Motivation, Barriers and Impacts of Mobile Technology
in Four OECD Countries: A Literature Review of e-Government
Service Deployment

Yang Wang

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Primary Supervisor: Krassie Petrova

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ATTESTATION OF AUTHORSHIP

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person or material which has been accepted for the qualification of any other degree or diploma of a university or other institute of higher learning."

Signed by _____

Yang Wang
January 2010

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ABSTRACT

Information and communication technologies significantly influence the work of local and central government agencies. An electronic government (e-Government) service is capable of providing intangible value to all stakeholders, and additionally builds a linkage for effortless communication between government and citizens. This dissertation aims to examine factors and issues that influence the e-Government service deployment, including advantages, disadvantages and its future trends. The researcher has conducted a systematic literature review and qualitatively analysed 136 recent articles about e-Government services deployment in four countries that are members of the Organization for Economic Co-operation and Development (OECD).

A range of factors relevant to e-Government service deployment motivators, barriers and future trends are identified and an internationally applicable framework of e-Government service deployment is constructed. Mobile technology and its impact on e-Government service deployment are investigated. M-Government has been identified as an extension of e-Government service deployment.

1. INTRODUCTION

Information and communication technologies significantly influence the work of local and central government agencies. An electronic government (e-Government) service is capable of providing intangible value to all stakeholders. Additionally, it builds a linkage for effortless communication between government and citizens. This chapter contains introductory information about the dissertation, including motivation, objectives, scope, intended audience and limitations.

1.1 Motivation

The Organisation for Economic Co-operation and Development (OECD) is an international organisation of 31 countries (as of 7 May 2010). It acts as a forum of countries committed to democracy and the market economy to support sustainable economic growth, boost employment, raise living standards, maintain financial stability, assist other countries' economic development and contribute to growth in world trade. The organisation provides a setting to compare policy experiences, seek answers to common problems, identify good practices, and co-ordinate domestic and international policies (OECD, 2010). Over the years citizens of OECD countries have engaged with government departments through many different channels, such as call centres and one stop shops. A more recent phenomenon is the offering of a wide range of information and interactive services online for customers and business anytime (Chen and Thurmaier, 2005). This transformation has been driven by different stakeholders, mainly the citizens and government departments who are looking to achieve higher efficiency and productivity in their interactions and communications, and ultimately better quality of services (Steyaert, 2004).

Improvement in the government business processes and information technology systems have supported the evolution of new e-Government service channels (Horst, Kuttschreuter, and Gutteling, 2007). Due to the rapid change of pace of lifestyle in OECD countries, citizens now tend to be time-poor, which means the conventional communication channels such as ringing a call centre or visiting a one stop shop can no longer satisfy all customers' needs. Customers now demand a more convenient and less time-consuming approach to communication and acquisition of expected information that can be achieved with the application of modern e-service models. This behavioural change was noted by government agencies in certain OECD countries during early

2000s, and some government departments started trials of providing information online by creating simple websites with standard first level information supply such as downloadable forms. An Australian survey (AGIMO, 2003) established that 80 to 86% of large and small business accessed government services via the Internet and had a strong preference for using the Internet to access these services. A stronger need for more interactive functions from e-Government was identified. Such increasing demand is also driven by the development of communication technology, the growth of Internet and the increasing coverage of mobile networks. This also means that connection to e-Government services can be made by the users almost anytime and anywhere (Scacchi, 2002).

The evolution in technology has seen a rapid move from fixed line Internet connectivity to mobile broadband. The current generation of smart phones and PDAs can easily access the Internet to search for services with fewer constraints such as location and mobility than a stationary home or business computer (Phan, Huang, and Dulan, 2002). With the help of mobile technology, businesses are now looking for solutions in integrating mobile technology. They provide services via the mobile platform to end-users and assess and analyse consumer habits in order to understand the concept of mobile enabled service models and to design and implement such models (Navarra and Cornford, 2005). This poses a challenge for governments because societies have now become more mobile oriented. This includes aspects such as 1) How will the government cope with changes of a society that is moving away from the traditional e-Government services provided via stationary computers with fixed Internet connectivity to the "always on" mobile platform, and 2) How will governments take the advantage of growing demands of mobile services to comply with the current e-Government strategy.

1.2 Research Objectives

The aim of this research is to review service deployment of e-Government in selected OECD countries, outline impacts of mobile technologies on e-Government service deployment and identify future trends of e-Government service. To achieve the aim, the following specific objectives are set forth:

1. To review e-Government service deployment initiatives in a selection of OECD countries;

2. To identify the main barriers and motivators for e-Government service deployment in the selected OECD countries;

3. To investigate impacts of mobile technologies on e-Government service deployment.

1.3 Audience and Research Outcomes

This research is aimed at providing informational outcomes to the following audience: 1) Government departments that are searching for an integrated e-Government solution with mobile extension to improve communication and interaction efficiency and productivity and to reduce process complexity; 2) Business operators that are providing integrated electronic services and could be involved in the design, implementation, deployment and operation phases of such an integrated solution; 3) Network service providers and operators who are involved in providing communication connectivity including fixed line channels and mobile channels; 4) Academic researchers who are interested in this area and would like to carry out a further investigation and analysis to expand the research outcomes and the application of such integrated systems.

The audience of this research should be able to obtain the following information:

i. An evaluation of the costs and benefits associated with e-Government service deployment, including economic, operational, social and ethical factors.

ii. The advantages and disadvantages of adapting e-Government services to a mobile platform to cope with the potential change in communication technologies and user demands.

1.4 Research Limitations

One of the limitations of the study is the lack of empirical evidence to support its conclusions. In addition, although a number of academic articles relevant to e-Government service deployment are available, only a limited number of articles were reviewed due to the limited time for this study. Furthermore, the systematic literature review focuses on e-Government service deployment in selected OCED countries (the selection procedure will be explained in chapter 3). Arguably these countries are among the top ten OCED countries that are most developed in terms of ICT (e.g. Internet) usage. However, data about less developed but smaller countries may be also useful for supporting or refining the results of the analysis.

1.5 Organization of the Dissertation

This dissertation contains six chapters: 1) ***Introduction*** provides basic information about the research study, such as research motivation, objectives, scope, audience, outcomes and limitations. 2) ***Background*** looks into the research area 'e-Government' by conducting a preliminary literature review and describes some of the issues in the field. 3) ***Research Design and Strategy*** describes how the researcher applies a systematic literature review as an approach to collect data from past research studies. 4) ***Results*** presents the collected qualitative data and the outcomes of the analysis. 5) ***Discussion*** addresses the research questions. 6) ***Conclusion*** summarises the research findings and outlines the implications, the limitations, and the contribution of this research. Directions for further research are also proposed.

1.6 Chapter Summary

This chapter contains introductory details about the conducted study. A feasible research scope is identified. The possible research outcomes are outlined and the audience that has interest in these is also identified. The next chapter – '*Background*' investigates some past research studies with the purpose of providing knowledge and better understanding about the field.

2. BACKGROUND

This chapter provides an overview of the state of e-Government services by reviewing some past research articles found with the help of the online search engine Google Scholar. More importantly, based on the findings of this preliminary review and the researcher's interest, the research questions are formulated in the next chapter (chapter 3).

2.1 General Issues of e-Government Service Deployment

The general responsibilities of the government are to manage and control the living environment of residents within the country, in addition to interacting with other international entities all over the world (Papazafeiropoulou and Pouloudi, 2000). This requires an extensive amount of communication between government, residents and other external parties. The more conventional and formal communication approach is to use physical materials such as printouts, letters and posters, which are mainly delivered to the intended audience by manual processes (mail, circulars) (Contini and Cordella, 2007). However, this requires a large amount of manpower and the associated costs are high. The delivery time slows the process down and increases the response time. Another conventional approach is to communicate with audiences via live events, but this is also costly, and its scope may be limited as only the local audiences would be involved and full coverage would not be obtained (Carter and Belanger, 2004).

New systems are being deployed developed based on the use of ICT. The new systems and the associated processes and services need to be promoted to the end users in order to facilitate adoption (Carter and Belanger, 2004). For example, the New Zealand government is moving towards the goal of a completely electronic and digitalized form. However, the current system still involves a lot of manual and physical processes in communication and content management. Therefore, it is not a feasible process to perform a sudden switch of the system in a short period of time due to the scope of the potential impact, and the risks associated with such a transformation. In this case, a 'mildly' phased adoption approach is used because: 1) The adoption must cope with changing user requirements, 2) The size and potential impact of adoption require an ongoing learning and preparation process, and 3) The size and impact of the adoption limit the pace of change (Moon, 2002).

2.2 E-Government Service Deployment – Stakeholder Analysis

The e-Government Stakeholder Model can be as simple as involving two key stakeholders: the end users (residential and business) who are communicating with the government, and the government who is answering the end users' requests (Papazafeiropoulou and Pouloudi, 2000). However, the e-Government communication model suggests that the interaction is performed over an electronic platform, which means an additional stakeholder who is responsible to provide such communication platform must be present in this model (Ndou, 2004). Therefore, the key stakeholders for the e-Government Stakeholder Model should include the following three main stakeholders: End Users (Residential and Business), Network Operators, and the Government.

To further expand the model in greater details, there are other stakeholders that are involved in the e-Government or m-Government communication process. These stakeholders may be implicit or optional but are still playing important roles in the process (Papazafeiropoulou and Pouloudi, 2000). To support the end users to communicate with the government, adequate devices must be available in the market. In this case, e-Government and m-Government services are operating on top of digital communication platforms, which require the use of computer devices and mobile devices. As a result, Device Manufacturers are responsible to supply such hardware devices to the end users, and Application Manufacturers are providing operating systems and other communication applications that are running in the hardware devices (Contini and Cordella, 2007). Since Device Manufacturers, Application Manufacturers and End Users are cooperating with each other to solve issues such as design and usability, and perform business activities such as sales and purchases, a value chain can be formed amongst these three stakeholders (Petrova, 2008).

On the other hand, the government is the other main end point of the communication for e-Government and m-Government services, the provisioning model of these services are abstracted from the end users' view (Yigitcanlar, 2003). Since the modern service model implies distributed service concepts such as outsourcing, the government may not be necessarily hosting its own the e-Government or m-Government services (Atkinson, 2000). In this situation, other stakeholders such as Electronic Service Providers and Service Developers may also be involved in the stakeholder model. The Electronic

Service Providers are acting as the bridge between the Network Operators and the Government to relay and process the requests from the End Users. They are effectively the host for the e-Government or m-Government services, which are developed by the Service Developers. In some cases, the Electronic Service Providers can be part of the Government or the Network Operators. It is also possible for the Government to have a functional unit which is responsible in developing e-Government and m-Government services similar to the Service Developer stakeholder. Therefore, the actual existence of the Electronic Service Providers and the Service Developers are solely dependent on the strategy applied by the Government.

According to the above findings, a comprehensive e-Government Stakeholder Model can be constructed as depictured in Figure 1.
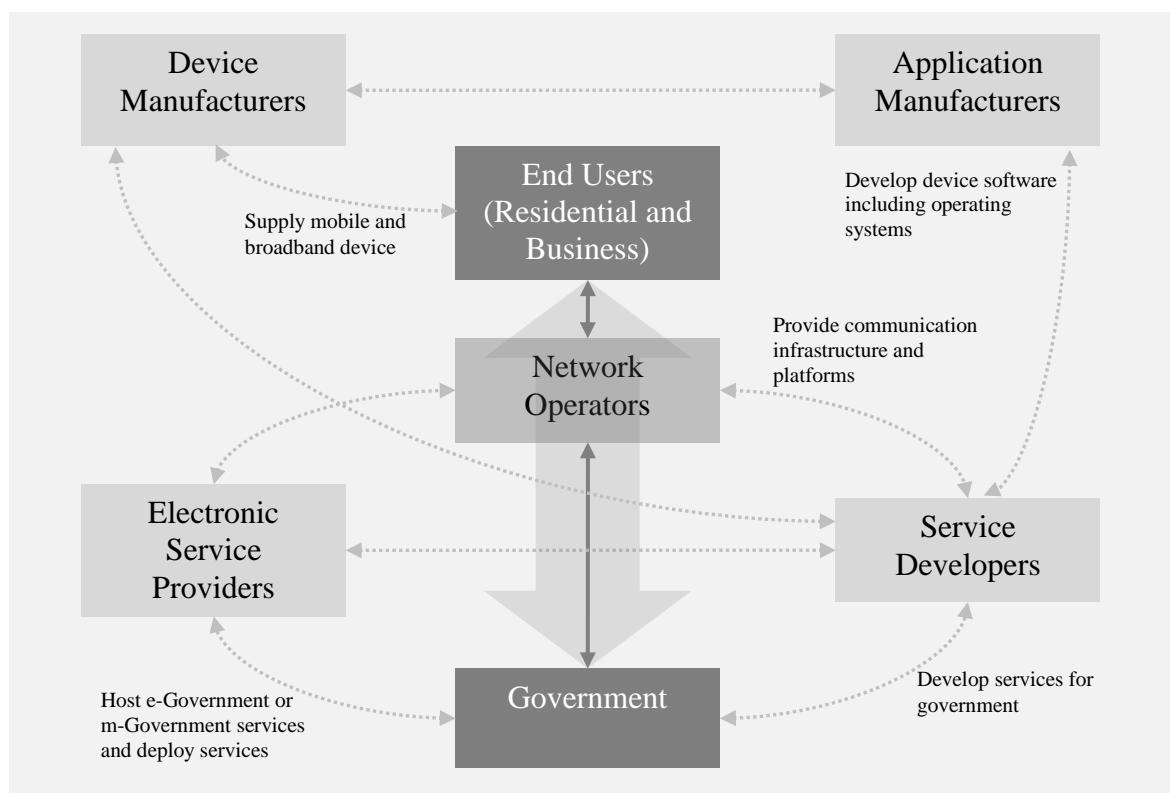
Figure 1: Advanced e-Government Stakeholder Model (Source: the Author)

End Users: These are one of the three key stakeholders. They are the end users of the e-Government or m-Government services. They are one of the two endpoints in the e-Government or m-Government service model along with the government. The main

objective of the end users is to communicate with the Government through electronic processes provided by the e-Government and m-Government services.

Device Manufacturers: These are the manufacturers of computer and mobile devices such as PDAs, Pocket PCs and mobile phones. The design of the devices is influenced by the current communication technology and the user requirements.

Application developers: These are the main suppliers of operating systems and other communication applications that run on the computer and mobile devices. The design of the applications is affected by the current communication technology available, the design of devices and the user requirements.

Network Operators: They are one of the three key stakeholders. Network Operators are implicitly involved in the e-Government and m-Government service model. They are the main carriers of data transmitted between the end users and the Government. The approach of data transmission depends on the communication technology available in the country and is constrained by the state of the telecommunication infrastructure that is influenced by the Government strategies and policies.

Electronic Service Providers: These are optional stakeholders that depending on the e-Government and m-Government implementation and deployment strategy. As an outsourced solution, their main responsibilities are to host and maintain the e-Government and m-Government services, to provide transactional mechanism and workflow process for such services and to serve as a bridge between the end users and the government at the application layer.

Service Developers: They are optional stakeholders that depend on the e-Government and m-Government implementation and deployment strategy. Their main responsibility is to design and implement e-Government and m-Government services that are required by the government and the end users.

Government: One of the three key stakeholders. The Government is one of the two endpoints in the e-Government or m-Government service model along with the end users. The main objective of the Government is to utilise electronic technologies to supply services to the end users in an integrated, automated, efficient (i.e. cost and time saving) and effective (i.e. quality) manner. The Government is the main decision maker for the communication technology investment proposed in the country. Network

operators work closely with the Government and need to comply with the latest strategies and policies in telecommunication industry.

2.3 E-Government Service Deployment – Requirement Analysis

The deployment of an electronic government (e-Government) system and its relevant services generally involves the following steps (Aldrich, Bertot and McClure, 2002):

1. Analysis of suitability and feasibility according to the current information technology level;
2. Collecting input from key stakeholders;
3. Identifying possible internal and external information technology dependencies;
4. System constraints and requirements refinement;
5. Installation and configuration;
6. Digitalizing physical materials and importing into the system database;
7. System trial and evaluation;
8. Official release and ongoing maintenance.

The suitability and feasibility analysis of an e-Government system is based on the current information technology level. This includes the penetration of broadband services, penetration of mobile services and the current status of telecommunication infrastructure in the country (Phan, et al., 2002). It also involves other factors such as government strategy and budget for e-Government service deployment and security level of telecommunication technology available.

It is vital to ensure stakeholders' acceptance of the e-Government services deployment at the start of a project. Each of the three key stakeholders have different their objectives for the e-Government services deployment. The government expects to use e-Government services to reduce costs and response time, and to increase productivity and efficiency with online and automated workflow and processes, so that the overall quality of service will be improved to satisfy users' demands (Taylor, 2004).

The end users expect that the e-Government services can produce convenience as well as reduce costs for the use of conventional services, such as time, travel and telephone charges (Carter and Belanger, 2004). Network Operators are concerned if their current telecommunication technology can satisfy both the end users and the government requirements, and focus on the profits that can be obtained by the use and operation of

e-Government services (Norris, Fletcher, and Holden, 2001). Only when the proposed system can present a win-win situation can the acceptance of stakeholders of the e-Government services be obtained.

There are certain aspects that need to be considered as information technology dependencies. Internal dependencies include: 1) Employees' knowledge level about information technology; 2) The state of existing electronic systems and their compatibility with the proposed e-Government services. On the other hand, external dependencies include: 1) Telecommunication technology available through the network operators; 2) Compatibility of e-Government services with technology available through the network operators; 3) Compatibility of the e-Government services with existing end user devices.

2.4 Culture, Technology, Behaviour and Business

A responsive and efficient government can cope with multiple cultural requirements. Since New Zealand is a multi-cultural country, the need for meeting such requirements is especially important. The current operational model implies several approaches to implement multicultural functionalities, including: 1) Multilingual hotline services; 2) Interpretation services; 3) Multilingual publication and printing of materials; 4) Media via multilingual television channels and radio channels (Deakins and Dillon, 2002). Although these approaches are functioning very well, the costs associated with the ongoing operation of these activities and their effectiveness are still major concerns. For example, hotlines limit the scope of the conversation to one-to-one format, and requires dedicated operator to interact with the caller; radio and television are one-to-multiple approaches, but they lack the instant interaction and feedback statistics.

