensions related to government organisations; these dimensions could be challenges, costs or benefits. In fact, there is a lack of studies focusing on the identification of the levels and categorisation of transactional e-government costs. Therefore, this paper will try to fill the information gap based on empirical case studies of two government organisations. This paper will identify the levels and categorisation of transactional e-government costs. Consequently, the work of decision-makers in government organisations will be improved as well as the researchers understanding of transactional e-government costs will be enhanced.

Keywords: Transactional e-government, costs, e-government systems

Introduction

E-government is the use of Information and Communication Technology (ICT) to promote more efficient and cost effective government, facilitate more convenient government services, allow greater public access to information, and make government more accountable to citizens (Monga 2008). It is one of the strategic innovations that many government agencies have considered adopting to support the development of government operations and deliver efficient government services (Mousa (2013)). In the last decade, e-government has made rapid progress (Datar *et al* (2010)). This

rapid development of Information and Communication Technologies (ICTs), especially in the field of e-government, has created an environment in which citizens have greater access to their governments and contact between citizen and government has become more inclusive (Gulati and Yates (2011)).

The process of implementation of an e-government system passes through stages such as information, communication and transaction, until it reaches its highest potential, known as the integration stage. The transaction stage can be considered as one of the most important stages of the implementation of any e-government system. It enables customers to carry out complete transactions with specified government organisations online safely. However, in order to reach the transaction stage of e-government, there are various dimensions such as challenges, costs or benefits, related to government organisations.

There appears to be a lack of studies that focus on the identification of the levels and categorisation of transactional e-government costs. Therefore, this paper will try to fill the information gap of the identification of the levels and categorisation of transactional e-government costs based on the empirical case studies of two government organisations. The purpose of this paper is to identify the levels and categorisation of transactional e-government costs. Consequently, the boundaries of knowledge can be expanded, especially for government organisations that are seeking to reach the transactional of e-government systems.

However, this paper will first present a discussion on the need for government organisations to reach the transactional stage. Then the costs of e-government will be discussed. This will be followed by the identification of the framework of this study; the research methodology used for gathering data will then be explained. Finally, the empirical data (derived from two organisations) regarding transactional e-government system costs will be discussed.

The need for government organisations to reach the transaction stage

It is clear that the stages of e-government are the central point and significant issue of an e-government system (Al-Sebie, 2011). A specified approach to the stages of e-government systems has not been agreed between scholars; neither has there been agreement on the number of stages required for an e-government system. However, the stages required by an e-government system have been classified into three, four, five, or six stages (Irani *et al* 2006).

The transaction stage of e-government is one of the most important stages to the implementation of an e-government system. Based on comprehensive literature reviews in the e-government field such as Irani *et al* (2006), Al-Sebie *et al* (2005), Al-Sebie and Irani (2005) and Adam *et al*

(2003), this section discusses the need for government organisations to reach the transaction stage. The potential importance of the transaction stage, as one of the most important stages of e-government system, comes from its impact on the implementation of e-government systems. The transaction stage enables two-way communication; 'push/pull e-government' where government services are pushed by government organisations to be available for customers online and data can be pulled from customers online. As a result of allowing customers to carry out complete transactions such as renewing visas and paying bills with specified government organisations online safely, the transaction stage offers a great possibility of reducing both costs and time. Furthermore, the transaction stage can be considered as the highest level of maturity of an e-government system inside government organisations. It leads to a high level of interactivity between government organisations and customers.

Additionally, government organisations might seek to reach the transaction stage of an e-government system for several reasons such as saving time, effort and the cost of delivery of services by increasing the efficiency of internal government processes as well as making the delivery of external services quicker and enabling customers to complete transactions electronically.

Costs of e-government (Al-Sebie, 2005)

E-government is a complex issue because the scope of e-government is very wide and interrelated with other areas (Al-Sebie (2005)). (Wimmer and Traunmuller, 2002, cited in Al-Sebie, 2005) claim that e-government is a multidisciplinary and multidimensional area; it is not only about using the technology for delivery of government information and services; it also touches on and involves many other issues including political, administrative, social, economic and business aspects. There are different dimensions such as challenges, benefits, costs and/or risks associated with the implementation of e-government systems. The cost is one of the most important dimensions related to any e-government system.

