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Adoption in Public Sector Organisations

Zakareya Ebrahim  
Brunel University

Zahir Irani  
Brunel University

Sarmad Al Shawi  
Brunel University

# A Strategic Framework for E-government Adoption in Public Sector Organisations

**Zakareya Ebrahim**

Department of Information Systems and Computing  
Information Systems Evaluation and Integration  
Network Group (ISEing)  
Brunel University  
[Zakareya.Ebrahim@brunel.ac.uk](mailto:Zakareya.Ebrahim@brunel.ac.uk)

**Zahir Irani**

Department of Information Systems and Computing  
Information Systems Evaluation and Integration  
Network Group (ISEing)  
Brunel University  
[Zahir.irani@brunel.ac.uk](mailto:Zahir.irani@brunel.ac.uk)

**Sarmad Al Shawi**

Department of Information Systems and Computing  
Information Systems Evaluation and Integration Network Group (ISEing)  
Brunel University  
[Sarmad.alshawi@brunel.ac.uk](mailto:Sarmad.alshawi@brunel.ac.uk)

## ABSTRACT

E-government has been recognized as a change agent for public sector reform. Through this change, the public sector organisation plans to increase operating efficiencies, build information-sharing partnerships and improve communication with other organisations, as well as with the public. Several studies have discussed how e-government will transform public sector organisations from traditional paper-based systems to electronic delivery that leads self-service operations that develop efficiently managed internal business process. However, a number of voids exist in the immature e-government literature, regarding its adoption strategy and process.

This paper looks at the *implementation* aspect of e-government in public sector organisations. The paper critically reviews the issues of e-government adoption and identifies factors that affect the implementation process, such as, technical, organisational, and environmental. In addition, the authors discuss the benefits and barriers that might influence the decision making process toward the adoption of e-government in public sector. Since, e-government is an emerging research area, there is limited literature explaining the framework of e-government adoption. Therefore, this study suggests a strategic framework for e-government adoption that will assist decision makers in public sector organisations to support their e-government adoption strategy and guide the IT developers for implementation process of e-government project.

## Keywords

E-government, Information and Communication Technology, Public Sector Organisations.

## INTRODUCTION

E-government refers to the delivery of government information and services online through the Internet or other digital means. However, the role of e-government is not only to provide information and services to citizens, the adoption of e-government in public sector strengthen government capacity through make electronic connections within and between organisations and their data stores. This connection facilitates the provision and implementation of the government data and policy and better use and running of government information and resources (Cabinet Office, 2000; Heeks, 2001). Governments can also transfer funds electronically to other governmental agencies or provide information to public employees through an intranet or Internet. Cabinet Office (2000) and Tyndale (2002) both agree that e-government will improve communication between different parts of governments so that people do not need to ask repeatedly for the same information from different services providers. In addition, the e-government integrated web portal will make possible for citizens and businesses to complete a transaction with government agencies without having to visit several separate ministries/departments in separate physical locations.

The adoption of e-government becomes an important strategic action plan for public sector since it is fundamental in modernising the government business process, as many IT managers believe that e-government adoption will increase efficiency and save money through increased centralisation of resources, economies of scale, unify government IS applications, and funnelling all IT initiatives through qualified IT professional (Melitski, 2003). However, the adoption and implementation aspect of e-government has not been given adequate attention in the research literature, whereas, number of voids exist regarding the framework for e-government adoption process in public sector organisations. Therefore, this paper presents an integrated framework for e-government adoption and identifies factors that influence the implementation process in public sector organisations. The proposed framework strategically draws the implementation process of e-government in form of stage of growth model. However, the stage of growth model is not a sufficient model for e-government adoption, there is a need for another framework that can explain the significant factors that influence the adoption process, and support the implementation of each adoption stage. Therefore, the authors integrate the stage of growth model with the primary factors of the Technology-Organisation-Environment framework by Tornatzky and Fleischer (1990) in conjunction with perceived benefits and barriers, as Figure 1 illustrates. The integration of these literature models (e.g. stage of growth model, Technology-Organisation-Environment framework, and benefits and barriers) may provide a more comprehensive framework for e-government adoption and therefore, benefit the information systems research.

