

Measuring the progress of e-government implementation at a national level: an interpretive case study

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Abstract

E-government implementation at a national level is still at an early stage and is not yet well understood. Many existing studies are technology driven or focus on local or state e-government. There is no agreement in the literature on the number of the development stages, nor on clear development measurements that can be used to differentiate between the development stages of any e-government implementation. This research attempted to explore these conflicting views through an interpretive case study. A detailed study involving 26 interviews, 10 observations and around 50 documents showed the successes and failures of an initial implementation planned over a two year period. The results highlight inadequacies in the published stages of models for such implementations and suggest an alternative way forward. Three main categories of measurements are identified and divided into further elements. These three main categories are: milestones category, advanced technology features category and services category. It is suggested that these measurements should contribute to the debate over the number of stages required to implement an e-government system as well as providing a useful tool for governments that are seeking to implement an e-government system at a national level.

Keywords:

E-government, implementation, development stages, national level, development measurements.

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Introduction

E-government is a radical change and strategic tool that supports and simplifies governance for parties, government, citizens and businesses (Gupta and Jana 2003; Evans, 2003; Basu 2004). Its benefits can be divided into two broad aspects, specifically the transformation of government operations and the transformation of governance positively affecting the relationship between citizens, businesses and governments through improving the interactivity between these parties and making it smoother, faster and more responsive (Moon 2002; Altallab 2001, cited in Al-Sebie *et al.* 2005). It is claimed that e-government can be used to address a number of the main aims of total quality management philosophy (TQM) for the public sector, particularly those related to the need to be customer-driven, empowering for communities, workers and customers; and effective and efficient (Sharifi and Zarei 2004). However, these expectations and claims are surrounded by a multitude of discourses around e-government implementation process as *“there are virtually no systematic research results to help guide this rapid transition”* (Holden and Flecher 2001; cited in Holden *et al.* 2003, p. 75). As recently as 2003, Holden *et al.* claimed that the contemporary literature on e-government could be characterising as being both recent and scant. Over the last few years only a few studies have examined e-government implementation and most of these examined the implementation process at local or state levels (e.g. Howard, 2001; Layne and Lee, 2001; West 2004; Moon 2002; McDonach 2002; and Deloitte Research 2000; cited in Silcock, 2001). In addition, each study has tended to focus on one aspect or perspective, such as considering government efficiency (G2G) or business aspects (G2B) or the interests of citizens (G2C). Within this literature, the number of stages required for developing an e-government system has been classified into 3, 4, 5 or 6 stages and,

clearly, the e-government implementation process at a national level is still neither well nor deeply understood. However, exploring the e-government implementation process at a national level is necessary to respond to managerial concerns since there are many countries over the world which might invest in e-government and might expect substantial changes and high returns from them. Therefore, there is a pressing need for empirical research to investigate how progress on an e-government project at a national level can be characterised. This paper intends to explore one aspect of the e-government implementation process at national level through a case study and, in particular, to identify the key measurements that can be used to differentiate between different stages of development.

Literature review

The lack of clear development measurements that can help in classifying the different development stages of an e-government system has led to disagreement among scholars on the number of stages require to develop that system. However, before starting the discussion of such disagreement, it is very important to have a definition for the concept of e-government with aim of forming a base for the discussion. E-government can be defined broadly as the use of information and communication technologies (mainly the Internet) to deliver online government services with the aim of improving the performance of governments' organisations and providing potential benefits to their customers (employees, citizens, public agencies and business partners).

The literature reviewed revealed that most of the studies rely on the type of the introduced services (e.g. information dissemination, interactive services and transactional services) as the main criterion. In addition, most of the available studies deal with the e-government

implementation as a normal development of a website. For example, Howard, (2001) suggests that the path of e-government evolution is composed of three main stages, namely publish stage, interact stage and transact stage. Other researchers tried to consider technical, organizational and managerial issues with the addition of another criterion which is the type of the integration between the different business applications (horizontal or vertical integration). An example of such studies is the Layne and Lee, (2001) study. They suggest that e-government is an evolutionary phenomenon and propose a growth model for e-government that is composed of four stages. Those four stages are: cataloguing, transactions, vertical integration and horizontal integration. West (2004) also suggests a four stage framework for e-government development, specifically the billboard stage, the partial-delivery-service stage; the portal stage, with fully executable and integrated service delivery; and interactive democracy with public outreach and accountability enhancing features.

Other authors suggested that e-government development should pass through five stages, for instance, Moon (2002) suggests a five stage model for e-government development where each stage reflects the degree of technical sophistication and interaction with the users. The proposed stages are: (1) Simple information dissemination stage (one-way communication); (2) Request and response stage (two-way communication); (3) Service and financial transactions stage; (4) Integration (horizontal and vertical integration); and (5) Political participation stage. Similarly McDonach (2002) suggests that e-government can operate at five stages. The first stage is similar to the first stage in many other models, information dissemination. In the second stage, citizens will start to communicate and interact with governments by submitting some electronic forms. During the third stage citizens will start to make some complex interactions and

transactions with their governments (e.g. vehicle registration). The focus of the fourth stage will be on the delivery of access to a wide range of government services across a whole government administration through a single contact point. The fifth stage is not yet fully realized in practice where government applications become intertwined with commercial applications. Finally, other studies have tried to divide the development of an e-government system into six stages. For instance, Deloitte Research (2000; cited in Silcock, 2001) proposes a six stage model for e-government development. The suggested stages are information publishing, “Official” two-way transactions, multi-purpose portals, portal personalisation, clustering of common services, and full integration and enterprise transformation.