According to (Phan, et al., 2002), the current multilingual hotline services provided by the government exhibit the following limitations: 1) Clients are queued because hotline service is in a one-to-one relationship; 2) Operators can only use one language at a time; 3) Repeated requests are processed consecutively, not in a batch. Although these limitations can be resolved by adding more operators to process requests, the costs associated also increase accordingly. In this case, an e-Government service that can provide an alternative approach to multilingual hotlines with less resource requirements is ideal to save time and costs for both the government and the end users. For example, online instant messaging technology can be used to answer clients' requests instead of a

standard telephone conversion. In this situation, multiple clients can be connected to the same operator who can understand multiple languages (Caldow, 1999). Also, online communities such as forums and bulletins can be managed and operated by the government, so that non-urgent requests are posted online without queuing time on the hotline services, and repeated requests are searchable by keywords.

The interpretation services provided by the government can be classified in several categories such as: 1) Online interpretation service; 2) In-person interpretation service, and 3) Offline interpretation service. Since online interpretation and in-person interpretation services require direct conversation between the end users and the interpreters, e-Government services may not be relevant in these cases (Navarra and Cornford, 2005). However, e-Government services may be helpful in processing offline interpretation requests. For example, conventional offline interpretation process requires clients to supply material to be translated in paper form through face-to-face or mail approaches. These approaches add extra costs in terms of time and monetary value to the clients and the government for travel, managing a counter and mail. The e-Government services may be able to provide an alternative channel for sending and receiving material to be translated in electronic form between the clients and the government (Schedler and Scharf, 2001). Such change in workflow can improve the efficiency and reduce costs associated with the process, as well as present environmental friendliness because of the reduction of use of paper materials.

Multilingual publications and printing materials are another important method currently used by the government to communicate with the end users. However, since materials are printed out using paper materials, and multiple languages are required for the same contents, government has to: 1) Keep track of the composition of populations speaking different languages to estimate the number of copies printed in each language; 2) Incur costs for printing materials in paper form even if it is just an update of previously printed contents; 3) Collect the waste caused by disposing such printed materials; 4) Incur the damage of environment by consuming large amount of paper, and 5) Incur the costs in mail or manual distribution of materials (Caldow, 1999). Therefore, it is expected that, by using e-Government services, the government can publish materials in electronic form rather than physically printing out the materials. This may be achieved by using a searchable and multilingual web portal. Users can access the latest information to reduce the costs associated with the conventional printing material

approach (Ndou, 2004). This also ensures the contents are up-to-date and are accessible immediately without unnecessary delay.

Multilingual television channels and radio channels are often used by the government to broadcast media contents to the subscribers (West, 2004). While this approach can reach a large number of end users, it is in unidirectional and subscribers cannot interact with the government via these channels. The main issue behind this is that these channels are unidirectional. Also, in most of the cases, some alternative interactive channels are also promoted in the advertisements, such as a call centre phone number or a website address. The drawback of such approach is that end users must memorise the communication details of these alternative channels to establish a connection in a relatively short time, because advertisements are not broadcast on-demand and are volatile. In such circumstances, e-Government services may be helpful to reduce the difficulties for the clients who would like to communicate with the government (Papazafeiropoulou and Pouloudi, 2000). For example, online advertisements and online video or audio clips are capable to deliver contents to the subscribers, as well as allow them to access further information or replay the contents by accessing associated links or using online controls. Because the broadcasting materials and the underlying e-Government services are all on the same platform, users can easily navigate to the contents of interest instantly without the hassles of switching to other communication channels.

2.5 Mobile Technology and Communication

The mobile phone has become now a necessary communication tool for all of us. Due to the maturity of mobile technology, computerised features are embedded in mobile handsets and the performance of mobile data communication has become more secure, stable and reliable. Since the Internet has become available on mobile devices (known as the mobile Internet) anytime and anywhere Internet service is deployed to mobile users (Petrova and Huang, 2007). Mobile service inherits the existing stationary Internet service and mobility is considered a bonus.

2.5.1 Motivation for Using A Mobile Service

The technological advancements that created a motivational change in the use of mobile phones can broadly be described as two main trends: on the one hand, the convergence of the standard wired home/business internet and wireless telecommunication networks have quickly developed into high data services using 3G technology (Bannister, 2003);

on the other hand, mobile devices have rapidly achieved high penetration; The mobile services are able to be personalised by the users, and offer location-based services and context-aware applications (Simon, 2005). The following two sections expand these two themes to pose the overall question of how governments should develop their m-Government service.

2.5.2 The Mobile Internet

Originally anytime voice communication was the main driver in the growth of the mobile phone, but the mass market penetration was really reached with the use of text messaging that allowed users to substitute a voice call if it was impossible or undesirable with a short message (Becker, 2007). This opened up a form of communication for people who may have considered using a mobile phone for its voice services too expensive. With this growing interest a basic or of the mobile internet was developed in the late 90's that allowed users to download ring tones and get sport score updates. Then came 2G using digital encoding such as GSM. This supported a high rate of voice transfer and limited data transfer that allowed low quality photos to be sent via the mobile network and also allowed users the ability to surf the web and read the news (Bannister, 2003). Currently 3G allows full access to the internet as long as sites are mobile friendly. This ability has seen some businesses extend their business channel to mobiles offering downloadable music, paying for parking, storing your flight details and allowing your phone to be used as a boarding pass by displaying a barcode. Subsequently, the competition has grown for hardware providers to offer phones with the biggest screen and the best camera. These extra applications have meant that phones have very powerful computer chips, and increases users' data demands. The chargeable services that mobile providers can offer has grown exponentially (Ivanek, 2008). Phones now represent the constant Internet information portal, be it a phone number from the white pages or getting directions by using Google Maps or listening to your favourite song. The mobile has merged many technologies into one.

2.5.3 Mobile Device Penetration

The growth of the mobile phone has been significant – for both business and personal use we are always connected. All OECD countries have seen the increase of voice communication via mobile networks. The introduction of a cheaper form of communicating via txt messages allowed mobile companies to reach critical mass, while hardware developers have been fighting for market dominance. All these have lead to a

move to develop and invest in the next best technology, making the mobile phone the all in one electrical device (Ndou, 2004). Travelling business people found that mobiles could increase their productivity. As their phones could now exchange emails, remind them of appointments, surf the internet and do some small business transactions, they became known as PDA's. With so many mobile devices offering people a low cost and instant connection to the internet, the wired PC may well lose some of its attraction. In 2004 the average OECD country 12 out of 100 of citizens had access to a broadband Internet connection. That number grew to 24.8 in 2008 (OECD Broadband statistics, 2008a), while the mobile penetration rate grew from 80% to 112% in the same period - i.e. mobile phones outnumbered the population (United Nations, 2005). This number of mobile devices used and the quality of 3G networks will put pressure on governments to extend their services as users demand them. This would also mean the government has greater interaction through m-Government and e-Government services.

2.6 Chapter Summary

This chapter reviews recent research studies that have investigated e-Government service deployment internationally. A number of e-Government general issues and cases are examined in various countries, stakeholders' analysis is conducted, deployment requirements, cultural, technology, behaviour and business perspectives are discussed and mobile technology and communication are examined. In the next chapter, the research questions for this study will be derived according to the main research objectives and design.

3. RESEARCH DESIGN AND STRATEGY

The research objectives introduced earlier (see section 1.2) are as follows:

1. To review e-Government service deployment initiatives in a selection of OECD countries;
2. To identify the main barriers and motivators for e-Government service deployment in the selected OECD countries;
3. To investigate impacts of mobile technologies on e-Government service deployment.

The specific research questions addressed in the study are therefore derived from these objectives, and can be formulated as follows:

Main Research Question: What are the drivers, the barriers and the mobile technology impacts for deploying e-Government service in OECD countries?

In order to answer the research question, the researcher has to collect relevant data in terms of findings out:

- *Sub-Q1: What are the motivation for e-Government service deployment in OECD countries?*
- *Sub-Q2: What are the barriers to e-Government service deployment in OECD countries?*
- *Sub-Q3: What are the mobile technology impacts on e-Government service deployment in OECD countries?*

This chapter introduces the research design and describes the research strategy, including data collection techniques and the data analysis methods used in the study. A systematic literature review is carried out and used to answer the research question of this dissertation (including Sub-Q1, Sub-Q2 and Sub-Q3). Moreover, the findings from the literature review for Sub-Q1 and Sub-Q2 will be analysed and applied as a framework. Some additional literature will be reviewed to strengthen the findings from the review, and to answer Sub-Q3.

This research is designed to be carried out in a timeframe of six months by applying a standard systematic literature review approach. The scope of the systematic literature review is to perform an analysis on the findings obtained from previously published literature regarding e-Government and the role of mobile platform in e-Government services design, implementation and deployment models. A summary of the collected empirical data will be presented in this dissertation with a thorough analysis of the reviewed articles. The number of reviewed articles will be in the range of 100 to 150. The source of literature is primarily published articles and journal articles from well known professional associations.

The systematic literature review comprises two stages: first a sample of OECD countries is selected, and then a systematic literature review is carried out investigating e-Government service deployment requirements and mobile technology impact.

3.1 Research Strategy

In order to find answers to the research questions, the researcher has defined the focus for each sub-question that matches the research objectives identified in the Introduction chapter. Table 1 demonstrates the research strategy and the linked objectives, research questions, focus, data collection, data analysis and possible research outcomes.

Table 1: Research Strategy Demonstration

Objectives	Question	Focus	Data Collection Tasks	Data Analysis Tasks	Outcomes
1	Sub-Q1	What are the motivators for deploying e-Government service in the selected OECD countries?	Conduct systematic literature review, find articles that investigate motivation for e-Government service deployment	Qualitative data analysis; outline the motivation mentioned in reviewed literature and record their numbers of appearance.	Motivation factors for e-Government service deployment are identified and their significance is considered.

				in the selected OECD countries.		
2	Sub-Q2	What are the barriers to deploying e-Government service in the selected OECD countries?	Conduct systematic literature review, find that articles investigate barriers to e-Government service deployment in the selected OECD countries.	Qualitative data analysis; Outline the barriers mentioned in reviewed literature and record their numbers of appearance.	Barrier factors of e-Government service deployment are identified and their significance is considered.
3	Sub Q3	What are the impacts of mobile technologies on e-Government service deployment in the selected OECD countries	Conduct systematic literature review, find articles that investigated mobile technologies and impacts to e-govt service deployment.	Qualitative data analysis; Gather qualitative data and analyze findings in reviewed literature and discuss the implications and opinions. Use additional literature sources to support the	A set of themes or opinions about how mobile technologies influence e-Government service deployment will be identified and discussed.

				arguments.	
1,2,3	Main Research Objective	What are the likely trends and recommendations for future e-Government service?	Based on findings and discussion from previous three stages.	Qualitative data analysis of the research findings in the reviewed articles. Discussions and outcomes from previous three stages.	A set of recommendations to future e-Government service deployment is identified and discussed.

3.2 Select OECD Countries

In this section, the approach and rationale of ranking and selecting countries that will be considered in this research are described. The results of the ranking and selection process are presented and the reason why a particular country is selected for this research will be explained in detail.

3.2.1 Rank and Select OECD Countries

The modernisation of government administrations in OCED countries within the context of e-Government has become a powerful tool for providing avenues of contact with business and individuals but not without a number of challenges both internal and external. The aim of this section is to investigate how at least four different OECD countries would rank in delivering government services to people, agencies and society (Steyaert, 2004).

The reviewed articles will be grouped by continent-country, and the leading countries in e-Government in each continent will be chosen as candidates. The aim is to maximise the sample diversity and world coverage. On the other hand, the telecommunication infrastructure of 30 OECD countries will be also ranked. By combining the search results from the ACM, IEEE, Science Direct and ProQuest online literature databases,

candidates that have the most similar rank to New Zealand and have the largest number of relevant articles will be selected, because:

- Countries with closest ranks to New Zealand denote similarity of telecommunication infrastructure and information technologies used to those in New Zealand;
- E-Government implementations are more portable between countries that have similar ranks;
- These countries will be therefore more likely to share similar sets of motivation and barriers of e-Government services deployment;
- Only countries that have been researched in a relatively large number of relevant articles should be selected to ensure the research sample size is large enough.

The ranking process of telecommunication infrastructure of 30 OECD countries will use the following three criteria:

- Broadband Penetration: The success of e-Government service deployment and service would firstly rely on the ability of citizens to access information through the Internet rather than a call centre or one stop shop (Anderson and Christiansen, 2006). This also indicates social and behavioural barriers to moving government services online, including the size of a country's population that may become discontented by the e-Government services (Fife and Pereira, 2002);
- Information Technology Investment: Selected on the basis that a country would need the ability to implement a cohesive e-Government or m-Government strategy it would firstly need to require and the man power and knowledge to execute any strategy (Jutla, et al., 2002). An indicator for the country's ability to make this move would be how much the country currently emphasises the use of information technology to drive efficiency;
- Mobile phone penetration: This measure is used to see if there is a sound user motivation case for extending e-Government to m-Government in less developed or developed OECD countries (Ndou, 2004). A higher phone penetration for a country may mean that cell providers may be better adaptable in making extra investment in mobile telecommunication services that allow for quick data transfer.

These three criteria are inter-influenced (Phan, et al., 2002). Broadband Penetration is usually the percentage of subscribers of broadband services in a country. However, this

is also related to the Information Technology Investment in a country because a subscriber will only want to use the broadband service if: 1) The cost of the service is lower than the value obtained from using the services; 2) The speed of the broadband services has met the subscribers' requirements, and 3) The broadband service can reach the subscriber (Anderson and Christiansen, 2006). These factors contribute to the subscribers' acceptance of broadband services. It also appears that the Information Technology Investment is closely related to the government strategy and policies in the telecommunication market, and is reflected by the marketing activities of ICT service providers in OECD countries. Most of the time the amount of investment is directly proportional to the average speed of broadband services provided to the subscribers, and is heavily influenced by the current government's telecommunication technology focus (Fife and Pereira, 2002). Mobile phone penetration is also in a similar situation to the Broadband Penetration, and in most of the cases a broadband service provider also provides mobile phone services, especially in the countries that are promoting the use of mobile Internet, such as New Zealand (Huang, 2008).

To select the appropriate OECD countries, a particular indicator is chosen for each of the criteria identified above. These indicators used for the data collected about all OECD countries. The "Broadband subscribers per 100 inhabitants" indicates the percentage of Broadband Penetration of a country. This indicator is used for both business and residential subscribers. The "Average advertised broadband download speed" is an indicator about how fast the broadband services are in a particular country. This indicates the level of "Information Technology Investment" because the speed of a network reflects best the state and quality of the telecommunication infrastructure of a country. Similarly to Broadband Penetration, the "Mobile subscribers per 100 inhabitants" denotes the Mobile Phone Penetration in a country. In this case, both prepaid and post-paid mobile users are included in this indicator.

According to (Obi, 2009), the rank of each country for their telecommunication infrastructure is calculated by the following steps:

i.   Obtain the ranks of "Broadband subscribers per 100 inhabitants" for the 30 compared OECD countries (OECD Broadband statistics, 2009).

ii. Obtain the ranks of "Average advertised broadband download speed, kbit/s" for the 30 compared OECD countries (OECD Broadband statistics, 2008b).

iii.   Obtain the ranks of "Mobile subscribers per 100 inhabitants" for the 30 compared OECD countries (OECD Key ICT indicators, 2007).

iv.   Add up the three rank values for each country to calculate the overall score (the lower the better)

v.   Rank the 30 compared OECD countries by the overall score. Note that it is possible to have multiple countries having the same score and therefore the same rank.

Table 2 shows the ranking for telecommunication infrastructure in each of the 30 OECD countries according to the selection criteria identified. The continent where countries are located is also indicated.

Table 2: Overall Ranks of Telecommunication Infrastructure in 30 Compared OECD Countries

Rank	Country	Broadband subscribers per 100 inhabitants	Average advertised broadband download speed, kbit/s	Mobile subscribers per 100 inhabitants	Continent
1	Finland	29.7	19226	115	Europe
2	Denmark	37.0	14633	116	Europe
2	Netherlands	38.1	18177	113	Europe
2	Norway	34.5	12364	110	Europe
5	Iceland	32.8	13693	105	Europe
6	Luxembourg	31.3	9984	142	Europe
7	**Korea**	**32.8**	**80800**	**90**	**Asia**
8	**United Kingdom**	**28.9**	**10673**	**121**	**Europe**
9	Sweden	31.6	12297	112	Europe
10	Germany	29.3	15919	118	Europe
11	Italy	19.8	11939	151	Europe
12	**New Zealand**	**22.8**	**13527**	**102**	**Oceania**
12	Portugal	17.0	14100	127	Europe

14	France	29.1	51000	87	Europe
15	Czech Republic	18.1	10468	127	Europe
16	**Australia**	**24.9**	**15539**	**102**	**Oceania**
16	Japan	24.2	92846	84	Asia
18	Switzerland	33.8	7946	109	Europe
19	Austria	21.8	10292	119	Europe
20	Belgium	28.4	7544	96	Europe
20	Greece	17.0	7504	145	Europe
22	Spain	20.8	9631	108	Europe
23	Ireland	21.4	6201	117	Europe
24	**United States**	**26.7**	**9641**	**87**	**North America**
25	Canada	29.7	6236	62	North America
26	Hungary	16.8	5354	110	Europe
27	Slovak Republic	12.6	6254	113	Europe
28	Poland	11.3	4313	109	Europe
29	Turkey	8.7	3338	85	Eurasia
30	Mexico	8.4	1514	65	North America
OECD Average		22.8	17412	96	

3.2.2 Four Selected OECD Countries

By combining with the search result from the four databases, the following four OECD countries are selected to be considered for this research:

1) Korea
2) United States
3) United Kingdom
4) Australia

Below is the rationale for selecting these four OECD countries.

Korea

Korea has the closest rank of telecommunication infrastructure (rank 7) to New Zealand (rank 12) and it is the top in Asia in telecommunication infrastructure. From the search result of the four databases, Korea also is a leader in providing e-Government services in Asia. Therefore, Korea is selected as one of the four OECD countries in this research.