The proposed framework can be used by organisations when considering the adoption of e-government and allows the IT managers and researchers to better analyse and explore the implementation aspect of e-government. The proposed framework can also be used as an assessment model that can determine the degree of progress that already made by organisation toward e-government implementation.

The proposed framework requires an empirical validation, which will be performed by authors in next stage of this research.

## STRATEGIC FRAMEWORK FOR E-GOVERNMENT ADOPTION

Since e-government is a relatively new research area, there is a limited literature analysing its adoption and implementation process. Therefore, the authors critically review other relevant areas that support the adoption of ICT. An example of such an area is electronic commerce adoption, electronic web services, and electronic business. As a result, the authors will be able to adopt factors from other relevant areas to conceptualise a strategic framework for e-government adoption.

The proposed framework for e-government adoption identifies six strategic objectives that allow the authors to view it as strategic framework:

- Unlike other ICT application projects, e-government project considers a strategic initiative framework that could not be adopted and implemented in one stage and in short period of time. It should be applied as an evolutionary process, with organisations going through a number of stages before they can fully realise the predicted benefits.
- The proposed framework incorporates a staged implementation strategy that outlines required capabilities, action plan, and a road map for understanding the evolution of e-government in public sector organisations.
- The staged of framework helps the organisation stakeholders to understand the implementation process based on long term plan and provides guidance on how to move towards realising potential of the e-government initiative.
- The integration of framework provides a vision statement and set a strategic action for government future in the information society by identifying key factors and stages for action.
- The framework increases the IT managers and researchers' awareness that transforming government business processes through e-government will not be straightforward. It will require developing and maintaining a number of issues such as, information technology capabilities, organisation structure and process, consumer's readiness, and relationship with external partnerships.
- The maturity of the framework stages will allow the IT managers and researchers to determine organisation progress based on how far along they are at incorporating various website features.

The proposed strategic framework for e-government adoption as shown in Figure 1 consists of three parts:

- Stage of growth model;
- Technology-Organisation-Environment framework and,
- Benefits and barriers factors

They will be explained respectively in the subsequent sections.