Based on comprehensive literature reviews such as Irani and Love (2001), Irani (1998) and Irani et al. (1998), costs that are related to the adoption of technology were discussed and classified into direct and indirect cost factors. Direct costs, that may include hardware and software costs, maintenance costs, system development costs etc., are financially tangible and are those that can be attributed to the implementation and operation of IT. Indirect costs are financially tangible/intangible and non-financial in nature. They can be divided into indirect human costs and indirect organisational costs. Indirect human costs could include employee training, employee motivation and management effort while indirect organisational

costs may include business process reengineering, losses in productivity, organisational restructuring etc.

*La Vigne (2001) argues that the costs of e-government are often underestimated for two reasons: (a) under–appreciation of the complexity of e-government - greater ability to break down the complexity of e-government leads to greater ability to predict the resulting costs; and (b) a lack of guides to identifying all cost factors. He claims that improving the ability to identify all cost categories and estimate specific costs is a growing concern in both public and private IT sectors***.**

Framework of this study

To meet the purpose of this research, the framework of the costs of transactional e-government systems should be identified. The identification of the framework of this research requires the clarification of some points as follows:

- E-government systems have different dimensions such benefits, challenges, costs and risks. This paper focuses on the cost dimension.
- This paper will focus only on government organisations as providers of government information and services and as scope for implementation of all stages of e-government including transactions (see Table 1).
- This paper focuses on the costs dimension that are faced at all stages until government organisations have reached the transactional stage. This paper does not provide classification of the costs of each stage of e-government up to the transactional stage**.**

Table 1 The scope of implementation of different stages of e-government (Al-Sebie *et al* (2005))

Stages	Scope of Implementation
Different stages until e-government reaches the transaction stage.	Inside one (specified) organisation.
Final stage (integration).	Includes different organisations, departments and agencies of local and/or central government.

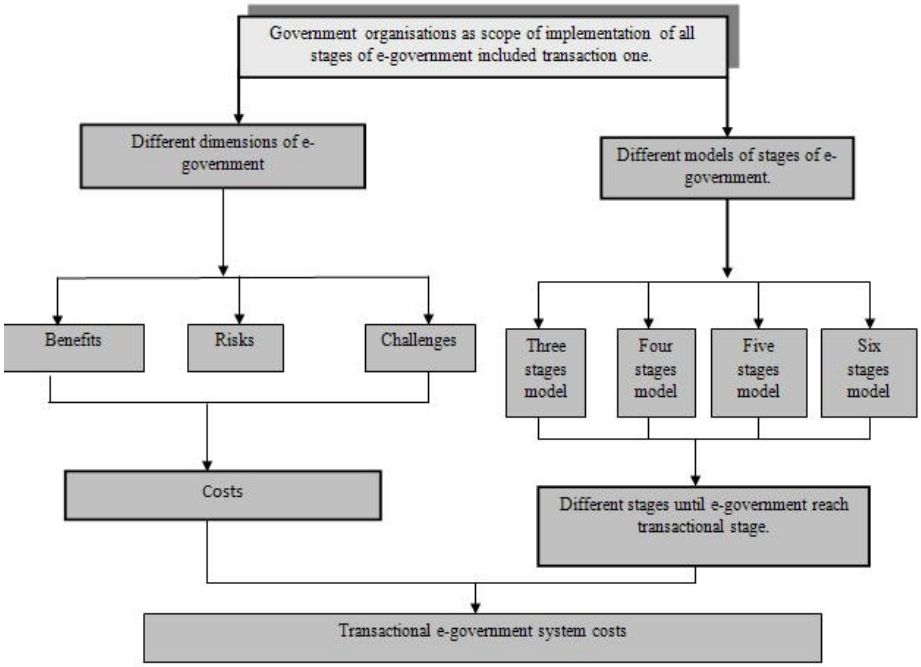
- **The reaching of transactional stage of the e-government system by government organisations will be called, within this paper, a transactional e-government system.**
- **The reaching of the transactional stage of the e-government system by government organisations can be measured by the following criteria (Al-Sebie (2005)):**
  - it will enable customers to fill in and electronically submit different types of forms such as registration and payment;

- it will provide a secure connection enabling customers to complete their transactions with the required government organisation online, safely and with trust in the system;
- it will allow customers to perform online financial transactions (if applicable) such as payment of bills and fines;
- it will enable customers to create online accounts with their own user names and passwords within government organisations;
- it will provide customers with instant decisions, meaning that as soon as a customer has completed a transaction, such as filling in a form or paying a bill online, a message will appear to confirm that the process has been executed successfully.

Consequently, this paper focuses on the cost of e-government at all stages until government organisations have reached the transactional stage.