United States

The United States has the highest rank of telecommunication infrastructure in North America area. It also has the highest number of articles about e-Government service among OECD countries in North America. Previous studies also suggest that United States has the best e-Government service deployment and implementation in the world. Therefore United States is selected as one of the four OECD countries for this research.

United Kingdom

The United Kingdom provides the best e-Government service in Europe. It also has the largest number of relevant articles in the four online databases about e-Government among other OECD countries in Europe. From the telecommunication infrastructure point of view, it has a relatively close rank (8) to New Zealand (12). Therefore, United Kingdom is selected over Sweden (9), Germany (10) and Italy (11) because of the number of articles available from the four databases.

Australia

New Zealand and Australia are the only OECD countries in Oceania. However, because we are attempting to draw conclusions from the rest of the OECD countries and apply them to New Zealand, New Zealand is excluded and Australia is selected as one of the four OECD countries for this research.

To sum up, due to the research timeframe and in order to find most relevant research data to answer the research questions, the researcher plans to use systematic literature review as the method for collecting research data that relates to the e-Government services in the four selected OECD countries and then the researcher tries to find the

answers. The data collection techniques and analysis methods are discussed in the following sections.

3.3 Data Collection Technique (Systematic Literature Review Protocol)

In order to find the answers to the research questions as posed previously, the researcher chooses a systematic literature review approach as research a method for this dissertation. This section describes how the researcher collects data (research articles) and also explains the literature selection criteria.

3.3.1 Literature Collection Criteria

E-Government service is a well researched area in the academic world; therefore the researcher sets the following selection criteria for the systematic literature review protocol:

i.   The publications are only from Journals and Conference Proceedings that can be found in the AUT's online databases. The researcher believes literature from journal and conference proceedings have higher research rigours and most relevant implications in the field.

ii. The publications are published in English.

iii. The publications are published between 1 January 2004 and 12 October 2009. In order to find a range of literature that meets the research scope, the most recent publications need to be collected. The researcher believes that e-Government research studies older than five years, are out of date.

iv. Duplicated publications will be counted only once.

3.3.2 Database Selection

Based on the literature collection criteria discussed in section 3.3.1, the researcher aims to collect between 100 and 150 research investigations that studied e-Government service in the four selected OECD countries. This section describes the selected databases and search strings for the systematic literature review.

In this research, articles are searched in four databases available from the AUT's e-library service that are relevant to e-Government services in the four selected OECD countries. The search strings are only applied to literature titles and abstracts, and the researcher has found 136 relevant articles from the following four online databases:

1. ACM
2. IEEE
3. Science Direct
4. ProQuest

The detailed search strings are showed as follows:

Keywords: (Note: they are not searched all together at the same time, but in different combinations)

e-government, e government, electronic government, e-Government, digital government, Korea, KOR, Australia, AUS, United States, America, US, USA, United Kingdom, UK, England, Britain.

In title or abstract field:

(e-government OR e government OR eGovernment OR electronic government OR digital government) AND (Korea OR OR KOR OR Australia OR AUS OR United States OR US OR USA OR America OR United Kingdom OR UK OR England OR Britain)

AND (pyr >= 2004 AND pyr <= Present (2009) (12 October 2009))

AND (Journal) + (Conference Proceedings) AND (all others excluded)

Table 3 summarises the article distribution status from each database, how many articles found, discarded and included are listed.

Table 3: Reviewed Articles Filtering Status

Database	Found	Discarded	Included
ACM	45	25	20
IEEE	59	37	22
Science Direct	31	17	14
ProQuest	149	69	80

In order to find the most relevant literature for the systematic literature review, there are four conditions for discarding articles from the found pool:

i.   Not in the four selected countries: the researcher has gone through the abstract and introduction of the found literature. If the research article does not investigate e-Government service in one or more of the four selected countries, it is excluded;

ii. Duplicate source: as mentioned in section 3.3.1, any duplicated source will be excluded from the selected pool;

iii. E-Government in other areas (e.g. e-Democracy): any article that does not focus on investigating e-Government services or is not relevant to information system studies will be excluded;

iv. Keyword does not match – some found literature does not match the keywords listed in section 3.3.2, and these articles will be excluded.

3.3.3 Endnote Database Management and Filtering Criteria

The researcher used Thomson Endnote X1 for managing the collected articles. Information such as author names, date of publications, and the type of publications is recorded. In addition, Abstract, Introduction, Discussion and Conclusion are also copied into the endnote X1 database. From the 136 initially collected research articles, the researcher aims to shortlist a group of literature by using the following three filtering criteria:

- Motivation (other relevant criteria e.g. facilitator or success factor) – 25 articles are relevant

- Barrier (other relevant criteria e.g. difficulty or impediment) – 27 articles are relevant

- Mobile government (other relevant criteria) – 11 articles are relevant

Therefore, after filtering the first list of literature (136 articles), a list of 48 articles are selected for data analysis. These articles examine e-Government services motivation (or relevant), barriers (or relevant) or the impacts of mobile technologies. The researcher uses qualitative approach for analysing the reviewed articles and discussed their findings. Note: some articles may satisfy multiple criteria.

3.4 Data Analysis

The previous section describes how the researcher has collected 136 research articles from four online databases according to the pre-defined criteria, and also has performed a shortlisting task. As a result, 48 articles are finally selected for reviewing and evaluating. This section describes the process of reviewing those 48 articles, and how the findings can contribute to answering the research question.

3.4.1 Findings, Analysis and Discussion

In order to answer the research question, the researcher has used Endnote X1 to qualitatively review Abstracts, Introductions, Discussions and Conclusions of the 48 selected articles. The process and its outcomes are illustrated in Table 4.

Table 4: Findings, Analysis and Discussion Related to the Research Question
(Sub-Q1, Sub Q2 and Sub-Q3)

	Findings	**Data Analysis**	**Discussion**	**Outcome**
Motivation or relevant (25 articles)	The key statements relevant to the description of motivation for e-government will be collected and	Use other descriptive statements or arguments from the articles to analyse the findings.	Identify and summarise a range of motivation (factors or statements) to e-Government	1. Contribute to answering Sub-Q1.

	quoted.		service deployment.	
Barriers or relevant (27 articles)	The key statements relevant to the description of motivation for e-Government will be collected and quoted.	Use other descriptive statements or arguments from the articles to analyse the findings.	Identify and summarize a range of barriers (factors or statements) to e-Government service deployment.	2. Contribute to answering Sub-Q2.
Mobile or relevant (11 articles)	The key statements relevant to the description of mobile technology and impacts to e-Government will be collected and quoted.	Use other descriptive statements or arguments from the articles to analyse the findings.	Identify and summarize a range of mobile impacts (factors or statements) to e-government service deployment.	3. Contribute to answering Sub-Q3.

The outcomes of this process contribute to answering research Sub-Q1, Sub-Q2 and Sub-Q3. All of these combined finally answer the main research question. A range of factors and descriptive statements that are relevant to e-Government service deployment motivation, barriers, and mobile impacts, are identified and discussed.

3.5 Chapter Summary

The diagram in Figure 2 summarises the research process for the conducted systematic literature review. The researcher has selected four OCED countries as investigated targets by comparing telecommunication infrastructures of 30 OECD countries. The researcher has found 136 articles and then cut down the list to 48 articles by filtering it with the use of a set of relevant criteria: motivation, barriers and mobile related. Finally,

qualitative methods are used for analysing those 48 articles, in order to find out answers for the two constructed research questions.
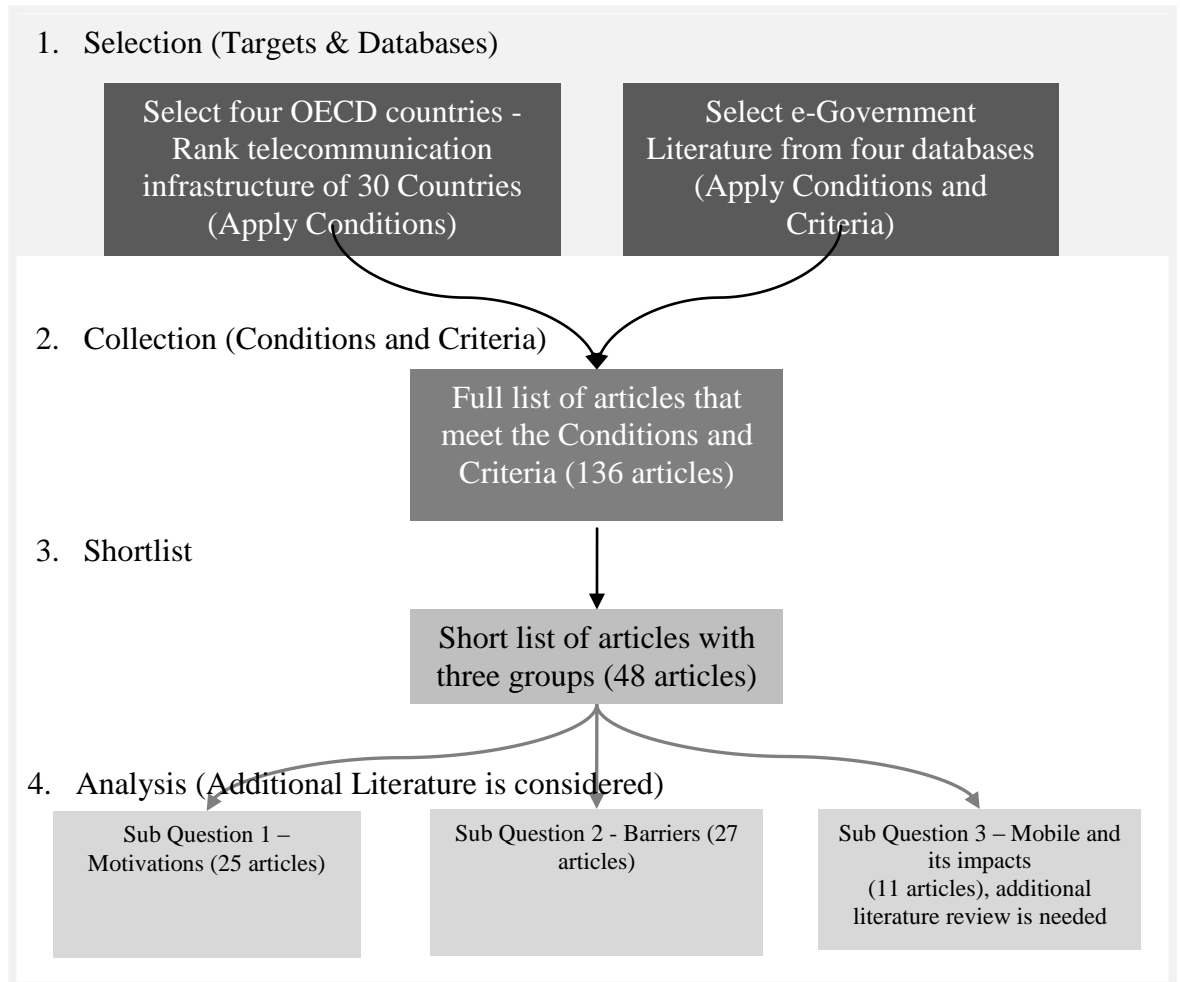
Figure 2: Research Process Flow Diagram (Source: the Author)

4. RESULTS

This chapter presents raw data (findings) from the selected 48 articles of the systematic literature review and provides an analytical summary (analysis) of the data. The researcher uses these results as primary data for further contributing to the discussion in chapter 5, with the purpose of summarising the findings and analysis, and answering the research question. According to the procedures for performing systematic reviews (pp23-24, Kitchenham, 2004), the results will be presented in tables. A full list of the selected articles can be found in the appendices A, B and C.

4.1 Motivators of e-Government Service Deployment

Out of 48 selected articles, 25 are found relevant to motivation for e-Government service deployment. This section presents the results, including selected supporting excerpts from the articles and an analytical summary of each article in a tabular form (Table 5). Each article is denoted by a code that contains a letter (A, B or C) (indicating the Appendix where it can be found), and a sequential number.

Table 5: Results for e-Government Service Deployment Motivators

Article A1	
Author(s)	Dugdale, A., Daly, A., Papandrea, F., and Maley, M. (2005)
Title	Accessing e-Government: Challenges for citizens and organizations
Supporting Excerpt	"Success in building socially marginalized communities' interest, enthusiasm and capacity to interact and communicate via online technologies, thereby contributing to how successful e-government can be in delivering gains in efficiency and improved services."
Analytical summary	The Internet has provided a common and efficient platform for information exchange. This has come to the attention of marginalised communities who are interested in e-Government services. It is pointed out that e-Government services enable minorities to have their say that is contributing to the harmony of the society. With such considerations, e-Government services can also be evaluated and adjusted to become a more accessible and efficient platform for communicating with the government. It also helps extend government services to distant areas

	where conventional government services are not easily accessible and may require toll calls or long distance travelling. With the development of online technologies and ICT infrastructure, e-Government services will be improved to meet citizens' expectation.
Article A2	
Author(s)	Norris, D. F., and Moon, M. J. (2005)
Title	Advancing e-Government at the grassroots: Tortoise or hare?
Supporting Excerpt	"ICT makes incremental but consistent progress in adopting and deploying e-government. There is even an indication of increasing enthusiasm for e-government, evidenced by local governments' stated plans for adopting online services. First, we can conclude that most American local governments have Web sites, although most are eight years old or less at this writing. Second, the adoption of Web sites is strongly related to local government size, measured by population."
Analytical Summary	Websites are one of the most common means implemented as part of e-Government services. It is pointed out that one of the major benefits of adopting websites for information storage and presentation is that websites have far lower operating and maintenance costs compared to printing materials. It shows that any alteration, correction or updates of contents can be completed online without incurring costs such as re-printing, waste disposing and delivery. It also appears that contents stored in electronic form can last longer than printing materials, and the accuracy of information delivered can be ensured. Websites also allow scalable deployment according to the size of local government. This is mainly influenced by the population of a particular region. The advantages of adopting websites results in a far lower cost per capita compared to printing materials, especially in regions that have higher population density.
Article A3	
Author(s)	Kolsaker, A., and Lee-Kelley, L. (2008)
Title	Citizens' attitudes towards e-Government and e-Governance: a UK study
Supporting Excerpt	"E-government is exploiting the potentially valuable online tools to enhance citizens' (users') participation and perceptions."
Analytical	The worldwide digitalization pushes the development of faster Internet

Summary	with better coverage. The number of households using personal computers has been increasing dramatically in the last decade. Because the Internet is convenient for providing access to information without physical constraints such as queuing or travelling that cost time and efforts, more people will start using online electronic services instead of the more conventional physical approaches. The e-Government services implementation is based on the Internet, which allows citizens to access these services remotely. It then serves as an alternative to conventional approaches and thus enables more citizens to participate if conventional approaches are not applicable. It is also pointed out that it is an opportunity for the government to promote online services and enhanced citizens' perception, which in long term could decrease running costs of government services by migrating conventional service delivery model to e-Government.
Article A4	
Author(s)	Mosse, B., and Whitley, E. A. (2009)
Title	Critically classifying: UK e-Government website benchmarking and the recasting of the citizen as customer
Supporting Excerpt	"E-government adoption and website benchmarking techniques links the government to both public sectors and private sectors."
Analytical Summary	The adoption of e-Government allows general government information to be published on the Internet. It also appears that tools and techniques that are commonly used for e-Business can be adjusted to fit the e-Government services development and deployment. Performance evaluation such as benchmarking can be used for e-Government services. It creates a competitive environment to drive constant improvements in e-Government service delivery by implicitly changing the relationship between the government and citizens to a more "business-customer" like association. Benchmarking also creates an opportunity for the government to rethink the models of service provisioned to the citizens, and the approaches to learn from the e-Business model to increase productivity and efficiency.
Article A5	
Author(s)	Ryder, G. (2007)