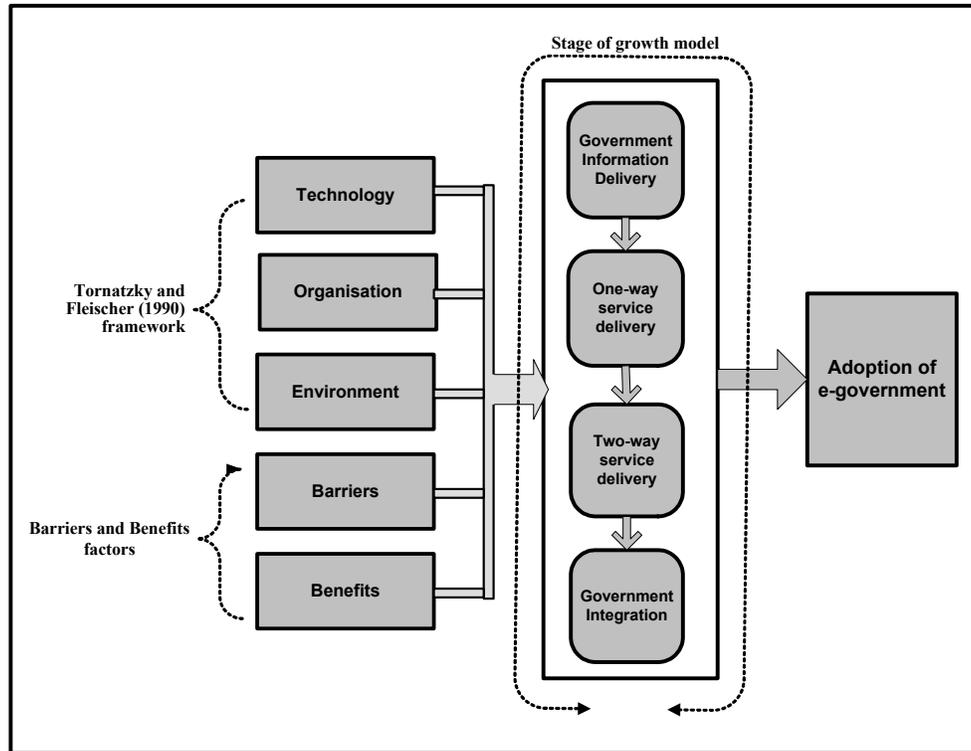


Figure 1. Strategic Framework to E-government adoption

**Stage of Growth Model**

Stage of growth model plays a significant role in IT strategies implementation at an organisation level. It presents organisational progress through a number of successive, identifiable stages. Each stage reflects a particular level of maturity in terms of the use and management of IT in the organisation (Nolan, 1973; Rogers, 1983).

Consequently, stage of growth models are still widely used internationally in both organisational research and Information Systems (IS) research. While Nolan (1973) then Rogers (1983) are the first studies applied stage model of organisational adoption and implementation, there have been many other literature streams application (e.g. e-commerce, enterprise resource planning systems, web services) focusing on stage research models for understanding organisational implementation of IS over the years. Table 1 shows some empirical studies for the organisational adoption of technological innovations that have critically used stage of growth model research in various IS applications.

Authors	IS Application
Chen (2003)	Adoption of Web services
Doukidis et al. (1996)	Evaluation of IS planning
Gallivan (2001)	Organisation Development
Holland (2001)	Enterprise Resource Planning System
King and Teo (1997)	Integration of business and IS planning
Kwon and Zmud (1987); Cooper and Zmud (1990)	IT adoption and implementation in Organisation
Nolan (1973)	Computer Resource Management
Rao et al. (2003)	E-commerce development
Rogers (1983, 1995)	Organisational innovation

Table 1. Research studies that empirically applied stage of growth model in the Information Systems applications

In the context of e-government adoption, the stage of growth model can describe the logical evolution of e-government; each stage being better in some sense than the previous stage, (Rao *et al.*, 2003), which can estimate the degree of progress a government has made towards the ultimate e-government status.

The motivations that have influenced the authors for using the stage of growth model as part of a framework for e-government adoption can be summarised as follows:

- Since e-government is a relatively new phenomenon, the staged model will allow public sector organisations to attract citizens and business trust and confidence to deal with an e-government portal more efficiently.
- As discussed earlier, e-government viewed as a strategic framework that could not be implemented in one scheduled stage. The IT project team should go through a number of predetermined stages before they can fully realise the predicted benefits.
- Due to possible resistance that could appear in a public sector organisation from stakeholders through implementation process, the staged model can address the organisational and cultural change during the ongoing process through various stages.
- Traditionally, the progress of any implementation of IT strategy in a public sector organisation context is slow going due to bureaucracy process of government; the model of stages will outline the structural transformation of public sector organisations as they progress towards an electronically-enabled organisation to understand the processes and outcomes.

Accordingly, the authors propose a four-stage model that characterise the adoption stage of growth model of an e-government initiative. These four stages, as shown in figure 1, are government information delivery, one-way service delivery, two-way service delivery, and government integration. The authors believe that the proposed stage of growth model in this framework is flexible to public sector organisation to adopt it regardless of its electronic service delivery maturity level and each successive stage raises the strategic potential of ICT-as will be discussed in Table 2. However, this stage model does not mean that all government organisations go through these stages or that they undertake them in this particular sequence. The commonality of this model will allow the researchers to determine organisation progress based on how far along they are at incorporating various website features. The empirical validation of the proposed four-stage model will verify whether the proposed implementation sequence of stages is obligatory and determine the integrity of the model. Table 2 presents the description of proposed four-stage model and identify key characteristics of each stage based on IS/IT implementation.

According to Table 2, it becomes clear that the proposed stage of growth model can be described as the logical evolution of e-government involving development of different stages, each later stage being more complicated in some sense than the previous stage because of demand of sophisticated ICT tools, cost, top management support, and high IT skills. Hence, improve effectively the functionalities and facilities provided to citizens along with the development of stages as shown in figure 2, which summarises and illustrates the development degree of performance in relation with functionality that associate with each single stage.