Careful analysis shows that the main issue in the disagreement between these authors on the number of the development stages is the lack of clear measurements that can help in differentiating between the different development stages. This suggests the need to identify new measurements other than the type of the services introduced during each stage (i.e. informational, interactive and transactional services). A staged model of benefit to governments should rely on clear measurements which can help e-government implementers to differentiate between the different stages of their e-government, system to anticipate the different activities of each stage and to evaluate their progress accordingly. Therefore, this paper aims to: first, explore e-government implementation activities at a national level; secondly, identify clear development measurements that can be use to classify the different development stages of an e-government system.

Empirical research methodology

To achieve the aims of this paper, a three staged empirical research methodology has been used. These three stages are: research design, data collection and data analysis. The three stages are discussed below.

Research design

An interpretive case study was used as a research strategy to meet the purpose of this study. The interpretive research method usually endeavours to understand phenomena through the meanings that people assign to them and aims at “*producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context*” (Walsham 1997, p.4-5). There are two main advantages of using the case study approach, specifically its ability to let the subject unfold naturally (i.e. it gives the ability to develop and refine concepts and frames of reference while studying the phenomena); and it enables researchers to understand and capture the dynamics of the process of organisational change (Galliers.1992). Another reason for the adoption of the case study approach is the novelty of the e-government phenomenon, since the method is particularly appropriate for problems where research and theory are at their early, formative stage, as in the case here (Benbasat et al., 1987; Eisenhardt, 1989; Yin, 1994). According to Irani *et al.* (1999) case studies have a strong tradition of description and theory building because of their inductive characteristics. Therefore, this method was used to describe and conceptualise the e-government implementation process at a national level and to identify the main measurements that can help in differentiating between its development stages.

The case study was conducted in Qatar. There were three main considerations that were taken into account with regard to the case

study selection. First, an e-government implementation process was taking place in Qatar at a national level as a project that was managed by a separate organisation. However, there were 24 ministries and public agencies that participated in that project. Not only this but also the e-government steering committee was composed of members who were working in different ministries or public agencies. This suggests an embedded case study design (Yin 1989) which allowed analysis of not only the e-government implementation within its organisation as a project, but also analysis of the embedded units (i.e. the participating ministries). Secondly, it was chosen so as to overcome any problems related to the access issues. *“Unless you are already known in the organisation or the industry, you are likely to be in the position of ‘cold calling’ the organisation.”* (Hartley, 1994, p. 216). Finally, from the technology perspective, the IT infrastructure in Qatar had reached a good level that encouraged the researchers to choose it as case study, for instance, they implemented some major milestones such as the implementation of the national public key infrastructure (i.e. secure authentication system) and the national payment gateway.

Data collection

Marshall and Rossman (1999, p. 159) stated that *“case studies rely on historical and document analysis, interviewing, and typically, some forms of observation as data collection.”* These three data collection techniques and others were used in this study. In particular, 26 semi-structured interviews, 47 official documents, 10 direct observations, and 10 electronic reports were used as primary sources of evidence in this study. The majority of the respondents were from the e-government organisation while the remaining were from four other organisations (ministries or agencies), namely the Ministry of Interior (MOI), the Ministry of Municipal Affairs and Agriculture (MMAA), the Ministry of Endowments and Islamic Affairs (MEIA) and the Supreme

Communication and Information Technology Council (SCITC). The respondents from each organisation and their details are summarised in Table 1 below. The aim of using these various instruments was to facilitate the process of data collection and to validate the collected data. In addition, the exploratory nature of the research encouraged the researchers to include rather than exclude items for investigation in the instruments. Moreover, many newspaper articles that related to the e-government implementation in Qatar and one TV interview with the e-government director and with some of the public users were collected.

Table1 : Respondents' organisations and positions

Organisation Name	Interviewee Designation	Number of Interviewees	Remarks
E-government	Steering Committee Member	3	Decision makers
	Director	1 (already calculated above)	The chairman of the e-government steering committee/ Decision maker
	Program Manager	1	Senior manager
	Department manager	3	Senior manager
	Project office Manager	1	Senior manager
	Developer	5	
	Help desk Operator	1	
MOI	IT Director	1 (already calculated above)	A member of the steering committee mentioned above/Decision maker
	Network team	1	
	Development team	1	
	IT Manager	1	Senior manager
MOMAA	Development team	1	
	Head of Development Section	1	Senior manager
SCITC	General secretary OFSCITC	1	Reports directly to the board of SCITC which is chaired by the Deputy of His Highness the Emir of the State of Qatar.