Title	Debunking the optimists: An evaluation of conventional wisdom about the digital divide and e-Government in the British Isles
Supporting Excerpt	"By adopting e-government services, conventional wisdom about the digital divide maintains that per capita income, education, age and access to technology."
Analytical Summary	The adoption of e-Government enables the government to review the digital divide effects that exist in the society. The e-Government services are not simply the electronic forms of government services but also the measurement of geographical and technological limitations in different regions of the country. It is also an indicator about the ICT expertise of population and can potentially be used to evaluate the education strategy and any possible underlying cultural and social issues. It is pointed out that the e-Government adoption can help the government to assess social factors and issues related to ICT such as per capita income, education level, age and accessibility. Government can use these measurements to review and improve e-Government services delivery as well as other conventional processes to answer the demands from citizens.
Article A6	
Author(s)	Ni, A. Y., and Bretschneider, S. (2007)
Title	The decision to contract out: A study of contracting for e-Government services in state governments
Supporting Excerpt	"E-government services results political logic is strongly present in state-level contracting decisions."
Analytical Summary	As outsourced solutions have started to provide IT services to organisations in the private sector, the government has to also start looking at the possibility of employing outsourcing solutions for e-Government services implementations and operations. The decision is based on the costs incurred by the development, deployment and maintenance of e-Government services in place are higher than employing outsourced solutions. It turns out that the operation of e-Government services requires high level IT expertise which can be a barrier for staff. As a result, outsourcing creates an opportunity for the government to implement the e-Government services at a lower cost. It is also pointed out that contracting out the e-Government services contributes to bridging

	the gap between the public sector and the private sector, and it is more beneficial to the end users because a competition mechanism has been introduced into the service operation and provisioning model.
Article A7	
Author(s)	Evans, D., and Yen, D. C. (2006)
Title	E-Government: Evolving relationship of citizens and government, domestic, and international development
Supporting Excerpt	"E-government allows a more timely, effective, and cost-efficient manner to government management and communication."
Analytical Summary	Conventional communication channels for government processes include telephone, mail and face-to-face meetings. These channels exhibit certain problems such as the cost of time when using mail and face-to-face meetings, and lack of persistency of telephone conversation compared to written or printed documents. To accommodate these issues, e-Government can actually enhance the responsiveness of services and processes by using the Internet that interconnects major locations. With an appropriate level of security implementation, digitalized documentations could be sent and received in a more economic way via secured emails or file sharing across the Internet in a more timely fashion than mailing printed materials. It is also claimed that advanced communication technologies such as VoIP and video conferencing can provide much more cost-effective solutions than conventional telephone and face-to-face meetings. The overall productivity and efficiency of government management and communication are therefore improved with the adoption of e-Government services.
Article A8	
Author(s)	Weerakkody, V., Baire, S., and Choudrie, J. (2006)
Title	E-Government: The need for effective process management in the public sector
Supporting Excerpt	"Enhance coordination and integration between the various stakeholders involved in the public-service delivery supply chain."
Analytical Summary	The demands of efficiency and effectiveness in government processes have become more vigorous. It is pointed out that while in the past responsiveness was constrained by distance and other geographical

	factors, the Internet has suggested a more efficient communication model to be adopted. The e-Government is therefore expected to cope with these demands to ensure that all stakeholders involved in government processes can post requests and receive responses in a more timely fashion. It also transpires that with the increasing complexity of government services, coordination and integration of all stages within the workflow are becoming essential. It shows that the improvement in communication efficiency helps to prevent any confusion and interruption that may have negative impacts on the public service supply chain.
Article A9	
Author(s)	Haldenwang, C. V. (2004)
Title	Electronic government (e-Government) and development
Supporting Excerpt	"E-government denotes the strategic, co-ordinated use of information and communication technologies (ICT) in public administration and political decision-making."
Analytical Summary	Since business intelligence is becoming more widely used by enterprises for their decision making processes, government can utilise the same techniques for public administration. It turns out that with the digitalization of information, data collection has become easier with the adoption of e-Government. Analytical approaches used by business can also be applied to data processing. The results of the analysis contribute to public administration and political decision-making which are the primary objectives. It is pointed out that with the processing power of ICT, the time required for analysis can be greatly shortened, and more difficult and complicated tasks that were not feasible in the past can now be performed. The overall quality of decision making process is therefore improved by the adoption of e-Government.
Article A10	
Author(s)	Beynon-Davies, P., and Martin, S. (2004)
Title	Electronic local government and the modernisation agenda: Progress and prospects for public service improvement
Supporting Excerpt	"The benefits of such enablement of the value chain include a faster order–delivery cycle, lower inventory causing reduced working capital requirements, and outsourcing of sub-assemblies leading to reduced fixed

	costs."
Analytical Summary	ICT enables business to utilise the Internet for communication between the organisation and customers. With the success of distributed communication model and outsourcing solutions, governments can seek similar solutions for service operation and delivery. Because electronic communication has become a standard way of communication, it is essential for governments to adopt e-Government services to communicate with other parties. This creates an opportunity for external organisations to participate into the e-Government service operation process and lifecycle. It is pointed out that the government can reduce operational costs and fixed costs as well as increase productivity of service delivery with the help of e-Government and outsourcing solutions for different stages in the service supply chain.
Article A11	
Author(s)	Irani, Z., Love, P. E. D., Elliman, T., Jones, S., and Themistocleous, M. (2005)
Title	Evaluating e-Government: Learning from the experiences of two UK local authorities
Supporting Excerpt	"Public sector organizations might receive benefit from the use of established ex-ante evaluation techniques, when applied to analyze the impact of e-government information systems."
Analytical Summary	The use of information systems empowers organisations to perform detailed and extensive analysis. This also applies to government processes where information systems can also be utilised. The e-Government adoption helps the government to be perceived better by citizens in various aspects which can be used to improve service quality and delivery. It is also noticeable that public sectors can utilise these perceptions to improve their own processes by analysing the impacts of e-Government adoption. The results guide organisations in the public sectors about how to improve client satisfaction as well as the direction of ICT development according to clients' demands.
Article A12	
Author(s)	Letch, N., and Carroll, J. (2008)
Title	Excluded again: Implications of integrated e-Government systems for

	those at the margins
Supporting Excerpt	"One dimension of e-government is the capacity to provide public services electronically 24×7, and the associated benefits of shifting the provision of public services from face-to-face contact with public servants to interactions through information and communication technologies (ICTs) have been widely espoused."
Analytical Summary	As being an innovated communication media, the Internet has changed the way of business operations and processes. The e-Government services are meant to be derivatives of e-Business models, inheriting communication channels used in e-Business, and also improving certain weaknesses that exist in conventional government processes. One of the major benefit is the service availability. It is pointed that with websites that are online in a 24/7 manner, information is available to the citizens virtually at any time. With the introduction of automated processes, certain services that do not involve manual operations may also be provided in 24/7 to the citizens. This shifts the communication model from face-to-face meetings or telephone calls to a more automated service provisioning model and saves the costs of government service delivery and costs incurred by the citizens when using the services.
Article A13	
Author(s)	Kim, S., and Lee, H. (2006)
Title	The impact of organizational context and information technology on employee knowledge-sharing capabilities
Supporting Excerpt	"Sharing knowledge and information is an important factor in the discourses on electronic government, national security, and human capital management in public administration."
Analytical Summary	Internal e-Government processes have decreased the process complexity and increased its efficiency when compared to traditionally delivered services. It is pointed out that the main attribute of e-Government is electronic collaboration and information sharing and exchange. With the help of computers and the Internet, data storage and sharing across geographical boundaries are much easier than before. The rapid development of information technology allows different functional departments and local governments to communicate with each other

	without incurring higher communication costs that are usually associated with conventional communication methods. The overall simplicity of information sharing nationwide has therefore lead to an increase in productivity and responsiveness in all aspects, such as national security, public administration and human capital management.
Article A14	
Author(s)	Daniel, E., and Ward, J. (2006)
Title	Integrated service delivery: Exploratory case studies of enterprise portal adoption in UK local government
Supporting Excerpt	"E-government uses enterprise portals and shows its ability to provide integrated services in the local government domain."
Analytical Summary	Integrated service delivery is one of the main factors in e-Business that contributes to the success of a business. In an ideal situation, seamless integration of processes and subsystems can create a smooth workflow at minimised costs of time and processing power. The efficiency and effectiveness are improved and flexibility and scalability can also be maintained because functional components contract a set of common interfaces to communicate with each other. E-Government is also expected to implement such seamless integration model. Although there are costs and barriers to develop and deploy fully integrated e-Government system, the benefits of utilising an integrated system in e-Government implementation are foreseeable. To start with a smaller scope, an attempt of integrated e-Government services for local government has relatively fewer difficulties than a nationwide deployment. The ability for future expansion and integration across multiple local government institutions also remains.
Article A15	
Author(s)	Ding, F., Wang, Y., and Ye, X. (2008)
Title	E-Government for the people: Learn from North America and European Union
Supporting Excerpt	"E-governments can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management."

Analytical Summary	There are quite a few advantages with the adoption of e-Government services. In this modern era responsiveness is an important measurement of the success of a business. Electronic government services provided to the citizens is a good attempt that can be explained as an alignment with the e-Business model. With the success of e-Business that has is proved to be more efficient and effective than conventional business models, e-Government also improves productivity and results in faster delivery of government services to the citizens at a lower cost. Also, with the implementation of e-Government, interaction between the government and other organizations is improved because electronic communication is one of the enterprise standards that many industries prefer. It is also pointed out that taking advantage of the Internet, it is now easier for citizens and businesses to access government services, resulting in better perception and participation. It is predicted that with the advance of information technology, the accessibility of electronic services will continuously increase at a decreasing cost.
Article A16	
Author(s)	Kim, H. J., Pan, G., and Pan, S. L. (2007)
Title	Managing IT-enabled transformation in the public sector: A case study on e-Government in South Korea
Supporting Excerpt	"The implementation of e-government is a burgeoning phenomenon across the globe. It improves and enhances the infrastructures and services provided to the citizens."
Analytical Summary	Digitalization is a global phenomenon. After the appearance of e-Business that has now become an alternative to conventional physical business presence, e-Government is starting to emerge and is expected to become one of the major access channels for interaction between citizens and governments in the future. With the example of success of e-Business, the ICT infrastructure in most of countries is now capable to deliver electronic services with a higher efficiency and effectiveness. These are exactly the aspects that e-Government services want to achieve to overcome the limitations of conventional government service delivery model. Citizens can now have an additional communication approach to using government services. It is expected that more citizens will start preferring e-Government services with the increase of ICT expertise and

	improved information technologies in the short future.
Article A17	
Author(s)	Coursey, D., and Norris, D. F. (2008)
Title	Models of e-Government: Are they correct? An empirical assessment
Supporting Excerpt	"E-government, like information technology in government before it, will probably not produce governmental reform or transformation but instead can be expected to support the interests of the dominant political-administrative coalitions within governmental organizations. Technology is not likely a primary barrier to e-government, especially as governments gain experience. Organizational and political factors are likely to significantly affect e-government application development, performance, and adoption."
Analytical Summary	While information systems are now widely used by governments, e-Government can be recognized as the next step of transformation. Previous experiences in applying information systems in government processes can contribute to the adoption of e-Government. It appears that public interest in electronic government services is increasing with the popularisation of Internet connectivity for households and businesses. Such increasing preference will drive the development and deployment of e-Government services that are expected to deliver better services to citizens. Both the government and citizens will be able to gain the advantage of communicating at a lower cost and with improved responsiveness. Public administration and political decision-making can be performed in better efficiency and effectiveness.
Article A18	
Author(s)	Stoltzfus, K. (2005)
Title	Motivations for implementing e-Government: An investigation of the global phenomenon
Supporting Excerpt	"The deployment of digitized inter-connective communication systems linking governmental organizations and its stakeholders such as the public, businesses, and other governments. It is not uncommon for governments to try and harness technological innovation to improve their operations and services."
Analytical	Collaboration and information sharing are important processes in any

Summary	organization. With the help of the Internet, communication between organisations has never been so efficient in terms of costs, responsiveness and availability. This concept can also be applied to government organisations because communication between stakeholders is essential. The innovation in information technology has therefore enabled the implementation of e-Government services which allows citizens, businesses and other stakeholders in the government services to communicate via a common communication platform. Service delivery and operations are greatly improved with Internet enabled technologies in terms of coverage, accessibility, availability and efficiency. With the increasing instances of e-Government implementations it will eventually become a common practice in delivering government services.
Article A19	
Author(s)	Weerakkody, V., and Dhillon, G. (2008)
Title	Moving from E-Government to T-Government: A study of process reengineering challenges in a UK local authority context
Supporting Excerpt	"E-government services is using ICT to respond to stakeholder's needs around the clock and from any location."
Analytical Summary	Service coverage and availability are major concerns for government services. With conventional government processes, accessibility of services may be limited in terms of coverage and availability. This is especially the case when the request is as simple as obtaining information, filing a form or making a payment. Physical visits, working hour limitation and distances can be issues preventing a citizen from accessing government services at certain time and location. With the adoption of e-Government, its availability and coverage have been enhanced with the help of the Internet. Certain contents and operations can be implemented online and accessed 24/7 without the need for physical attendance. The overall responsiveness of services to the stakeholders is therefore improved.
Article A20	
Author(s)	Pilling, D., and Boeltzig, H. (2007)
Title	Moving toward e-Government: Effective strategies for increasing access and use of the internet among non-internet users in the U.S. and U.K.

Supporting Excerpt	"E-government improves the usability of government websites, and raising awareness of the benefits of using online government services are applicable to all groups."
Analytical Summary	There are quite a few usability issues that can be improved when adopting e-Government. Citizens are willing to access information in a more systematic and simplified approach. Normally, basic elements such as search engine and ordered categorisation of information exist on government websites that are able to provide a convenient access to information in a more accurate and quicker manner. This also guarantees that with an appropriate Internet connection citizens should be able to access the same, up to date information regardless of their locations, especially for distant regions or even overseas. The provisioning of government service has therefore been extended to more groups of users, and ICT learning and education is also encouraged.
Article A21	
Author(s)	Homburg, V. M. F. (2008)
Title	Red tape and reforms: Trajectories of technological and managerial reforms in public administration
Supporting Excerpt	"E-government initiatives mark a single trajectory away from the classical bureaucracy, into a modernized administrative sublime."
Analytical Summary	Modernisation processes consists of the global digitalization and ICT infrastructure implementation. Besides the benefits that can be achieve by transforming conventional government processes into e-Government services, it also promotes a positive image of a country. It changes citizens' perception of the government from classical bureaucracy to a more accessible and responsive organisation. This also improves the performance of public administration because of the acknowledgement obtained from citizens with the adoption of e-Government services. It is therefore a presentation of ICT infrastructure, computing expertise and education in the modernisation process.
Article A22	
Author(s)	Kumar, N., and Peng, Q. (2006)
Title	Strategic alliances in e-Government procurement
Supporting	"Electronic government is a critical component of the government's

Excerpt	supply chain initiatives. It provides an innovative solution in dealing with the inefficient public procurement that has received a lot of criticism and negative perception."
Analytical Summary	Conventional government processes usually mean slowness, inefficiency, unwanted roundtrips and costs. The transparency of operations is in doubt and performance of services is uncertain. The e-Government initiative addresses these issues with a more efficient, transparent and responsive service delivery model in the supply chain. The utilisation of information technology creates better integration between functional departments in the government processes, and a higher satisfaction level with service delivery. It is therefore essential for the government to change the citizens' perception by providing a solution to deal with the aforementioned negative effects. The outcome of the adoption shows that with increasing ICT infrastructure penetration and popularisation of Internet access, e-Government is now becoming a preferred service delivery model and citizens are showing their acceptance to e-Government services over time.
Article A23	
Author(s)	Kim, Y. S., and Hong, E. K. (2007)
Title	A study of UniSQL encryption system: Case study of developing SAMS
Supporting Excerpt	"E-government allows interactions between the government and clients through an ICT-based and human-based network environment."
Analytical Summary	Advanced technologies have brought the governments closer to their clients. With ICT based network, accessibility of government services is now becoming more convenient and feasible in comparison to conventional communication approaches. The additional communication channel gives the government the opportunity to interact with specific groups of clients that were normally difficult to access with conventional communication approaches. The overall result encourages the e-Government services to become a complementary or even alternative access method over others. The increasing interactivity between the government and the clients results in better service delivery and social and cultural issues resolution.
Article A24	

Author(s)	Lim, J. H., and Tang, S. (2008)
Title	Urban e-Government initiatives and environmental decision performance in Korea
Supporting Excerpt	"Information technology leadership of senior management and Web site quality are key to decision intelligence, quality, and speed and e-government Web divide, a gap in the capability of city Web sites to support public service delivery and democratic interaction, translates into disparities in environmental decision performance across cities."
Analytical Summary	A multidimensional view of e-Government gives a detailed breakdown of advantages that are achieved to overcome the limitation of the classical government processes. The use of Websites has been an improvement in information publication and coverage. The contents are accessible to an increasing number of Internet service subscribers, and it reduces environmental impacts by decreasing the needs of printed materials and travelling. Local government decision making processes can utilise information analysis performed by e-Government services with the help of appropriate data analysis. Public service delivery can also be improved in terms of speed and quality with ICT-based networks.

Article A25	
Author(s)	Ni, A. Y., and Bretschneider, S. (2005)
Title	Why does state government contract out their e-Government services?
Supporting Excerpt	"Political and legislative factors appear to be more important than productive economic considerations. One of the major results of this work is to recognize that arguments associated with markets and economic rationality are clearly in part politically motivated."
Analytical Summary	Outsourcing e-Government services can introduce competition into the government service supply chain. It is clear that citizens' service quality perceptions depend on their experiences of using the services. Stages and processes within the service supply chain are abstract to the citizens and therefore outsourcing part or entire e-Government service process should create minimum level of inconvenience to the citizens. The overall costs of delivery, costs of maintenance of ICT infrastructure and fixed costs are reduced. It is also pointed out that the e-Government service acts as a bridge between the government, businesses, individuals and other

	organisations to encourage greater participation. The efficiency and effectiveness of service delivery are improved and the total costs of ownership are minimised.

4.2 Barriers of e-Government Service Deployment

Out of 48 selected articles, 27 articles were found relevant to barriers of e-Government service deployment. This section presents the results, including selected supporting excerpts from the articles and an analytical summary of each article (Table 6). Each article is denoted by a code that contains a letter (A, B or C) (indicating the Appendix where it can be found), and a sequential number.

Table 6: Research Findings and Analysis for e-Government Service Deployment Barriers

Article B1	
Author(s)	Dugdale, A., Daly, A., Papandrea, F., and Maley, M. (2005)
Title	Accessing e-Government: Challenges for citizens and organizations
Supporting Excerpt	"Greater attention to community-based human capital development is needed."
Analytical Summary	Accessibility of e-Government services has become a challenge for citizens and organisations. Unlike well-known conventional communication channels such as telephone and face-to-face meetings that hardly present barriers for the majority of citizens and organizations to access, e-Government service has a set of prerequisites that may become barriers to the citizens and organizations. This includes the costs of acquisition of communication channels (mainly Internet connectivity), expertise in computing operation and the costs of equipment needed to assist accessing the e-Government services (such as computers and other accessories for disabled users). In this case, the government must also supply additional services such as computer training courses and subsidy in e-Government service accessing accessories rather than simply supplying e-Government services without these supports.