	Stage	Description	Characteristics
Stage 1	<b>Government information delivery</b>	Posting static information through government website. Significance of this stage is a key for e-government initiative, which describes primary services and transactions provided by government organisations, as well as declares instructions and procedures of government operations.	<ul style="list-style-type: none"> <li>▪ Creating government website which makes government general information and services available online</li> <li>▪ Introducing Internet and intranet to organisation</li> <li>▪ Providing information about government organisations, such as organisation outline, hours of operation, mailing address, proposed legislation and phone numbers.</li> <li>▪ Maintaining web pages to update policies and procedures</li> <li>▪ Reducing cost of government expenditure such as stationery and communication</li> <li>▪ Reducing workload on front-office employees</li> <li>▪ Requires no advanced technology tools and additional management support</li> </ul>
Stage 2	<b>One-way service delivery</b>	Providing higher level of information that communicates public sector organisations to citizens through providing dynamic information, online application forms, and establishing channels with government officials. It provides primary preparation in term of technical for organisation and psychological for citizens.	<ul style="list-style-type: none"> <li>▪ Providing service passively, not exchanging information between government and public</li> <li>▪ Facilitating information retrieval from organisation databases</li> <li>▪ Increasing use of intranet to facilitates file transfers</li> <li>▪ Incorporating ICT tools such as e-mail systems, electronic records' management and data-transfer technologies into its websites</li> <li>▪ Introducing search engine to allow key word searching</li> <li>▪ Providing citizen interactive conversations through e-mail systems or online forums with constituents or government officials</li> <li>▪ Downloading application forms from government server</li> <li>▪ Viewed as grounding stage for two-way service delivery</li> <li>▪ More complex than stage 1- as figure 2 illustrates</li> </ul>
Stage 3	<b>Two-way service delivery</b>	Vehicle of complete electronic services from and to citizens, which can deliver entire government transaction electronically while sitting in front of their computer. For example, citizens can fill tax returns, pay fines, and apply for vehicle registration.	<ul style="list-style-type: none"> <li>▪ Facilitating high-level of two-way communication between citizens and government, from initial processes till the payment for service fee.</li> <li>▪ Connecting internal government systems to online interfaces</li> <li>▪ Allowing citizens access to organisation back-office to complete transaction processing</li> <li>▪ Embedding with advanced ICT tools to extend organisation intranet to extranet</li> <li>▪ Reprogramming databases to be linked online into website</li> <li>▪ Maintaining security and confidentiality mechanisms to provide secure transactions</li> <li>▪ Playing strategic role in achieving e-government objectives</li> <li>▪ More complex and level of interactivity higher than in stage 2- as figure 2 illustrates</li> </ul>
Stage 4	<b>Government integration</b>	About transformation of government organisations' processes and re-engineering internal business processes, as well as integrating public information and services across organisations and departments. Implies public services accessible through single window, even if provided by different public sector organisations and departments.	<ul style="list-style-type: none"> <li>▪ Providing one-stop government portal</li> <li>▪ Connecting organisations across different levels of departments</li> <li>▪ Interchanging results of transactions from one organisation system with another system</li> <li>▪ Using full capabilities of ICT applications to transform how government functions are organised and executed.</li> <li>▪ Integrating shortened gap between front and back office.</li> <li>▪ Implementing applications' integration of heterogeneous databases located in different sites</li> <li>▪ Integrating external supply and distribution chains with government</li> <li>▪ Viewed as critical long-term success plan of e-government implementation</li> <li>▪ Most advanced and expensive stage of e-government adoption model- as figure 2 illustrates</li> </ul>