To satisfy the aim of this paper, Figure 1 represents the framework of this study. It has been divided into two main parts. The first part shows that the different models of the stages of e-government systems can be divided into three, four, five, or six stage models (see Section: 2). The stage aimed for in this research is the transaction one. The second part reveals the different dimensions of e-government including benefits, challenges, risks, and/or costs issues. Costs dimension is that targeted by this study. Consequently, costs of transactional e-government systems are the main purpose of this research.

Figure 1 Framework of the costs of transactional e-government



Empirical research methodology

To realize the purpose of this paper, a case study (two cases) strategy has been chosen for gathering data. The following table (Irani *et al* (2006)) shows the different strategies and methods available in the research methodology area; the reasons why the chosen approaches for data gathering were considered the most suitable; and the justification for the decisions:

Table 2 Types of approaches chosen, and the justification(s) for the decision

Approach	**Methods**	**Strategies**	
Types of approach	Quantitative, qualitative, mixed	Case study, grounded theory, ethnography, etc…	Single or multiple case studies
An appropriate approach	**Qualitative**	**Case study**	**Multiple case studies**
Justification(s) for the Decision	▪ This paper seeks to understand individual experiences of work. ▪ Qualitative method allows exploration of a phenomenon about which extremely little is known. ▪ Rich empirical data is required to give more understanding of transactional e-government costs. ▪ The need for rich empirical data means that the use of the qualitative methods is more suitable for this paper because it enables the processes to be examined in-depth.	▪ E-government is a relatively new area with little and limited research. Therefore, a case study strategy is more suitable. ▪ The case study strategy enables the author of this paper to study the phenomenon in its natural settings. ▪ Studying the transactional of e-government costs in their natural settings will help the author to understand the nature and complexity of transactional e-government costs. ▪ The case study strategy allows the author to understand in-depth the context of transactional e-government costs.	To analyse data from more than one organisation allows cross checking and examination of the findings of the research through the analysis of data across organisations.

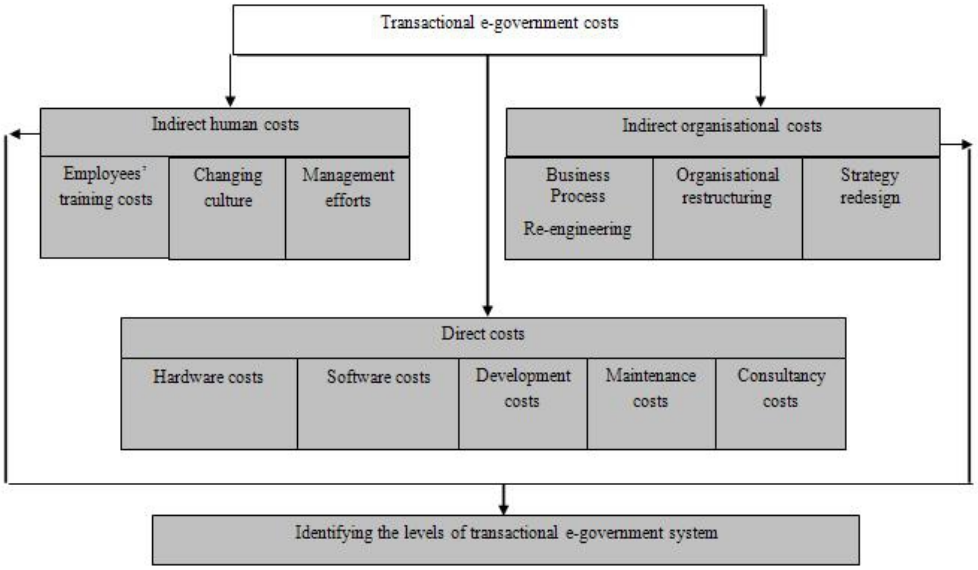
Conceptual model of transactional e-government system costs

To meet the purpose of this research, based on the above analysis (see section: 3) and in the light of the classification of EAI (Enterprise Application Integration) costs (Themistocleous, 2002), a conceptual model of transactional e-government systems costs has been developed.

As shown in the proposed conceptual model (see Figure: 2), the costs of transactional e-government systems have been classified into three main

dimensions. Direct costs include hardware costs, software costs, development costs, maintenance costs and consultancy costs. Indirect human costs include employees' training costs, changing culture costs and management efforts' costs. Finally, indirect organisational costs include business process re-engineering, organisational restructuring and strategy redesign costs.