Article B2	
Author(s)	Smith, S., Jamieson, R., and Winchester, D. (2007)
Title	An action research program to improve information systems security compliance across government agencies
Supporting Excerpt	"It is difficult to maintain code of practice for information security management."
Analytical Summary	Security and code of practice has been a growing concern in the electronic world. An e-Government system contains a large amount of sensitive data that requires careful handling and processing in a secured and controlled environment. Compared to the traditional security management of sensitive information that implies mainly physical security implementations, e-Government requires the digitalisation of client information and storage, and is facing the threat of higher vulnerability that can cause unauthorized access and usage of sensitive information. Especially with the rapidly changing information technologies, to maintain the security of e-Government data operators must comply with up-to-date code of practice and standard operation procedures. This attracts constant investment in reviewing current code of practice, efforts in adopting changes and continuous training of operators.
Article B3	
Author(s)	Norris, D. F., and Moon, M. J. (2005)
Title	Advancing e-Government at the grassroots: Tortoise or hare?
Supporting Excerpt	"We find that e-government adoption at the grassroots is progressing rapidly (if measured solely by deployment of Web sites). However, the movement toward integrated and transactional e-government is progressing much more slowly.
	Local governments have encountered several barriers to the adoption of e-government. The most significant of these include a lack of technology or Web staff and expertise, lack of financial resources, and issues around privacy and security. Lack of technology or Web staff and lack of financial resources continue to be two major perceived barriers to e-government. While there has been a modest decrease in the portion

	of local governments that lack technology or Web staff and expertise, an increasing portion lack financial resources and experience other privacy- and security-related barriers to e-government."
Analytical Summary	Identification of communication peer is now a concern for information security. An e-Government service usually involves the Web or other forms of online electronic communication approaches and it turns out to be more difficult to identify if it is communicating to the correct entity or involves higher costs to ensure the communication is happening to the right person. In this case, because information is transferred through the Internet that is deemed an insecure communication medium, it encounters higher risks for sensitive data leakage and being misused during communication compared to other traditional communication approaches such as telephone or face-to-face meetings. It is also noticeable that, to ensure the highest level of security is maintained and correct operation procedures are followed, staff must be trained constantly and required to have appropriate level of computer operating skills. This can be a concern to existing staff that have high expertise in government service operations but lack such computer skills. In such cases, e-Government service deployment will require large amount of financial resources to ensure that the staff, the services, the clients and the security are all aligned. It is pointed out that its feasibility is usually in doubt if it is associated with conventional government service models.
Article B4	
Author(s)	Beynon-Davies, P. (2005)
Title	Constructing electronic government: The case of the UK inland revenue
Supporting Excerpt	"A need for an understanding of the dynamics of change and challenges specifically associated with e-Government and its likely impacts on the internal and external processes of government."
Analytical Summary	The adoption of e-Government services requires careful handling of the foreseeable changes that would be created in existing internal and external processes. The issue with internal processes has several aspects: 1) Integration with the existing communication channels and processes, 2) Interoperability between conventional service and e-Government services, and 3) Complexity introduced into the existing system that may greatly impact staff and productivity. Interfacing with citizens and

	organisations also poses issues to e-Government services. These issues include: 1) Accessibility for all user groups that may have large deviation in age, computer expertise and preferences, 2) The costs incurred by the users when using e-Government services, and 3) The users' demands of e-Government services compared to conventional processes. All of these issues imply costs for design, support and integration of e-Government services and usually mean requirements of large amount of financial resources.
Article B5	
Author(s)	Ryder, G. (2007)
Title	Debunking the optimists: An evaluation of conventional wisdom about the digital divide and e-Government in the British Isles
Supporting Excerpt	"Conventional wisdom about the digital divide maintains that per capita income, education, age and access to technology are its main causes and also the main barriers to internet access."
Analytical Summary	Citizens and organisations are familiar with conventional processes for accessing government resources. The communication channels include telephone and mobile (voice), mail, face-to-face meetings, television and radio. These communication channels are well known and the technologies are already mature, which means the access costs and expertise required are minimised. However, e-Government services require Internet access that can create difficulties for certain perspective users. To promote the use of e-Government services, government has to first resolve issues associated with the costs and accessibility of using e-Government services, and consequently additional financial resources may be required.
Article B6	
Author(s)	Williams, M. D. (2008)
Title	E-Government adoption in Europe at regional level
Supporting Excerpt	"Lack of an ICT strategy as being a key inhibitor to greater ICT usage. ICT support and staff training are difficult terms of national e-government service deployment."
Analytical Summary	The Internet serves as the basis for e-Government services that relies on the countries' telecommunication infrastructure. In order to provide

	services that can replace conventional processes, high speed Internet connection with adequate level of coverage and suitable costs to users are important factors. These factors are to attract citizens and organisations to use e-Government services. As a result, ICT infrastructure constrains the usage of e-Government services. On the other hand, e-Government services are usually running in parallel with conventional processes, which means more difficulties are created for staff to perform maintenance, administration and operations of the e-Government systems.
Article B7	
Author(s)	Carter, L., and Weerakkody, V. (2008)
Title	E-Government adoption: A cultural comparison
Supporting Excerpt	"The results indicate that of the prevailing adoption constructs, relative advantage and trust are pertinent in both the U.S. and the U.K., while ICT adoption barriers such as access and skill may vary by culture."
Analytical Summary	Culture difference is one of the main factors that may affect the accessibility of e-Government services. Citizens from different cultural groups may have variations in per capita income, education and cultural requirements. A factor that directly influences the accessibility of e-Government services is the language options available to citizens. The demands for multilingual interfaces delivering the same set of information also mean the government has to employ staff with multilingual capability as well as computer expertise for e-Government service operation, maintenance and administration. For both internal and external e-Government related processes, the barriers of skill requirements are now becoming more obvious.
Article B8	
Author(s)	Margetts, H. (2006)
Title	E-Government in Britain- a decade on
Supporting Excerpt	"A number of organizational barriers to e-government progress remain, particularly shortage of information technology expertise and a residual reluctance of public officials to fully embrace Internet-based ways of working.

	The key organizational change has been large scale outsourcing which has drawn a number of huge global computer service providers into government. Indeed in the eyes of some commentators e-government has overtaken previous administrative reforms to become the new 'paradigm' of government, with major implications for the nature of government administration."
Analytical Summary	Public acceptance of Internet based e-Government services is still one of the biggest concerns. An adoption of e-Government services usually implies the access of these services require a certain level of information technology expertise. Such requirement may exclude a portion of users who may be lacking IT expertise or Internet access, and raises the concern about access fairness. Under these circumstances, conventional processes are still working as expected and are still accessible by the majority of users. The e-Government services may become complementary to the existing processes that creates doubts about the feasibility of e-Government adoption and finally the reluctance to employ e-Government services over convention processes. The impedance comes from factors both internal and external to the government.
Article B9	
Author(s)	Weerakkody, V., Baire, S., and Choudrie, J. (2006)
Title	E-Government: The need for effective process management in the public sector
Supporting Excerpt	"The concept of e-government has evolved from the domain of e-Business where enterprises need to collaborate with partners, suppliers and customers for the effective delivery of e-services. While needing integration and communication between business processes and underlying information systems in disparate organizations, in a non-process-oriented, legacy system driven public sector, this presents a significant challenge."
Analytical Summary	Although the concept of e-Government is derived from e-Business that has now been a common business process model applied by a large number of organisations, the nature of e-Government presents a considerable amount of differences in comparison to e-Business. Whilst e-Business focuses on communication and integration between

	functional departments within the organisations and external parties, e-Government focuses on delivering services to citizens and other relevant parties. The large user base means the system has to cope with complexity in operation and integration. However, the interoperation with existing processes or migration of existing processes is not simple. Unlike the development of e-Business system that may create impacts to one organisation, the government must be careful about the possible impacts created by adoption of e-Government services. The impacts or consequences can be regional or even national, and there are many factors that the government must consider prior to the deployment of e-Government services to increase public acceptance, including ICT infrastructure and level of computing expertise nationwide.
Article B10	
Author(s)	Haldenwang, C. V. (2004)
Title	Electronic government (e-Government) and development
Supporting Excerpt	"The introduction of e-government will mainly be confined to the industrialized and more advanced developing countries. However, potential uses are also opening up for the poorer countries. E-government should be taken as an instrument to promote good governance and to strengthen reform-oriented actors in politics and civil society."
Analytical Summary	The deployment of e-Government services depends on the availability of suitable ICT infrastructure in a country. In this case, developed countries have the advantage of being more advanced in information technology utilization compared to developing countries. In fact, the amount of financial resources required to implement and deploy usable e-Government services still presents a challenge. The constraints in ICT infrastructure and financial resources can greatly hinder the adoption of e-Government. Insufficient supports in these two areas may lead to a non-usable e-Government presence, limiting the service to be only available local to a particular region or only being used by a specific group of users. Issues with fairness, accessibility and usability can create reluctance in the public for transforming existing government processes into e-Government implementations.
Article B11	

Author(s)	Norris, D. F. (2004)
Title	Electronic government at the American grassroots project highlights
Supporting Excerpt	"However, most sites are relatively new (two-thirds of the web sites are seven years old or less), suggesting that most local governments are newcomers to the deployment electronic government. In addition, studies of local government web contents have found that most sites are fairly basic, offering mostly information and access to a few services. Relatively few cities and counties engage in electronic transactions or offer other electronic services through their web sites and fewer still are true portals. Instead, most web sites are passive, information providing instruments. These data indicate that few local governments have extensive digital government installations. Finally, these and other studies have found that local governments report the existence of several barriers to the adoption of digital government."
Analytical Summary	Usability of e-Government services is doubted by citizens. A majority of e-Government services only provide basic features such as information presentation and certain simple services. Due to considerations about costs, such e-Government implementation may not be able to satisfy users' demands for more advanced operations. It appears that the lack of interactive contents and services may eventually cause users to use more conventional and interactive communication approaches such as telephone and face-to-face conversations. A too basic implementation of e-Government may become an alternative to printed materials or purely passive information presentation. The high costs in advanced e-Government services that can provide extensive functionalities to the users, and the lack of preference of using low-cost e-Government implementation that only provides basic features are the tradeoff that the government has to carefully think about.
Article B12	
Author(s)	Beynon-Davies, P., and Martin, S. (2004)
Title	Electronic local government and the modernisation agenda: Progress and prospects for public service improvement
Supporting Excerpt	"Funding and staff development, combined with more fundamental changes to internal business processes and inter-organizational working,

	are needed if councils are to harness the full potential of new ICTs to transform their transactions with service users and citizens."
Analytical Summary	Prerequisites for adopting e-Government services include budget, staff with adequate level of expertise and interoperability between internal processes and external organisations. The issue behind these prerequisites is that any of these items not meeting the standards may impede the success of the e-Government services. Unfortunately, local councils may exhibit different preferences and the situation can be different from one council to another. The integration of systems between councils, the available staff that can operate the systems and the budget limit in system development and deployment may eventually lead to unbalanced accessibility or incompatibility of services. Users' demands and requests may not be able to be satisfied fully which can result in complaints about e-Government services and affect the image of government in terms of fairness, productivity and availability.
Article B13	
Author(s)	Reddick, C. (2004)
Title	Empirical models of e-Government growth in local governments
Supporting Excerpt	"Privacy and security limit e-government growth."
Analytical Summary	Due to the fact that the Internet is an open and unsafe interconnected network, it is now more difficult to ensure the privacy and security of communication between peers. This is especially critical to e-Government service acceptance because online transactions usually involve transmission of sensitive information across the Internet. Internet threats such as viruses, Trojan programs and other malicious programs or activities make people afraid to use and trust online transactions. Especially with the exposure of incidents in sensitive information leakage and unauthorised access, people are now more cautious about online activities. As a result, it is more challenging for the government to implement constantly changing technologies to ensure the privacy and security of any use of e-Government services as well as to persuade and promote the safety of e-Government services in order to attract more users.

Article B14	
Author(s)	Letch, N., and Carroll, J. (2008)
Title	Excluded again: Implications of integrated e-Government systems for those at the margins
Supporting Excerpt	"E-government (IT) project planer poorly-understood dimension of digital exclusion. The major negative impacts of e-government use in public administration is reduced flexibility available to public officials at the interface with citizens."
Analytical Summary	The insignificant availability of ICT infrastructure in a country limits the delivery of e-Government services. This can be due to geographical or technological limitation of ICT infrastructure, so that more advanced ICT communication approach may not be available to certain regions due to legacy devices or constraints on financial resources. In either case, a certain group of users may be excluded from using e-Government service because of lack of suitable ICT infrastructure or the available ICT infrastructure is not capable of delivering certain e-Government services. Such digital exclusion may result in a negative impact on the e-Government adoption or could even generate social issues. It is difficult for the government to obtain an equilibrium point that can balance the accessibility of e-Government services as well as the increased flexibility in public administration.
Article B15	
Author(s)	Gauld, R., Gray, A., and McComb, S. (2009)
Title	How responsive is e-Government? Evidence from Australia and New Zealand
Supporting Excerpt	"It is difficult to deploy an e-government system in order to build a more responsive government."
Analytical Summary	Responsiveness of e-Government service may not be as efficient as users thought. Conventional communication approaches such as telephone and face-to-face meetings often allow citizens to obtain a response to their requests during the conversation. However, the use of e-Government services may create delay to the responsiveness because communications are usually through emails or downloaded forms that are sent via mail. Except for few online transactions that can be fully

	automated, operations requiring human interactions may actually be less efficient when using e-Government services than conventional processes, at least for some citizens. Although advanced technologies allow the implementation of a more responsive system such as Instant Messaging, computer expertise in operation and maintenance is another difficulty for the government to overcome.
Article B16	
Author(s)	Daniel, E., and Ward, J. (2006)
Title	Integrated service delivery: Exploratory case studies of enterprise portal adoption in UK local government
Supporting Excerpt	"How does e-government service improve service delivery, including the ability to share information across its own directorates and also to improve working with other agencies?"
Analytical Summary	The delivery of e-Government service is not only to external parties like citizens and organisations, but also internal to government agencies. The interests of the internal processes using e-Government services mainly focus on information sharing, data presentation, reporting and other management activities that can be similar to top management use of e-Business systems. The issue with the use of e-Government for internal processes is that the overall model may not be as simple as the one applied by e-Business. The handling of sensitive data, political consideration, expertise in ICT and accessibility are all confining the productivity and flexibility within a government agency or across different government agencies.
Article B17	
Author(s)	Irani, Z., Love, P. E. D., and Jones, S. (2008)
Title	Learning lessons from evaluating eGovernment: Reflective case experiences that support transformational government
Supporting Excerpt	"E-government service itself does not improve knowledge and understand the eGovernment evaluation."
Analytical Summary	We understand that the emphasis of e-Government services is on the attempt to automate processes, to provide an additional method for accessing government services by using the growing Internet connectivity and to improve productivity so that in a long term the

	overall costs of operation and maintenance of government services can decrease. However, the transition to e-Government services seldom provides users with the reason for such changes. This is especially the case for external users who may believe that e-Government is simply an "extra" approach for accessing the government services. As a result, the importance of the long term benefits of e-Government adoption is not communicated to the users that can slow down the entire transition to e-Government because of reluctant public acceptance and insufficient understanding of e-Government.
Article B18	
Author(s)	Kim, H. J., Lee, J., and Kim, S. (2008)
Title	Linking local e-Government development stages to collaboration strategy
Supporting Excerpt	"E-government's service has its responsibility to build connection between the stages of e-government development and collaboration demands in local government."
Analytical Summary	E-Government services exist in different scopes. It is therefore normal for several e-Government services from several local governments to cooperate when responding to a client request. However, such integration and interoperability are difficult to implement due to the differences of operating platforms of e-Government services. The technological and geographical issues sometimes make it non-feasible to implement e-Government services and conventional government processes may be a more preferable option. In this situation, the choice of using e-Government services may be questioned because conventional government processes may be able to complete the required task in a more effective and efficient manner. Pipelining and workflow are essential but difficult to implement in e-Government services and usually require advanced ICT infrastructure and has high demands for financial resources.
Article B19	
Author(s)	Kim, H. J., Pan, G., and Pan, S. L. (2007)
Title	Managing IT-enabled transformation in the public sector: A case study on e-Government in South Korea

Supporting Excerpt	"Without understanding the alignment of technology and business processes, integration of resources into core business activities, integrating stakeholders' trust and commitment, and the role of organizational learning, which cannot enhance the adoption and institutionalization of e-government initiatives."
Analytical Summary	For an organisation that is adopting e-Business, the alignment of technology and business objectives are essential for the success of e-Business implementation. It includes aspects such as learning process, business activities integration and stakeholder integration that are deterministic for the adoption of e-Business. Likewise, e-Government adoption would have similar requirements, but its scope has been enlarged to a regional or even national size. The level of ICT expertise, accessibility, knowledge, technology and per capita income are heterogeneous and cannot be filtered. These requirements must be met before initiating e-Government adoption and this is the first issue encountered by the government prior to the e-Government development and deployment.
Article B20	
Author(s)	Coursey, D., and Norris, D. F. (2008)
Title	Models of e-Government: Are they correct? An empirical assessment
Supporting Excerpt	"Local e-government is mainly informational, with a few transactions but virtually no indication of the high-level functions E-government is not necessarily continually progressive in its technical development, nor is it without problems-more is not necessarily always better, and some consequences are not positive."
Analytical Summary	Due to the limitation of available resources, local implementation of e-Government may sometimes be incomplete or too basic. However, this may decrease the value obtained by users when using e-Government services as they can obtain the same services via other approaches that do not rely on the Internet. This may lead to the question whether e-Government is necessary or it may not be useful as people initially thought. The problem is, people who have limited ICT expertise and income may not feel using the Internet is as comfortable as using conventional government services via telephone and face-to-face meetings. The e-Government services may be deemed "extra" or even

	"redundant" if people could not obtain higher value out of using them. The government is therefore in a situation to decide to implement basic e-Government as a passive information presentation or a more advanced online transaction processor requiring larger investment of financial resources and ICT education.
Article B21	
Author(s)	Pilling, D., and Boeltzig, H. (2007)
Title	Moving toward e-Government: Effective strategies for increasing access and use of the internet among non-internet users in the U.S. and U.K.
Supporting Excerpt	"Increasing penetration of the Internet for government service delivery (e-government) poses new challenges for the users of those services, especially groups of people who are less likely to use the Internet but are more likely to use government services - people on low incomes, older people, and people with disabilities."
Analytical Summary	Unlike business organisation that can target a specific kind of users of an e-Business system, it is expected that ideally the e-Government services should be accessible by all citizens. But this is normally not the case. Because citizens may exhibit large deviation in habits accessing government services, e-Government may not necessarily be the preferable communication approach for certain user groups. This has raised the issue about fairness where certain citizens may want to access e-Government but they could not, whereas some citizens may prefer accessing conventional government services but they found such services are replaced by e-Government services. The problem can even go further for specific groups of people such as older people and disabled people. Organisations are attempting to set up standards for accessibility of Internet-based applications to ensure services can be accessed by most groups of users, but this requires government regulations to enforce and implement.
Article B22	
Author(s)	Bekkers, V., and Homburg, V. (2007)
Title	The myths of e-Government: Looking beyond the assumptions of a new and better government
Supporting	"All national policies myths of technological inevitability, a new and