Table 2. Proposed Four-stage Model for e-government adoption

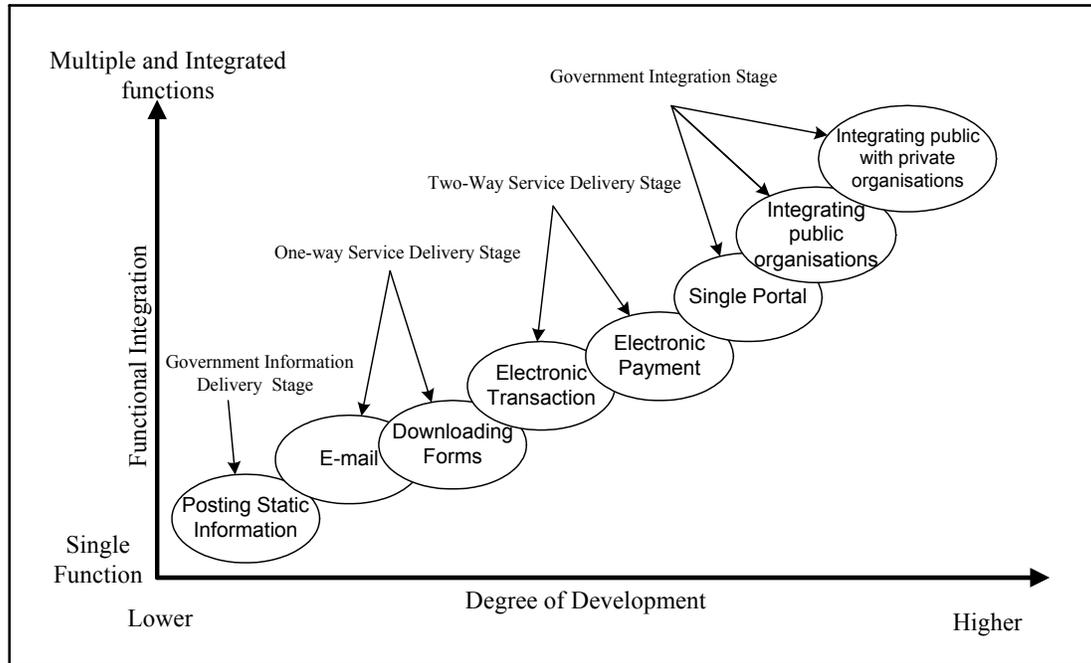


Figure 2. Development of E-government performance in relation with functional integration

**Technology-Organisation-Environment Framework**

The authors propose to use Technology-Organisation-Environment framework by Tornatzky and Fleischer (1990) as the second part to be added to the proposed strategic framework for e-government adoption. This framework will incorporate the proposed stage of growth model that has been discussed above to be supported by the technological, organisational and environmental issues that can be raised gradually along with growth of adoption stages.

Based on the ICT/ IS adoption literature review (e.g. Chau and Tam 1997, Zhu et al. 2002, Cahill et al. 1990, Kuan and Chau 2001), the Tornatzky and Fleischer (1990) framework has a theoretical basis of IS adoption, empirically tested, and has been found a useful starting point for understanding the adoption of technological innovations which can apply to any type of organisation or unit of analysis. One of the contributions for Zhu *et al.* (2002) study is the usefulness of Tornatzky and Fleischer (1990) framework, which identifies facilitators and barriers of their study in e-business adoption. Zhu *et al.* suggest that this framework could be applied by researchers to study other IS adoption in different settings. Cahill et al. (1990) found that the unique combination of these three categories of factors- environment, organisational, and technological – gave greater explanatory power for the successful use of IT in various governments setting than any one single category of factors. Other authors have the same experience (e.g. Ang et al. 2001, Scupola 2003), which using Technology-Organisation-Environment framework effectively in their empirical research. Table 3 illustrates selections of critical IS domains that have been empirically tested using Technology-Organisation-Environment framework by Tornatzky and Fleischer (1990).

Research domain	Empirical References
IT usage in public sector	Ang et al. (2001)
Open systems Adoption	Chau and Tam (1997)
EDI Adoption	Kuan and Chau (2001)
E-commerce adoption	Scupola (2003)
E-business adoption	Zhu et al. (2002)

Table 3. Research studies using Tornatzky and Fleischer (1990) Framework empirically in Information Systems domains

The Technology-Organisation-Environment framework by Tornatzky and Fleischer (1990) includes three factors- as shown in figure 1, that affecting the adoption and implementation process of e-government can be summarises as follows:

- **Technological factor**, which represents the pool of technologies available for adoption by the organisation. Since e-government requires a substantial degree of technical competence to ensure smooth and efficient adoption, the question can be viewed as the degree of match between the characteristics of the e-government innovation and the current technological setting of an organisation.
- **Organisational factor**, which is a source of structures, processes and attributes that constrain or facilitate the adoption of e-government. Many dimensions can be part of the organisational context which can influence the implementation process of e-government such as, the role of top management, financial readiness, degree of centralization, formalization, quality of human resources, amount of slack resources available internally, and size of organisation.
- **Environmental factor**, which is the arena in which the organisation conducts and influences its consumers. One of the primary reasons for e-government adoption is that organisations could be driven towards it by the actions of competitors, as well as, establishes a connection with other organisations for better collaboration and the expectations of citizens and business.

Accordingly, the authors believe that Tornatzky and Fleischer (1990) framework is the proper framework that can explain the factors influencing e-government adoption process in public sector organisation, the reasons are summarised as follow:

- Highlights the three influential contexts in public sector organisation that play a significant role in e-government adoption (i.e. organisational context, technological context, environmental context).
- Implementation of e-government requires several information and communication technologies infrastructure, integrated systems and applications that enable each adopted stage achieve its objective.
- E-government offers an opportunity to reengineer the organisations management process and operations, thus organisational level requires an analytical model that focuses on structure, strategy, and individual attitudes in those organisations and their roles in each adoption stage of growth model.
- The success of adoption of e-government depends on the external environment, in terms of citizens and business willingness to interact with government electronically, as well as the cooperation and competition of other organisations in government.
- Such factors help the authors to analyse the adoption maturity of each stage of growth model that take place in public sector organisation.
- As any ICT adoption, the adoption of e-government offers many benefits to adopters and at same time, they are experience of some barriers during implementation process, the combination of these factors can help to identify barriers and benefits of each adoption stage.

### Perceived benefits and barriers

An extensive literature review of factors affecting the adoption of IT (e.g. Icovou et al., 1995, Mehrstens et al., 2001; Themistocleous and Irani, 2002) reveals that perceived barriers and benefits are one of the most important factors affecting the IT adoption process. These literatures suggest that an awareness of potential/perceived benefits leads to greater adoption.

In this context, e-government is a novel approach in organisational infrastructure development, which quantification of the costs and benefits related to it may lead toward perception of the possible benefits and barriers. As a result, the authors consider that both perceived benefits and barriers experienced in public sector influence the decision making toward e-government adoption.

Consequently, the authors believe that benefits and barriers that associated with e-government should be considered as factors that influence the implementation process of e-government as figure 1 illustrates. This is also reflected in the model proposed by Themistocleous and Irani (2002) and Icovou et al. (1995).

There are a number of barriers experienced in public sector organisations that prevent the realisation of anticipated benefits and degrade successful adoption of e-government projects. On the other hand, there are potential benefits and motivations arise from e-government literature that could promote the top management to adopt it. However, these benefits and barriers have not been identified empirically in the literature, and then the authors will validate empirically in the next stage of this research the significant of these factors on the implementation of e-government through identify them.

The explanation of influence of barriers and benefits factors into e-government adoption process is given below:

**Perceived benefits:** refer to the level of recognition of relative advantage that e-government could provide to the organisation. The degree of relative advantage can be measured as economic profitability, social prestige, or improve business process efficiency, or other benefits. For example, innovations that save money over existing methods have been found to diffuse more rapidly due to their perceived economic advantage.

**Perceived barriers:** refer to the level of factors that inhabit the adoption of e-government or impact the organisation, which is negatively influence the implementation on each adoption stage of the proposed model. The barriers could be varying from one stage to other because each stage requires different ICT tools and strategic action plan. Such barriers can include shortage of financial resources, inappropriate IT infrastructure, and security and privacy issue.

The major aim of the proposed strategic framework for e-government adoption is to reduce the confusion surrounding the e-government adoption process in public sector by understanding the implementation process, identifying the requirements of ICT tools, highlighting the importance of the organisational readiness and the impact of environment. The framework can also help the decision makers' level to set a vision statement and strategic action plan for government future in the information technology age by identifying key factors and stages for action. As well as, the proposed framework will allow the IT specialists to understand and evaluate the maturity of their e-government project.