Figure 2 Proposed conceptual model for transactional e-government costs



Empirical data regarding costs of transactional e-government

This section seeks to summarise the aims of the following sections that related to empirical data of this study. Based on empirical data derived from the case studies of two government organisations (see sections 8 and 9) and to meet the purpose of this paper, Section 10 will identify the level of each transactional e-government cost (as a factor) included in the conceptual model (see Figure: 2). Additionally, Section 11 will categorise those transactional e-government costs included in the conceptual model (see Figure: 2), based on levels of costs.

Case study one – Sharjah City Municipality (ShM)

Sharjah is one of the seven emirates that make up the United Arab Emirates (UAE). One of the most important aims of the Sharjah e-government project is transforming government services into integrated, secure and value-creation e-services through effective business, IT and infrastructure transformation.

Background to the organisation

Sharjah city municipality (ShM) is one of the oldest municipalities in the UAE. ShM executes many public projects in the emirate of Sharjah every year, and it has a great role in boosting the economy, society, public health, environment and many other fields in the emirate.

To meet the purpose of this paper, and according to the criteria discussed (in Section 4) of this paper to reach transactional e-government within government organisations, ShM and LDeG (case study two) have already reached a transactional e-government system.

Transactional e-government system costs at ShM

This sub-section aims to provide the perceptions of the interviewees related to the level of transactional e-government system costs at ShM. Four stakeholders who were involved directly in the implementation of the e-government project were interviewed using structured interviews. The stakeholders interviewed were the: Director of Information and Systems Dept (D.I); E-Services Project Manager (P.M); Head of System Development Section (H.S) and IT Consultant (I.C)

Interviewees were asked to identify the level of each transactional e-government cost (as a factor) identified in the conceptual model proposed in Section 6. The levels of cost presented in Tables 3 and 4 of this paper follow the values of: (a) high (H); (b) medium (M) and (c) low (L).

Table 3 summarises the perceptions of the interviewees when asked to identify the level of transactional e-government costs.

Table 3 Level of transactional e-government costs in ShM.

Categorisation of transactional e-government costs	Transactional e-government systems costs in ShM.	D.I	P.M	H.S	I.C
Direct costs	Hardware costs	H	M	L	L
	Software costs	H	L	H	M
	Development costs	M	H	M	H
	Maintenance costs	M	M	L	M
	Consultancy costs	H	H	M	L
Indirect human costs	Employees' training	M	L	L	M
	Changing culture	H	L	M	L
	Management efforts	H	L	M	L
Indirect organisational costs	Business process re-engineering	H	H	H	H
	Organisational restructuring	H	H	L	M
	Strategy redesign	H	H	H	H

Case study two– Land Department of Government of Dubai (LDeG)

Dubai is one of the seven emirates that make up the United Arab Emirates (UAE). Today, Dubai has emerged as a cosmopolitan metropolis that has grown steadily to become a global city and a business and cultural hub of the Middle East. Dubai has recently attracted world attention through many innovative large construction projects. It is investing heavily in adopting and implementing Information and Communication Technology (ICT) in its government and private sectors. Dubai can be considered one of the world's most advanced countries in the application of IT, especially in e-government systems.

Background to the organisation

The Land Department was established in 1960, in order to safeguard the property rights of the city during the building of the United Arab Emirates and while building the foundations for the Union. The Land Department uses sophisticated electronic systems in its operations; managed by qualified national minds to apply the best real estate practices.

Transactional e-government system costs at LDeG

This sub-section aims to provide the perceptions of the interviewees relating to the level of transactional e-government system costs at LDeG. Four stakeholders who were involved directly in the implementation of the e-government project were interviewed using structured interviews. The stakeholders interviewed were the: E-Services Manager (E.M); Manager of Infrastructure and Operations Section (I.O); Chief Engineer - Networks (E.N) and Assistant Engineer - Technical Support (T.S)

The interviewees were asked to identify the level of each transactional e-government cost (as a factor) identified in the conceptual model proposed in Section 6. The levels of cost presented in the Table 4 of this paper follow the values presented in sub-section 8.2.

Table 4 summarises the perceptions of the interviewees when asked to identify the level of transactional e-government costs.

Table 4 Level of transactional e-government costs in LDeG

Categorisation of transactional e-government costs	Transactional e-government systems costs in LDeG.	E.M	I.O	E.N	T.S
Direct Costs	Hardware costs	M	H	H	H
	Software costs	H	M	H	H
	Development costs	M	M	L	M
	Maintenance costs	M	L	M	L
	Consultancy costs	M	M	M	M
Indirect human cost	Employees' training	M	L	H	H
	Changing culture	M	H	H	L

	Management efforts	M	H	H	M
Indirect organisational costs	Business process re-engineering	H	M	L	M
	Organisational restructuring	M	H	M	H
	Strategy redesign	H	H	H	L

Transactional e-government costs

This section seeks to identify the levels of transactional e-government costs, which are identified in the conceptual model (see Figure 2), based on empirical data derived from two case studies (ShM and LDeG) presented in sections 8 and 9.