Excerpt	better government, rational information planning, and empowerment of the intelligent citizen can be discerned."
Analytical Summary	With the development of technologies, digitalization and a move towards an intelligent society are underway. Although transformation of government processes into electronic form is inevitable, the transformation may be conducted proactively or passively. The question is whether the ICT expertise in the society pushes the transition to e-Government services, or the adoption of e-Government services encourages the growth of ICT expertise in the society. The problem is, these two approaches are depending on each other but the government could only have one focus at a time. It is also noticeable that an unsuitable option chosen against the current trends in the society can create negative impacts and consequences.
Article B23	
Author(s)	Choudrie, J., Weerakkody, V., and Jones, S. (2005)
Title	Realising e-Government in the UK: Rural and urban challenges
Supporting Excerpt	"The considerable success achieved with information and communications technologies (ICTs) within the private sector has influenced various stakeholders (including the government) to link up public sector services with the Internet revolution. This is being achieved by making expeditious attempts to provide online public sector products and services on a nationwide basis. However, there are certain regions and groups of the populace in a country where this aim will not be achieved."
Analytical Summary	The revolution of information technology has enabled a worldwide interconnected network for information sharing and online applications. Even through the coverage of the Internet has been greatly increased in the last decade with the help of new wired and wireless communication technologies, it is still not possible to ensure that all citizens in a country have access to the Internet, or to have the same specifications for their Internet connections. Although in the private sector various businesses have utilised the Internet as their service provisioning platform successfully, the government may have a different experience when adopting e-Government services in the public sector. The limitations of the ICT infrastructure prevents certain parts of the population in the

	country from receiving e-Government services at all or at a quality similar to others. As a result, user satisfaction could be impacted and can potentially generate negative consequences.
Article B24	
Author(s)	Sarikas, O. D., and Weerakkody, V. (2007)
Title	Realising integrated e-Government services: A UK local government perspective
Supporting Excerpt	"A fully integrated e-government service can be influenced by understanding of the technological, wider organizational issues and social-cultural issues (e.g. access to e-services, usability of e-government web sites, lack of trust, security concerns)."
Analytical Summary	In order for the government to successfully develop and deploy e-Government services to the public, it is necessary to analyse all kinds of possible issues that would affect the acceptance of e-Government services, or issues could be caused by the adoption of e-Government services. Besides the ICT infrastructure limitation that requires mainly the investment of financial resources, other cultural and social issues and integration issues are still major concerns: 1) The integration of e-Government services with existing processes, cross local government integration and changes of processes making impact on employment and training; 2) Privacy and security of the information transmitted across the Internet and the establishment of trust between citizens and the government via e-Government interfaces; 3) Accessibility of e-Government services by the populace, and 4) Contents, functionalities and usability considerations for the e-Government user interfaces.
Article B25	
Author(s)	Tambouris, E., Loutas, N., Peristeras, V., and Tarabanis, K. (2008)
Title	The role of interoperability in eGovernment applications: An investigation of obstacles and implementation decisions
Supporting Excerpt	"The role of interoperability in government applications for e-government service is essential, however it is hard to achieve."
Analytical Summary	Interoperability can become an issue when e-Government is one of the major communication approaches. There are many different aspects of interoperability that e-Government services should be aware of but are

	still difficult to implement. 1) The interoperability between e-Government services and existing government services and processes are still problematic and require efforts in the areas of information conversion, storage and communication. 2) The interoperability between e-Government services are still hard to achieve due to limitations of regional ICT infrastructure and available technologies. 3) The interoperability between e-Government services and external parties such as citizens and organisations may create accessibility issues, culture and social issues and usability issues. It is therefore difficult for e-Government to be interoperable without extensive efforts to analyse and consider all these aspects.
Article B26	
Author(s)	King, S. F., and Johnson, O. A. (2006)
Title	VBP: An approach to modelling process variety and best practice
Supporting Excerpt	"E-government service cannot be standardized."
Analytical Summary	There are many standards available for organisations to implement so that IT processes and services can be managed and controlled. Although different business disciplines may have different requirements for their e-Business models, one can still tailor a base standard to suite their specific needs. However, this is not the case for e-Government. It is virtually impossible to get a fixed set of standards for e-Government services simply because the scope is too large. Unlike a business organisation that can be specific about a targeting a particular user group, e-Government is expected to target all possible population groups which makes it difficult to generalise and use a fixed standard. In this case, learning from other e-Government implementations can only provide a limited guidance as it is not possible to standardise e-Government services.
Article B27	
Author(s)	Ding, F., Wang, Y., and Ye, X. (2008)
Title	E-Government for the people: Learn from North America and European Union
Supporting	"E-government, as with all reforms, cannot be achieved simply by

Excerpt	drafting a law or issuing an order from political leaders. Electronic government is neither easy nor cheap. At the same time, e-government responds to changes outside of government."
Analytical Summary	Public acceptance of e-Government is not a simple matter. Before an e-Government service can become an alternative or even substitution of a conventional government service, the government has to ensure that sufficient financial resources, available technologies, ICT infrastructure and public accessibility of the planned e-Government services are in place. The government also has to prepare for a long-term and slow progressing plan for e-Government adoption which means more complexity would be introduced during the time of deployment and operation, and the costs along with such a process must fit into the budget plan. These environmental factors are essential for the success of e-Government transformation which in fact is influenced by entities in the society instead of internal to the government.

4.3 Mobile Technology and its Impacts of e-Government Service Deployment

11 out of the 48 selected articles were found to be relevant to mobile technology and its impacts on e-Government service deployment. This section presents the results, including selected supporting excerpts from the articles and an analytical summary of each article (Table 7). Each article is denoted by a code that contains a letter (A, B or C) (indicating the Appendix where it can be found), and a sequential number.

Table 7: Research Findings and Analysis for Mobile Technology and its Impacts to e-Government Service Deployment

Article C1	
Author(s)	Dugdale, A., Daly, A., Papandrea, F., and Maley, M. (2005)
Title	Accessing e-Government: Challenges for citizens and organizations
Supporting Excerpt	"Providing mobile phones to jobseekers so that they can be text-messaged with available jobs on a daily basis is currently being experimented with by Centrelink, a one-stop shop for government cash

	benefits."
Analytical Summary	Mobile communication can be an extension to e-Government service provisioning. The mobility of mobile devices can increase the responsiveness of e-Government service further to help users who are eager to obtain fast response to their requests. Certain government benefit programs, such as job seeking assistance, can utilise mobile devices as an alternative or supplementary communication channel to Internet-based communication. In this case, SMS text messaging can be used instead of emails to provide more immediate notifications to the subscribers who would like to obtain the latest information about available jobs. Because both SMS and emails are electronic communication methods, e-Government service can implement both interfaces easily to provide an additional channel for accessing e-Government services.
Article C2	
Author(s)	Gunter, B. (2007)
Title	Advances in e-Democracy: Overview
Supporting Excerpt	"A wide range of innovations and test projects have been piloted using the internet, digital interactive television and other fixed and mobile electronic devices. For example, use mobile phones for staffs training or having video conferencing."
Analytical Summary	The convergence of mobile phones and stationary computers is now under progress. However, instead of merging the two different sets of features for mobile devices and computers respectively, it appears that mobility is being added to stationary computers with diminishing size. Indeed, mobile devices are now becoming a subset of computers, and a large number of computer applications and services are now running on mobile devices. At this stage, e-Government services are expected to have better portability so that they are compatible with mobile devices. Especially when voice communications are now running as VoIP, which is Internet-based, mobile devices are now capable of delivering voice, video and online interactions. E-Government services, such as online staff training, long distance video conferencing and other activities are extended to the mobile platform.

Article C3	
Author(s)	Galindo, F. (2006)
Title	Basic aspects of the regulation of e-Government
Supporting Excerpt	"We all know about the possibility of voting via mobile telephone, for example, in order to vote for a participant in a TV programme."
Analytical Summary	The costs of mobile usage are constantly decreasing so more e-Government services can be ported to the mobile platform to add mobility and responsiveness. Because the charges applied per SMS message are at an acceptable level, simple operations can be carried out using SMS technologies. One of the major usages of SMS messaging is as a reminder for e-Government services subscription and to notify users about status. Because mobile devices add mobility and personalisation to services, it is more reliable and responsive than normal email notification. On the other hand, simple and convenient requests can be sent through SMS to e-Government services. An example would be the voting of candidates where users can input their opinions by sending a simple designated code to a given number, and the background e-Government services will decode the request to process accordingly.
Article C4	
Author(s)	Scholl, H. J., Liu, S., Raya, F., and Unsworth, K. (2007)
Title	Choices and challenges in e-Government field force automation projects: Insights from case studies
Supporting Excerpt	"New generations of mobile devices, which effectively combine voice and data communication in a ubiquitous fashion, promise breakthroughs in that regard in the not too far future. Yet, however smart the new technology might become, field operations remain a work domain with large amounts of task- and asset-specific tacit knowing, which traditionally escapes effective ICT enablement."
Analytical Summary	Field forces are fully mobile. To extend the e-Government to support field force automation, wireless technology has become an essential and decisive factor. Similarly to computers, mobile devices including laptops, PDAs and Pocket PCs can be used for accessing e-Government services such as knowledge base, ticket management systems and other information databases. This is, however, still dependent on the ICT

	infrastructure availability and technologies in the country. Therefore, with the convergence of data and voice communication, application of mobile devices in certain areas such as field force is still depending on the development and deployment of e-Government services. The adoption of e-Government in this situation serves as the base whilst the mobility added by ubiquitous devices is an add-on and extension to the coverage and fluidity of service provisioning.
Article C5	
Author(s)	Ding, F., Wang, Y., and Ye, X. (2008)
Title	E-Government for the people: Learn from North America and European Union
Supporting Excerpt	"E-Government" refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government."
Analytical Summary	Mobile government is a concept extending the e-Government to mobile devices. As a result, mobilisation of e-Government services still depends on the adoption of e-Government services regardless if it is for stationary computing or mobile computing. Under the common concept of e-Government that transforms relationship between government and citizens into electronic processes, mobile computing is merely an extension to the normal e-Government implementations that were targeting stationary computers. The addition of mobile communication channels to e-Government services increases the accessibility of certain services, while many other services may not be suitable to be provisioned on mobile devices due to their small size, low processing power and platform incompatibility.
Article C6	
Author(s)	Grimsley, M., and Meehan, A. (2007)
Title	E-Government information systems: Evaluation-led design for public value and client trust
Supporting Excerpt	"The ICT 'architecture' of CBL - the technology used (Internet, mobile and auto telephony, locally available print media) and the clients' interface to traditional human enquiry services when needed, is common

	to many other e-Government services."
Analytical Summary	Mobile devices are now evolving to become computer-like devices, and the importance of voice communication on mobile devices is slowly decreasing. However, conventional voice communication over the mobile phone is not categorised as part of e-Government. The ICT infrastructure supporting e-Government has covered many different communication approaches and technologies, including Internet-based services, auto telephony systems, SMS messaging and other electronic communications. The use of mobile technology is therefore playing a minor role in e-Government service provisioning at the current stage because all services can also be accessed by stationary computers through the Internet. The high popularity of stationary computers and the low need for mobility of e-Government service provisioning still limits the deployment of specific mobile e-Government services.
Article C7	
Author(s)	Scholl, J. (2007)
Title	Introduction to the 2007 electronic government track
Supporting Excerpt	"E-Gov Emerging Topics nurtures new topics such as mobile Government. M-government means to use mobile phones for performing government services. M-service has its specific advantage that is mobility."
Analytical Summary	Mobile government is a new concept. With the adoption of e-Government, delivery and access of e-Government services can make use of mobile devices. The major advantage of mobile devices over stationary computers is that mobility it adds to normal e-Government services, so that e-Government services can be accessed in a more timely fashion by citizens. However, the costs associated with using mobile devices are still higher compare to stationary computers with Internet connectivity. The popularity of mobile government has therefore been constrained by the insufficient demands of mobility of e-Government services from the citizens and the relatively higher costs incurred than using stationary computer. However, the mobile platform is still playing an important role in e-Government service provisioning, especially with the foreseeable convergence of mobile devices and stationary computers in the near future.

Article C8	
Author(s)	Lee, J., and Rao, H. R. (2007)
Title	Perceived risks, counter-beliefs, and intentions to use anti-counter-terrorism websites: An exploratory study of government-citizens online interactions in a turbulent environment
Supporting Excerpt	"Sometimes, Citizens will not depend on ACT website information, unless the information provider has demonstrated a high level of competence in protecting citizens from a terrorist attack and the web-based service has an advantage over an alternative service source (e.g., NGO or private sector organizations) or channel (e.g., TV or mobile network)."
Analytical Summary	Because of the mobility and responsiveness of mobile devices, certain important and urgent e-Government services seem to perform better on mobile platforms than on stationary computers. This includes emergency notifications, where timely responsiveness is critical to the safety of citizens. Since mobile devices are more accessible when citizens are outside their houses and offices, they can use these devices to access e-Government services immediately without the need to look for other communication channels. Also, location-based services can be also provided with mobile devices so that a positioning ability is added to e-Government services. The value obtained by citizens using mobile devices in these circumstances is much higher than that obtained from other more common services such as government websites usually accessed by stationary computers.
Article C9	
Author(s)	Homburg, V. M. F. (2008)
Title	Red tape and reforms: Trajectories of technological and managerial reforms in public administration
Supporting Excerpt	"However, in a broader sense, the type of technologies used could also include wide area networks in general (including but not limited to the Internet), mobile telephones, and personal digital assistants used by street-level bureaucrats, and so forth."
Analytical Summary	Both internal and external government processes can be transformed using e-Government services, and in certain situation mobile devices are

	doing a better job than stationary computing devices. For some daily routines in public administration such as parking, both citizens and government staff can make use of mobile devices to perform their jobs easier. E-Government processes such as mobile parking payment service and street bureaucrats using PDAs simplify the operations and achieve better responsiveness and efficiency. It is therefore evident that in certain areas mobile devices provide a better approach e-Government services. However, the categories of government services provided through mobile devices are still within the scope of e-Government.
Article C10	
Author(s)	Lim, J. H., and Tang, S. (2008)
Title	Urban e-Government initiatives and environmental decision performance in Korea
Supporting Excerpt	"Recently, the "U-Korea Master Plan" was developed, shifting a focus from wired e-government to wireless mobile government, seeking to provide public services seamlessly through the ubiquitous computing networks."
Analytical Summary	The service provisioning model of e-Government is now evolving from wired to wireless. Since mobile devices are within the scope of computer devices, the efforts required in adjusting e-Government services to be mobile-capable are relatively low. As ubiquitous computing is playing an important role in ICT, the boundary between wired and wireless devices is blurred and these two platforms are converging. E-Government services will need to start coping with two different sets of interfaces – wired e-Government and wireless e-Government that is normally referred to as mobile government or m-Government. The focus of mobile government is driven by the increasing popularity of mobile devices and applications.
Article C11	
Author(s)	Martin, N., Gregor, S., and Hart, D. (2004)
Title	Using a common architecture in Australian e-Government: The case of smart service Queensland
Supporting Excerpt	"Governments must be clear in determining the definitions and parameters of business and supporting electronic channels. In this case,

	the Queensland government stated clearly that its defined business delivery channels (eg, call centres, mobile devices, and kiosks) are supported by appropriate technical electronic channels (eg, Internet, Intranet). This allows government to remain technologically flexible and agile in its electronic channel deployments, while maintaining consistent business delivery points of presence for its customers."
Analytical Summary	Electronic channels are now becoming the major communication data carriers in enterprises and governments. Especially when voice and video communications are encapsulated into digital data with the help of modern telecommunication infrastructure and technologies, a homogenous electronic platform can provide services to citizens with a great variety of derivatives. This includes voice, video, websites, SMS messaging, email and other online services that run on Internet or intranet. The interfaces can be stationary or mobile so that they can maintain the best level of consistency of service provision. In this case, mobile communication for e-Government services can only exist with other stationary or conventional physical communication channels. The current ICT and users' behaviours suggest that the mobile communication channel cannot fully replace other communication methods so that mobile government is still a subset of e-Government services.

4.4 Chapter Summary

This chapter presents the results of the systematic literature review of the 48 selected articles, including supporting statements and a summary of each article. The findings allow to conclude that the selected articles focus significantly on the identification of the motivators and the barriers of e-Government service deployment. The findings will be analysed further in the next chapter in order to address the research questions.

However, less supporting evidence was found for the impact of mobile technology on e-Government service deployment. Although relevant publications mentioning m-Service as tool for mobile government service deployment, such as the position paper on the transition from e-Government to m-Government (Germanakos, Samaras, and Christodoulou, 2005), and the Cyprus based m-Government implementation case study

(Hall, 2008) can be found in the literature, in the sources used for the systematic literature review only relatively a small portion of the sources presented and discussed findings relevant to m-Government. For example, the word 'mobile' was mentioned only in eleven articles, mainly when examining the use of mobile phones as communication or other tools but not in the context of m-Government; mobile technology was not found to be investigated as a medium of e-Government service deployment A further investigations into the area my be needed to investigate the processes of m-Government deployment.

5. DISCUSSION

This chapter explores and discusses the findings presented earlier, in order to address the research questions. Firstly, a range of motivational factors with respect to e-Government service deployment are identified and presented in a summarised form. Second, the same format is followed to introduce the factors that can be interpreted as barriers to e-Government service deployment. Finally, the relatively limited range of factors relevant to the mobile technology impact on e-Government service are also presented with some additional sources used to support the discussion.

5.1 Motivators of e-Government Service Deployment

The motivators of e-Government service deployment are identified through a further review of the findings presented in chapter 4. A total of 25 articles are found to be relevant. A description of each factor based on the article content is created and each relevant article is re-analysed in order to confirm the presence of the factor. A total of nine motivating factors are identified. The relationship between each of the factors and the three main stakeholders are summarised in Table 8; the results of the analysis are briefly summarised in Table 9; the article ID refers to the article number in chapter 4 (Table 5).