The next stage of this research is to validate and test whether the proposed stages of growth model can fit the actual events and processes of public sector organisations. Therefore, the authors will be able to explore the integrity and consistency of stages by identifying the degree of interconnection and relationship between each stage. The authors will also determine the degree of impact of barriers and benefits on the e-government adoption process by identifying them.

## RESEARCH METHOD

The next stage of this study is to empirically validate and test the proposed framework of e-government adoption in its natural sitting (see Figure 1). Therefore, the research approach that will be used in this context is interpretivism epistemology since it seeks to describe, understand and translate phenomena through the meanings that people assign to them which producing understanding of the context of the IS (Denzin and Lincoln, 1998; Hussey and Hussey, 1997).

Therefore it will allow the authors to identify and understand in more holistic picture the proposed stages of growth model of e-government adoption through conducting IT specialist within the organisations.

Since e-government adoption is a little-known phenomenon and the intention of this research focus onto the factors that influence the decision of people (e.g. managers, IS specialists) who work in public sector organisations during adoption process of e-government, so the qualitative research method will more appropriate than quantitative, as qualitative research methods can be used to better understand any phenomenon about which little is yet known and to gain more in-depth information that may be difficult to convey quantitatively (Strauss and Corbin, 1998).

The research strategy that will be adapted in this research is exploratory case study. It provides the researchers the opportunity to examine the organisations information systems via series of interviews, document analysis and observation. In addition, the exploratory case study strategy will focus on to the adoption process of e-government in public sector organisations, which will explore the adoption stages of e-government that have been followed by government organisation. This will lead to identify the factors that inhabit and/or promote the decisions for adoption at a particular stage, thus, validate the proposed conceptual framework that has been developed.

Furthermore, multiple-case study approach would be appropriate for this research, since single case study may not provide sufficient data that would justify the final framework of e-government adoption. The reason for this is that the proposed strategic framework of e-government- as shown in Figure 1- divided the adoption process into four stages (i.e. government information delivery, one-way service delivery, two-way service delivery, and government integration), which has been assumed by the authors that the growth level of e-government in organisations is vary due to their IT capabilities and requirements, hence, each stage possibly will be approached by a different organisation. Therefore, it is necessary to identify the factors that influence the adoption of each stage, which leads to examine four case studies.

Throughout the case study, the authors will apply multiple data sources evidence as data and methodological triangulation within each conducted organisation, such as, interviews, document analysis, observation, archival records and organisation website resources, in order to preserve the reliability and validity of findings.

The empirical data analysis of case studies will be placed during the examination of organisations to verify the availability of required data. The empirical evidences that will be derived from the case studies will draw the empirical conclusion. Empirical evidences then will be used to draw the conclusion and finding of this research, which will formulate the final strategic framework for e-government adoption.

## CONCLUSIONS

Although many literatures discussed the potential benefits of e-government adoption and its effectiveness for citizens, business and government, however there is still limited normative literature analysing the adoption process for e-government. In addressing this relative void, the authors of this paper analyse and identify the implementation process of e-government by suggesting stage of growth model that can be used as the proposed strategic framework for e-government adoption. However, the stage of growth model is not a sufficient model for e-government adoption, there is a need for another framework that can explain the significant factors such as, organisation, technology and environment to support the implementation process and analyse the requirements for each adoption stage. Therefore, the authors integrate the proposed stage of growth model with Tornatzky and Fleischer (1990) framework in conjunction with perceived benefits and barriers in order to conceptualise a strategic framework for e-government adoption.

The integration of these models - stage of growth model, Tornatzky and Fleischer (1990) framework and perceived barriers and benefits- that lead to formulate a strategic framework for e-government adoption will help to outline a road map for understanding the evolution of e-government in public sector organisations. As a result, it will accelerate and facilitate the implementation process of e-government by identifying the fundamental adoption stages and their needs. The proposed framework can be used also as an assessment model to determine the degree of progress made toward e-government implementation. Additionally, it can be used as a decision-making tool that supports management when taking decision regarding the adoption of e-government. The proposed framework in this paper will be empirically validated using case study strategy and will form the basis for further research.

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