Levels of transactional e-government costs

The purpose of this sub-section is to provide the findings derived from analysis of the data presented in Tables 3 and 4 regarding the levels of transactional e-government costsin the two case studies:

- Most interviewees in the two case studies considered that the strategy redesign costs, software costs and business process re-engineering costs are high – except one who claimed that the costs of strategy redesign is low. A few claimed that the strategy redesign costs, software costs and business process re-engineering costs are medium or low.
- Organisational restructuring costs are considered as high by some interviewees, while others claimed that were medium.
- The costs of (Development and consultancy) are considered as medium by most interviewees – a few claimed that (Development and consultancy) costs were high or low.
  - There was disagreement among interviewees regarding (hardware, employees' training, changing culture and management efforts) costs, where they were considered as high, medium and low costs.
  - The perspectives of interviewees were divided into two groups regarding the maintenance costs. Some interviewees claim that maintenance costs are medium while others claim they are low.

Categorisation of transactional e-government costs

In light of the above discussion (see sub-section 10.1) and to satisfy the aim of this paper, the purpose of this section is to categorise those transactional e-government costs from the perspectives of the interviewees of the two case studies (ShM and LDeG), based on levels of costs. This categorisation could benefit decision-making in other local governments attempting to reach transactional e-government. It will allow them to pay

more attention, focus on and give consideration to the high or medium costs and try to minimize or avoid them.

Categorisation of transactional e-government costs

As a result of the above discussions (see sub-section 10.1) regarding the level transactional e-government costs based on the empirical data presented in Tables 3 and 4, Table 5 shows the categorisation of these transactional e-government costs based on levels of costs.

Table 5 Categorisation of transactional e-government costs

Transactional e-government costs	Level of costs	Reference
Strategy redesign	**Almost high**	**Based on the perspective of interviewees of two case studies (ShM and LDeG)**
Software costs		
Business process re-engineering		
Organisational restructuring	**Between high and medium**	
Development costs	**Almost medium**	
Consultancy costs		
Hardware costs	**Disagreement among high, medium and low**	
Employees' training costs		
Changing culture		
Management efforts		
Maintenance costs	**Between medium and low**	

Conclusion

Due to the lack of studies that focus on the identification of levels and categorisation of transactional e-government systems, this paper has focused on filling in this information gap based on empirical data derived from two government organisations case studies (ShM and LDeG).

This paper may be considered one of the pioneer studies in this area of e-government; to the best of the author's knowledge, no empirical study to date has focused on transactional e-government costs. Furthermore, it can be claimed that this paper has made a novel contribution to the area of e-government and has expanded the boundaries of knowledge, especially for government organisations that are seeking to reach the transactional of e-government systems. Three aspects are offered. These are:

1) The identification of each level of transactional e-government system costs (as a factor) is novel because it can lead to improved analysis through enhancing the work of decision-makers in government organisations when they take decisions regarding e-government systems. It can also assist

researchers in understanding transactional e-government costs in such systems.

2) Another innovative aspect of the categorisation of transactional e-government system costs is that it could benefit decision-making in government organisations attempting to reach transactional e-government by allowing them to: pay more attention to, focus on and give consideration to those costs which are high and medium. So that, it could help to minimize or avoid high and medium costs. It could also benefit decision-makers by supporting the management when they take the decisions needed to achieve transactional e-government systems. Additionally, it could enable researchers to analyse and understand transactional e-government costs.

3) The final important contribution made in this paper deals with developing a model for transactional e-government costs that require a robust research methodology. Such a methodology could be employed in other research projects, especially those with a similar focus. The most important reason for the qualitative method chosen as being most appropriate for this research is that such a method enables the generation of rich data which is associated with human and organisational issues. However, it can be said that the results of the empirical data in this research have made a novel contribution to the area of e-government systems and have expanded the boundaries of knowledge regarding the costs of transactional e-government systems.

In conclusion, this paper has tried to put transactional e-government costs into perspective. An interesting foundation has been laid in studying transactional e-government systems costs and more concrete inferences might be drawn by future research studies in this area.

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