Table 8: Relationship between Factors Contributing to Motivators to e-Government Service Deployment and Stakeholders

Factors	End User	Network Operator	Government
Better service accessibility	Better convenience to access and less costs and effort to access.	Limited by network service coverage	Design of services need to meet end user expectations
Better service availability	24/7 availability of certain e-Government services	Reliability of network services	Reliability of e-Government service and applications
Better service responsiveness	Minimised wait time to obtain	Speed of connectivity and	Automation of services and good

	service outcome	coverage of high-speed connectivity	design of workflow and internal processes to increase productivity
Better service quality and efficiency	Automation allows users to access same service at the same quality	Quality of communication must be ensured.	Automation of services ensures same user experience
Service scalability	Users should not be affected when service scalability is changed	Scalability of network controls the scalability of e-Government service	Design of service should allow scalable deployment
Better stakeholder participation	End users are expecting to be able to access government services whenever needed	Network usage can increase if more users are using e-Government service, resulting in better profits.	Government is expecting all citizens can use government services whenever needed.
Better integration, communication and interaction	End users can choose their preferred form of communication, especially in the form based on electronic platforms	Network operators provide communication infrastructure	The e-Government services are expected to be integrated with existing government services.
Reduced costs (fixed and operational)	End users are expected to reduce access costs, including costs of travelling, costs of time and effort	More usage of network services will maximise the usage of communication infrastructure	Automation of services allows saving of costs for operation and maintenance
Better worldwide image	End users will feel the government is	The utilisation of network	A promotion of digitalization of

	always contactable, even when they are overseas	infrastructure attracts local and foreign investment	government

Table 9: Motivators of e-Government Service Deployment

#	Factors	Article ID
1	Better service accessibility	A1, A3, A5, A12, A13, A15, A16, A20
2	Better service availability	A2, A7, A12, A19
3	Better service responsiveness	A2, A7, A12, A19
4	Better service quality and efficiency	A1, A4, A5, A7, A8, A10, A14, A15, A16, A18, A19, A22, A24
5	Service scalability	A2, A14
6	Better stakeholder participation	A3, A8, A18, A19, A21, A23
7	Better Integration, communication and interaction	A4, A8, A11, A13, A14, A15, A17, A18, A23
8	Reduced costs (fixed and operational)	A6, A7, A9, A10, A12, A25
9	Better worldwide image	A6, A9, A11, A17, A21, A22, A25

Nine factors that can motivate e-Government service deployment have been identified from the systematic literature review. The outcomes indicate that by using e-Government services supported by ICT, state or local governments may gain advantages in the following areas:

1) **Better service accessibility**

   Since e-Government provides an additional communication channel for users to access government services, this can attract more users to use government services in a more convenient way, especially for distant users or disabled users.

2) **Better service availability**

   Similar to many e-Business service model, certain e-Government services can be automated to provide 24/7 availability, such as general information retrieval or certain transaction processing.

3) Better service responsiveness

Because certain e-Government services can be automated, users can use these services with virtually no wait time, whereas with conventional approaches such as telephone calls or in-person visiting can take longer time to complete the same request.

4) Better service quality and efficiency

Success in building socially marginalised communities' interest, enthusiasm and capacity to interact and communicate via online technologies, thereby contributing to how successful e-Government can be in achieving gains in efficiency and improved services.

5) Service scalability

The advantage of the scalability of websites has a far lower cost in comparison to printing materials, especially in regions that have higher population density. Also, the efficiency and effectiveness are improved and flexibility and scalability can also be maintained because functional components can use a set of common interfaces to communicate with each other.

6) Better stakeholder participation

As e-Government service takes advantage of the Internet, it is now easier for citizens and businesses to access government services, resulting in better perception and higher participation.

7) Integration, communication and interaction

a) The utilisation of information technology allows better integration between different functional departments in the government processes, and a higher customer satisfaction level with service delivery across both traditional and electronic channels.

b) The additional electronic communication channel gives the government the opportunity to interact with specific groups of clients that may normally be difficult to access through a conventional communication approach.

c) As e-Government services are normally designed in a way that requires a considerable amount of human-computer interaction (as citizens operate the services) it may be more difficult for staff to perform maintenance and administration tasks.

8) **Reduced costs (fixed and operational)**
a) One of the major benefits to government agencies is that the use e-Government provides information storage and flexible means to present information. This may lead to far lower operating and maintenance costs compared to printing all materials. Alteration, correction or update of content can be completed online without incurring costs for re-printing, waste disposal and re-delivery.

b) E-Government service deployment is an Internet-based implementation that allows citizens to access these services online. In this case, it serves as an alternative of conventional approaches and allows citizens to save time and reduce costs when they use a service online without the need to travel and when it is suitable for them.

9) **Better worldwide image**
E-Government services result in an improved worldwide image about the ICT infrastructure, education and ICT expertise and per capita income. Political decisions may push forward the adoption of e-Government services to showcase these factors and to create a more positive worldwide image.

The above nine motivational factors will ultimately contribute to a framework of e-Government service deployment.

5.2 Barriers to e-Government Service Deployment

By reviewing the findings and the analysis presented in section 4.2, the relationships between each of the factors and the three main stakeholders are summarised in Table 10. Table 11 summarises factors that are related to barriers of e-Government service deployment. The article ID refers to the article number in chapter 4 (Table 6).

Table 10: Relationship between Factors Contributing to Barriers to e-Government Service Deployment and Stakeholders

Factors	End User	Network Operator	Government
Lack of ICT accessibility and digital divide	Not every end user can use ICT to access e-Government services, e.g. users in rural areas.	Coverage is still one major issue.	The design of services makes it difficult to maintain accessibility for minorities, such as disabled people.
Lack of ICT expertise and/or technology	End users may lack the required ICT expertise to successfully use e-Government services.	End users must have knowledge of network connectivity.	Government is responsible to increase the average expertise in ICT for all citizens.
Poor Information security	Users may feel in secure because services are carried out over the Internet.	Network is accessible to the public.	It can be difficult to maintain service security.
Lack of financial resources	Total costs of acquisition of network connectivity to access e-Government services may not be affordable for certain groups of users.	Development of ICT infrastructure requires a considerable amount of investments.	Migration of conventional services to e-Government services, implementation as well as deployment and education and training all require additional financial resources.
Reluctance to changes	Certain users may feel more	Additional networking	It is difficult and costly to convert

	comfortable with conventional approaches to accessing government services and may refuse the migration to e-Government services.	requirements such as increased security may be required for the ICT infrastructure.	conventional government services that are already working fine.
Difficulties in integration and interoperation	User data may not be shared across multiple services due to difficulties in integration.	Different services may require different types of networks.	It is difficult to implement e-Government service to cooperate with existing services, especially for those that involve manual operations.
Usability issues and lack of features	Users may find information provided is too limited, too basic and lack of interaction.	Bandwidth and latency may limit the provisioning of certain e-Government services.	Financial resources are required to implement advanced e-Government service with good interactivity and keep all information up to date.

Table 11: Barriers to e-Government Service Deployment

#	Factors	Article ID
1	Lack of ICT accessibility and digital divide	B1, B4, B5,B7, B21, B23, B26
2	Lack of ICT expertise and/or technology	B1, B3, B5, B6, B7, B8, B15, B16, B19, B20, B21, B22
3	Poor Information security	B2, B13, B24
4	Lack of financial resources	B3, B5, B6, B10, B12, B15, B16, B22, B26, B27
5	Reluctance to changes	B4, B8, B9, B10, B11, B12, B17, B27
6	Difficulties in integration and interoperation	B9, B11, B14, B18, B23, B25
7	Usability issues and lack of features	B11, B15, B20, B24

Seven factors that can be barriers to e-Government service deployment have been identified from the systematic literature review. The outcomes indicate that by using e-Government services supported by ICT, state or local governments will have difficulty or negative impacts while deploying e-Government service:

1) **Lack of ICT accessibility and digital divide**

   The adoption of e-Government requires the government to review the digital divide effects that exist in the society. The e-Government services are not simply a form of electronic processes for government services but also the measurement of geographical and technological limitations in different regions of the country.

2) **Lack of ICT expertise and/or technology**

   The adoption of e-Government requires the government to review the digital divide effects that exist in the society. It is also an indicator about the ICT expertise of the population that can potentially be used to evaluate the focus of education and any underlying cultural and social issues.

3) Poor Information security

In the e-Government service deployment process, it is difficult to maintain a code of practice for information security management. For example, the identification of communication peer is now a concern for information security. An e-Government service usually involves Web or other forms of online electronic communication approaches where it is more difficult to identify if communication takes place with the correct entity, or higher costs are involved to ensure the communication is happening to the right person.

4) Lack of financial resources

E-Government service deployment will require large amount of financial resources to ensure the staff, the services, the clients and the security are aligned. Usually its feasibility in association with conventional government service models casts doubts.

5) Reluctance to changes

Insufficient supports in these two areas may lead to a non-usable e-Government presence, limiting the service to be only available locally to a particular region or only being used by a specific group of users. Insufficient fairness, accessibility, and usability can create reluctance in the public to adopt the in transformation of existing government processes into e-Government implementations.

6) Difficulties in integration and interoperation

The integration of systems between councils, the lack of available staff that can operate the systems and the budget limit for system development and deployment may eventually lead to unbalanced accessibility or to incompatibility of services. Moreover, different e-Government services can have different scopes. It is therefore normal for several e-Government services for local governments to cooperate together in order to respond to client requests. However, such integration and interoperability are difficult to implement due to the differences on operating platforms of e-Government services.

7) **Usability issues and lack of features**

The interaction between e-Government services and external parties such as citizens and organisations may create accessibility issues, cultural and social issues and usability issues. It is therefore needed to analyse and consider these factors and their implications.

The above seven barriers factors will ultimately contribute to a framework of e-Government service deployment.

5.3 E-Government Service Deployment Model (Motivation and Barriers)

As a result of the summaries and discussions in sections 5.1 and 5.2, a framework has been created that demonstrates an e-Government service deployment model (motivation and barriers). The framework is presented in Figure 3. Answers to sub research question 1 and 2 are also presented.
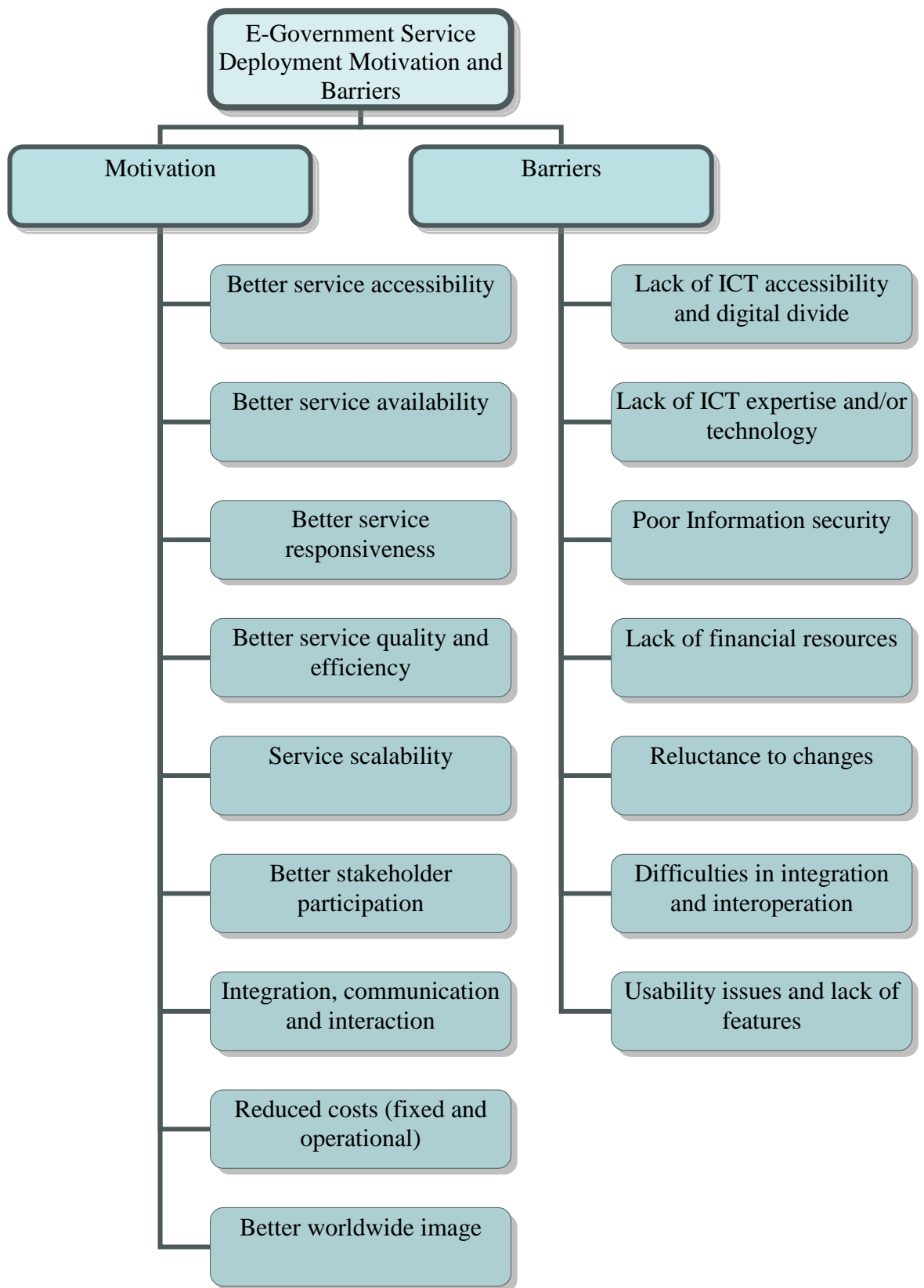
Figure 3: E-Government Service Deployment Model Framework (Source: the Author)

The outcomes related to the research question are based on four selected OCED member countries, thus this e-Government framework has international applicability.

5.4 Mobile Technology and its Impacts on e-Government Service Deployment

By reviewing the findings and analysis presented in section 4.3, the relationship between each of the factors and the three main stakeholders can be summarised in Table 12. Table 13 summarises factors that are related to mobile technology and its impacts on e-Government service deployment. The article ID refers to the article number as introduced in chapter 4 (Table 7).

Table 12: Relationship between the Mobile Technology Factors and their Impacts on e-Government Service Deployment and Stakeholders

Factors	End User	Network Operator	Government
Responsiveness	End users expect to obtain better responsiveness by using mobile technologies to overcome geographical and other environmental limitations.	Mobile communication infrastructure limits the responsiveness and quality of communication.	Personalisation of mobile communication allows better responsiveness to user requests.
Mobile interactivity (voice and video)	End users expect on mobile devices to obtain interactivity that is similar to that with stationary computers.	Mobile network infrastructure must support high bandwidth data transmission to ensure better interactivity.	Multi-channel communication model should be applied to government services implementation.
Accessibility (mobility)	Users can add mobility to accessing	Network coverage, infrastructure technology level and	Design of government service should make use of

	government services by using mobile devices.	speed of network determine the accessibility of services.	mobility to increase accessibility.

Table 13: Mobile Technology and Impacts on e-Government Service Deployment

#	Factors	Article ID
1	Responsiveness	C1, C5, C8, C11
2	Mobile interactivity (voice and video)	C2, C4, C6, C7
3	Accessibility (mobility)	C3, C4, C5, C6, C7, C9, C10, C11

Three impacts of mobile technology on e-Government service deployment factors that have been identified from the systematic literature review:

1) Responsiveness

   a) Mobile communication can be an extension to e-Government service provisioning. The mobility of mobile devices can increase the responsiveness of e-Government service further to help users who expect timely responses to their requests.

   b) The costs of mobile usage are constantly decreasing so more e-Government services can be ported to the mobile platform to add mobility and responsiveness.

   c) Because of the mobility and responsiveness of mobile devices, certain important and urgent e-Government services seem to perform better on mobile platforms than on stationary computers.

   d) For some daily routines in public administration, e.g. parking, both citizens and government staff can make use of mobile devices to perform their jobs more easily. E-Government processes such as mobile parking payment service and street bureaucrats using PDAs simplify the operations with better responsiveness and efficiency.

2) Mobile interactivity (voice and video)

   a) A wide range of innovations and test projects have been piloted using the internet, digital interactive television and other fixed and mobile electronic devices. For example, mobile phones and video conferencing have been used for staff training.

   b) As mobile phones or related devices become more and more popular, they are considered the most efficient and effective communication tools for cooperation, interaction and collaboration.

   c) Since mobile Internet becomes available on current 3G mobile phones, mobile Internet services inherit most futures from Internet services. This means users can participate in e-Government service and can interact with others using mobile phones with the current mobile Internet service.

3) Accessibility (mobility)

   a) The adoption of e-Government in this situation serves as the base whilst the mobility added by ubiquitous devices is an add-on and extension to the coverage and fluidity of service provisioning.

   b) The high popularity of stationary computers and the low need for mobility in e-Government service provisioning still limits the deployment of mobile specific e-Government services.

   c) E-Government emerging new topics such as mobile government. M-Government means to use mobile phones for performing government services. The specific advantage of m-Service is its mobility.

   d) The major advantage of mobile devices over stationary computers is the mobility added to normal e-Government services, so that e-Government services can be accessed in a more timely fashion by citizens. However, the costs associated with using mobile devices are still higher compared to the use of stationary computers with Internet connectivity.

e) The popularity of mobile government has therefore been constrained by the insufficient demands for mobility of e-Government services from the citizens and the relatively higher costs incurred. However, the mobile platform still plays an important role in e-Government service provisioning, especially with the foreseeable convergence of mobile devices and stationary computers in the near future.

The systematic literature review has found three main impacts that mobile technology has on e-Government service deployment. These are explored and discussed above. In fact, mobile technology has the potential ability to influence e-Government service deployment and user adoption (Ishmatova, 2007; Mukherjee and Biswas, 2005). Since mobile technology has advanced, it has inherited features of end user service based on Internet service (Fidel, et al., 2007), and it is predicted that e-Government service will be significantly deployed over mobile platform (Trimi and Sheng, 2008). This happens due to the networks convergence between fixed line Internet and mobile network, as mobile Internet has become more and more popular (Petrova and Huang, 2007).

Apart from that, end users are willing to use their mobile phones for doing internet activities, because mobile service has no location and time limitations (Kiki and Lawrence, 2006). In other words, people can use e-Government services by using their mobile phones anytime and anywhere. However, in order to clarify the current status of using mobile phones for e-Government service deployment, and to identify the relationship between e-Government and m-Government, the researcher has also conducted some additional literature review. The findings of the review are as follows:

1. M-Government service uses mobile phones as a communication tool and the traffic goes through mobile communication platform. Apart from these two features, there is no big difference between mobile government service and e-Government service, and therefore mobile government is a subset of e-Government (Amailef and Lu, 2008; Cao and Luee, 2007).

2. E-Government has two parts: wired e-Government and wireless (mobile) e-Government. However due to the technological convergences, e-Government services will also start to converge (Misuraca, 2009; Mukherjee and Biswas, 2005).

3. Unless other communication channels are proved to be obsolete, m-Government is not a substitution of e-Government. Rather, it is an extension to e-Government, therefore m-Government has a potential ability to influence e-Government service deployment. It also retains a high academic research interest in the near future (Trimi and Sheng, 2008).

The review allowed to identify three important impact factors. A further investigation may be able to 'unpack' these into a set of motivators and de-motivators affecting m-Government adoption and provide a model for an empirical study of the impact of mobile technologies on e-Government services and the transition from e-Government to m-Government.

6. CONCLUSION

This dissertation examines e-Government service deployment motivation, barriers, mobile impacts and future trends. The researcher has conducted a systematic literature review by investigating 136 recent journal and conference articles. Finally 48 articles are used for qualitative analysis. These articles are related to e-Government service deployment in four selected OECD countries: US, UK, Australia and Korea. Therefore, the outcomes from this dissertation are internationally applicable.

The discussion answers the main research question of this dissertation with three sub questions. For sub question 1 and 2, nine motivation factors about e-Government service deployment and seven barrier factors about e-Government service deployment are identified. A systematic literature review and data analysis are carried out and discussed. The researcher also builds a conceptual framework about e-Government service deployment, outlines factors that would provide benefits to existing government services if e-Government services are adopted. Difficulties of deploying e-Government services are also presented.

For sub question 3, the researcher has identified three impacts of mobile technology on e-Government services: responsiveness, interactivity and mobility. Also, by using additional literature sources, the researcher finds that mobile government is a subset of e-Government. E-Government has two parts: wired e-Government and wireless (mobile) e-Government. Therefore, m-Government is not a substitution of e-Government, rather it is an extension to e-Government.

To sum up, although e-Government service deployment is not new, this research study systematically examines its positive, negative and future impacts. Also it is very interesting to find whether mobile communication and technologies will be involved significantly in future e-Government service deployment or academic investigations. A future study is proposed to look at how mobile government can be considered as an extension of e-Government development. Also, the constructed framework can be tested empirically with data from some other countries.

6.1 Implications and Limitations

The motivation and barriers of deploying e-Government service have been identified and discussed. The constructed framework of e-Government service deployment outlines a range of factors related to how the e-Government service can enhance existing government services. On the other hand, e-Government is not easy to be successfully deployed and some barriers are identified. Since the systematic literature review is conducted with a selection of four OCED member countries (see chapter 3), the outcomes of this review process should be internationally applicable. However, due to the limited timeframe given for completing this dissertation, the systematic literature review has only focused in four selected OECD countries.

Although there are only 48 articles used for the qualitative analysis, answers to sub-Q1 and sub-Q2 are quite expected and reasonably well known. The answer of sub-Q3 appears incomplete due to the little relevant information collected from the systematic literature review. The researcher did collect some additional data to support the findings and discussion related to the concept of 'mobile government', and the outcomes from discussion are quite promising and positive. In general, both research questions are answered in the discussion chapter 5.

A further research study could focus on an empirical investigation of a larger scope with more countries involved. The framework in this dissertation could be tested, and also some future trends of e-Government service deployment should be examined. Furthermore, it is strongly recommended to carry out an investigation into how mobile government could become an extension of e-Government in the near future.

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APPENDICES

Appendix A: List of 25 Articles on Motivators for e-Government Service Deployment

A1. Dugdale, A., Daly, A., Papandrea, F., & Maley, M. (2005). Accessing e-Government: Challenges for citizens and organizations. *International Review of Administrative Sciences, 71*(1), 109-118.

A2. Norris, D. F., & Moon, M. J. (2005). Advancing e-Government at the grassroots: Tortoise or hare? . *Public Administration Review, 65*(1), 64-75.

A3. Kolsaker, A., & Lee-Kelley, L. (2008). Citizens' attitudes towards e-Government and e-Governance: a UK study. *The International Journal of Public Sector Management, 21*(7), 723-738.

A4. Mosse, B., & Whitley, E. A. (2009). Critically classifying: UK e-Government website benchmarking and the recasting of the citizen as customer. *Information Systems Journal, 19*(2), 149-173.

A5. Ryder, G. (2007). Debunking the optimists: An evaluation of conventional wisdom about the digital divide and e-Government in the British Isles. *Transforming Government: People, Process and Policy, 1*(2), 112-130.

A6. Ni, A. Y., & Bretschneider, S. (2007). The decision to contract out: A study of contracting for e-Government services in state governments. *Public Administration Review, 67*(3), 531-544.

A7. Evans, D., & Yen, D. C. (2006). E-Government: Evolving relationship of citizens and government, domestic, and international development. *Government Information Quarterly, 23*(2), 207-235.

A8. Weerakkody, V., Baire, S., & Choudrie, J. (2006). *E-Government: The need for effective process management in the public sector.* Paper presented at the System Sciences, 2006. HICSS '06. Proceedings of the 39th Annual Hawaii International Conference on.

A9. Haldenwang, C. V. (2004). Electronic government (e-Government) and development. *The European Journal of Development Research, 16*(2), 417-432.

A10. Beynon-Davies, P., & Martin, S. (2004). Electronic local government and the modernisation agenda: Progress and prospects for public service improvement. *Local Government Studies, 30*(2), 214-229.

A11. Irani, Z., Love, P. E. D., Elliman, T., Jones, S., & Themistocleous, M. (2005). Evaluating e-Government: Learning from the experiences of two UK local authorities. *Information Systems Journal, 15*(1), 61-82.

A12.   Letch, N., & Carroll, J. (2008). Excluded again: Implications of integrated e-Government systems for those at the margins. *Information Technology & People, 21*(3), 283-299.

A13.   Kim, S., & Lee, H. (2006). The impact of organizational context and information technology on employee knowledge-sharing capabilities. *Public Administration Review, 66*(3), 370-385.

A14.   Daniel, E., & Ward, J. (2006). Integrated service delivery: Exploratory case studies of enterprise portal adoption in UK local government. *Business Process Management Journal, 12*(1), 113-123.

A15.   Ding, F., Wang, Y., & Ye, X. (2008). *E-Government for the people: Learn from North America and European Union.* Paper presented at the Web Intelligence and Intelligent Agent Technology, 2008. WI-IAT '08. IEEE/WIC/ACM International Conference on.

A16.   Kim, H. J., Pan, G., & Pan, S. L. (2007). Managing IT-enabled transformation in the public sector: A case study on e-Government in South Korea. *Government Information Quarterly, 24*(2), 338-352.

A17.   Coursey, D., & Norris, D. F. (2008). Models of e-Government: Are they correct? An empirical assessment. *Public Administration Review, 68*(3), 523-536.

A18.   Stoltzfus, K. (2005). *Motivations for implementing e-Government: An investigation of the global phenomenon.* Paper presented at the Proceedings of the 2005 national conference on Digital government research, Atlanta, Georgia.

A19.   Weerakkody, V., & Dhillon, G. (2008). Moving from E-Government to T-Government: A study of process reengineering challenges in a UK local authority context. *International Journal of Electronic Government Research, 4*(4), 1-16.

A20.   Pilling, D., & Boeltzig, H. (2007). *Moving toward e-Government: Effective strategies for increasing access and use of the internet among non-internet users in the U.S. and U.K.* Paper presented at the Proceedings of the 8th annual international conference on Digital government research: bridging disciplines & domains, Philadelphia, Pennsylvania.

A21.   Homburg, V. M. F. (2008). Red tape and reforms: Trajectories of technological and managerial reforms in public administration. *International Journal of Public Administration, 31*(7), 749-770.

A22.   Kumar, N., & Peng, Q. (2006). Strategic alliances in e-Government procurement. *International Journal of Electronic Business, 4*(2), 136-145.

A23.   Kim, Y. S., & Hong, E. K. (2007). *A study of UniSQL encryption system: Case study of developing SAMS.* Paper presented at the Advanced Communication Technology, The 9th International Conference on.

A24.   Lim, J. H., & Tang, S. (2008). Urban e-Government initiatives and environmental decision performance in Korea. *Journal of Public Administration Research and Theory, 18*(1), 109-138.

A25.   Ni, A. Y., & Bretschneider, S. (2005). *Why does state government contract out their e-Government services?* Paper presented at the System Sciences, 2005. HICSS '05. Proceedings of the 38th Annual Hawaii International Conference on.

Appendix B: List of 27 Articles on Barriers for e-Government Service Deployment

B1. Dugdale, A., Daly, A., Papandrea, F., & Maley, M. (2005). Accessing e-Government: Challenges for citizens and organizations. *International Review of Administrative Sciences, 71*(1), 109-118.

B2. Smith, S., Jamieson, R., & Winchester, D. (2007). *An action research program to improve information systems security compliance across government agencies.* Paper presented at the System Sciences, 2007. HICSS 2007. 40th Annual Hawaii International Conference on.

B3. Norris, D. F., & Moon, M. J. (2005). Advancing e-Government at the grassroots: Tortoise or hare? . *Public Administration Review, 65*(1), 64-75.

B4. Beynon-Davies, P. (2005). Constructing electronic government: The case of the UK inland revenue. *International Journal of Information Management, 25*(1), 3-20.

B5. Ryder, G. (2007). Debunking the optimists: An evaluation of conventional wisdom about the digital divide and e-Government in the British Isles. *Transforming Government: People, Process and Policy, 1*(2), 112-130.

B6. Williams, M. D. (2008). E-Government adoption in Europe at regional level. *Transforming Government: People, Process and Policy, 2*(1), 47-59.

B7. Carter, L., & Weerakkody, V. (2008). E-Government adoption: A cultural comparison. *Information Systems Frontiers, 10*(4), 473-482.

B8. Margetts, H. (2006). E-Government in Britain- a decade on. *Parliamentary Affairs, 59*(2), 250-265.

B9. Weerakkody, V., Baire, S., & Choudrie, J. (2006). *E-Government: The need for effective process management in the public sector.* Paper presented at the System Sciences, 2006. HICSS '06. Proceedings of the 39th Annual Hawaii International Conference on.

B10.   Haldenwang, C. V. (2004). Electronic government (e-Government) and development. *The European Journal of Development Research, 16*(2), 417-432.

B11.   Norris, D. F. (2004). *Electronic government at the American grassroots project highlights*. Paper presented at the Proceedings of the 2004 annual national conference on Digital government research.

B12.   Beynon-Davies, P., & Martin, S. (2004). Electronic local government and the modernisation agenda: Progress and prospects for public service improvement. *Local Government Studies, 30*(2), 214-229.

B13.   Reddick, C. (2004). Empirical models of e-Government growth in local governments. *E - Service Journal, 3*(2), 59-84.

B14.   Letch, N., & Carroll, J. (2008). Excluded again: Implications of integrated e-Government systems for those at the margins. *Information Technology & People, 21*(3), 283-299.

B15.   Gauld, R., Gray, A., & McComb, S. (2009). How responsive is e-Government? Evidence from Australia and New Zealand. *Government Information Quarterly, 26*(1), 69-74.

B16.   Daniel, E., & Ward, J. (2006). Integrated service delivery: Exploratory case studies of enterprise portal adoption in UK local government. *Business Process Management Journal, 12*(1), 113-123.

B17.   Irani, Z., Love, P. E. D., & Jones, S. (2008). Learning lessons from evaluating eGovernment: Reflective case experiences that support transformational government. *The Journal of Strategic Information Systems, 17*(2), 155-164.

B18.   Kim, H. J., Lee, J., & Kim, S. (2008). Linking local e-Government development stages to collaboration strategy. *International Journal of Electronic Government Research, 4*(3), 36-56.

B19.   Kim, H. J., Pan, G., & Pan, S. L. (2007). Managing IT-enabled transformation in the public sector: A case study on e-Government in South Korea. *Government Information Quarterly, 24*(2), 338-352.

B20.   Coursey, D., & Norris, D. F. (2008). Models of e-Government: Are they correct? An empirical assessment. *Public Administration Review, 68*(3), 523-536.

B21.   Pilling, D., & Boeltzig, H. (2007). *Moving toward e-Government: Effective strategies for increasing access and use of the internet among non-internet users in the U.S. and U.K.* Paper presented at the Proceedings of the 8th annual international conference on Digital government research: bridging disciplines & domains, Philadelphia, Pennsylvania.

B22.   Bekkers, V., & Homburg, V. (2007). The myths of e-Government: Looking beyond the assumptions of a new and better government. *The Information Society, 23*(5), 373-382.

B23.   Choudrie, J., Weerakkody, V., & Jones, S. (2005). Realising e-Government in the UK: Rural and urban challenges. *Journal of Enterprise Information Management, 18*(5/6), 568-585.

B24.   Sarikas, O. D., & Weerakkody, V. (2007). Realising integrated e-Government services: A UK local government perspective. *Transforming Government: People, Process and Policy, 1*(2), 153-173.

B25.   Tambouris, E., Loutas, N., Peristeras, V., & Tarabanis, K. (2008). *The role of interoperability in eGovernment applications: An investigation of obstacles and implementation decisions.* Paper presented at the Digital Information Management, 2008. ICDIM 2008. Third International Conference on.

B26.   King, S. F., & Johnson, O. A. (2006). VBP: An approach to modelling process variety and best practice. *Information and Software Technology, 48*(11), 1104-1114.

B27.   Ding, F., Wang, Y., & Ye, X. (2008). *E-Government for the people: Learn from North America and European Union.* Paper presented at the Web Intelligence and Intelligent Agent Technology, 2008. WI-IAT '08. IEEE/WIC/ACM International Conference on.

Appendix C: List of 11 Articles on Mobile Technology and its Impacts for e-Government Service Deployment

C1. Dugdale, A., Daly, A., Papandrea, F., & Maley, M. (2005). Accessing e-Government: Challenges for citizens and organizations. *International Review of Administrative Sciences, 71*(1), 109-118.

C2. Gunter, B. (2007). Advances in e-Democracy: Overview. *Aslib Proceedings: New Information Perspectives, 58*(5), 361-370.

C3. Galindo, F. (2006). Basic aspects of the regulation of e-Government. *Law Technology, 39*(1), 1-22.

C4. Scholl, H. J., Liu, S., Raya, F., & Unsworth, K. (2007). *Choices and challenges in e-Government field force automation projects: Insights from case studies.* Paper presented at the Proceedings of the 1st international conference on Theory and practice of electronic governance, Macao, China.

C5. Ding, F., Wang, Y., & Ye, X. (2008). *E-Government for the people: Learn from North America and European Union.* Paper presented at the Web Intelligence and Intelligent Agent Technology, 2008. WI-IAT '08. IEEE/WIC/ACM International Conference on.

C6. Grimsley, M., & Meehan, A. (2007). E-Government information systems: Evaluation-led design for public value and client trust. *European Journal of Information Systems, 16*(2), 134-148.

C7. Scholl, J. (2007). *Introduction to the 2007 electronic government track.* Paper presented at the System Sciences, 2007. HICSS 2007. 40th Annual Hawaii International Conference on.

C8. Lee, J., & Rao, H. R. (2007). Perceived risks, counter-beliefs, and intentions to use anti-counter-terrorism websites: An exploratory study of government-citizens online interactions in a turbulent environment. *Decision Support Systems, 43*(4), 1431-1449.

C9. Homburg, V. M. F. (2008). Red tape and reforms: Trajectories of technological and managerial reforms in public administration. *International Journal of Public Administration, 31*(7), 749-770.

C10. Lim, J. H., & Tang, S. (2008). Urban e-Government initiatives and environmental decision performance in Korea. *Journal of Public Administration Research and Theory, 18*(1), 109-138.

C11. Martin, N., Gregor, S., & Hart, D. (2004). *Using a common architecture in Australian e-Government: The case of smart service Queensland.* Paper presented at the Proceedings of the 6th international conference on Electronic commerce, Delft, The Netherlands.

Appendix D: Specified Search String for the Four Databases

ACM

((Title:e-government or Title:"e government" or Title:"electronic government" or Title:eGovernment or Title:"digital government") and (Title:Korea or Title:KOR or Title:Australia or Title:AUS or Title:"United States" or Title:US or Title:USA or Title:America or Title:"United Kingdom" or Title:UK or Title:England or Title:Britain)) or ((Abstract:e-government or Abstract:"e government" or Abstract:"electronic government" or Abstract:eGovernment or Abstract:"digital government") and (Abstract:Korea or Abstract:KOR or Abstract:Australia or Abstract:AUS or Abstract:"United States" or Abstract:US or Abstract:USA or Abstract:America or Abstract:"United Kingdom" or Abstract:UK or Abstract:England or Abstract:Britain))

IEEE

((((e-government)<in>ti) <or> (("e government")<in>ti) <or> ((eGovernment)<in>ti) <or> (("electronic government")<in>ti) <or> (("digital government")<in>ti)) <and> ((("Korea")<in>ti) <or> ((KOR)<in>ti) <or> ((Australia)<in>ti) <or> ((AUS)<in>ti) <or> (("United States")<in>ti) <or> ((US)<in>ti) <or> ((America)<in>ti) <or> (("United Kingdom")<in>ti) <or> ((UK)<in>ti) <or> ((England)<in>ti) <or> ((Britain)<in>ti))) <or>((((e-government)<in> ab) <or> (("e government")<in> ab) <or> ((eGovernment)<in> ab) <or>   (("electronic government")<in> ab) <or> (("digital government")<in> ab)) <and> (((Korea)<in> ab) <or> ((KOR)<in> ab) <or> ((Australia)<in> ab) <or> ((AUS)<in> ab) <or> (("United States")<in> ab) <or> ((US)<in> ab) <or> ((America)<in> ab) <or> (("United Kingdom")<in> ab) <or> ((UK)<in> ab) <or> ((England)<in> ab) <or> ((Britain)<in> ab)))

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