The interviews were conducted using a printed, standardized instrument as an interview guide for semi-structured interviews. However, the interview questions were classified based on the interviewees' managerial positions and hence interviewees were not all asked the same questions but rather the questions asked depended on the interviewees' different managerial positions. Those in similar positions were asked identical questions. In addition, all interviewees were asked some open questions with the aim of giving them the chance to speak with more freedom and at the same time there were some unplanned questions that emerged from the interviewees' answers. All the interviewees' answers were typed up in draft, then each interviewee was given the opportunity to review the final draft of their answers. In doing so, it was intended to reduce the risk of the responses being misinterpreted by the researchers. This procedure was found very useful in overcoming the accuracy issue since none of the interviewees allowed the researchers to tape-record their interviews. The interviews were all conducted in English and in the following text quotes are reproduced verbatim, in particular, the English grammar and phraseology is transcribed as spoken rather than modified for correct written form.

Data analysis

Data collection and data analysis processes were accomplished in line with the principles proposed by Klein and Myers (1999). Careful consideration was given not only to the views and behaviours of individuals in the organisation under study, but also to the context in which these individuals operate (i.e. the fundamental principle of the hermeneutic circle, Klein and Myers (1999)). Data collection and data analysis processes were intertwined; analysis occurred as the data was collected and led to further data collection and analysis. Data analysis

techniques such as content analysis, cross-interview analysis, interview guide approach, coding, and classifications, were used in this study. The content analysis strategy was achieved in this study with the aid of NVivo software. In particular, the researchers followed broadly the three streams (i.e. data reduction, data display and data conclusion drawing) that were suggested by Miles and Huberman (1984).

Case study background

The case study was conducted in the State of Qatar. Qatar is a peninsula with a strategic position that is situated halfway along the west coast of the Arabian Gulf and it borders Saudi Arabia on the southwest and has a number of important islands such as Halool, Shira'aw, and Al-Ashat. The total land area of Qatar is approximately 11,431 square kilometres (i.e. slightly more than half of Wales area) with a topography that is composed of a rocky flat surface with some limestone outcrops. According to the results of the 2004 population census, the population of Qatar amounts to 744029 inhabitants compared to 522023 inhabitants in the previous census conducted in 1997. Arabic is the official language, but English is also widely spoken. Qatar's economy is dominated by oil and natural gas, which accounts for 70% of its export income. Comparing its economy with its population, Qatar has been considered as one of the richest countries in the world. Qatar started its new era and modern history with the rule of His Highness (HH) Sheikh Hamad Bin Khalifa Al-Thani who succeeded his father in 1995. HH the Emir is the head of the constitutional authorities, holding both legislative and executive powers. In line with HH wisdom, insight and vision, many national projects were initiated such as education reform, the national administrative development project, and the national e-government project. The focus of this study is on the national e-government project.

E-government implementation practices

Preliminary activities

Aware of the Internet in the mid 1990s, most of the ministries and public agencies in Qatar started thinking about having an online presence and providing some web services for their visitors. They started with giving some limited information services and generally served as public information sources. Some of these websites appeared many years ago, for instance, the Ministry of Municipal Affairs and Agriculture (MMAA), the Ministry of Endowments and Islamic Affairs (MEIA) and the Ministry of Interior (MOI) had developed their websites in 1997, 1999 and 2001, respectively. Gradually, those websites were able to introduce some interactive services. On the other hand, some other ministries did not have websites at the date of completing the data collection process, such as Ministry of Energy and Industry (MOEI), Ministry of Finance (MOF), and Ministry of Justice (MOJ). Table 2 shows some interviewees' answers regarding the objectives of having websites and examples of the services that were developed.

Table 2: Examples of public websites' objectives and services

	Websites objectives	Websites Services
Mr AA	<p>"Some of the websites here in Qatar started without clear objectives in mind but at a later stage they realised the benefits of having these websites and started developing some good services."</p>	<p>"Currently, our website provides good services such as publishing information about the ministry's and the minister's activities, some interactive services like applying for new commercial permit or amending the existing one, applying for some other agricultural services, etc."</p>
Mr AO	<p>"Some ministries simply pursuing an image of being modern and aim to look good in front of its visitors who visit its website but there are also some ministries that eager to introduce some good services for its own users."</p>	<p>"We introduced many services that related to the Islamic affairs such as Haj services, Haj Contractors service, GIS service, IVR service and others. GIS (Geographical information system) service is a very lovely service as it shows the citizens number of Mosques around their area, the Khataths' (or speakers') names and Mosques' locations and distance between the Mosques and the citizen house, etc. Haj Contractors' service is also another service that ready and is used by around 30 Haj contractors."</p>
Mr BR	<p>"The website of this organisation starts simple but now it provides some good services to its visitors."</p>	<p>"We start simple by publishing some static information about the ministry, then providing some inquiries facilities to the website visitors."</p>
Mr OH	<p>"The MOI website start simple since there was not clear objectives at that time. Gradually, we start introducing some services"</p>	<p>"We started with statistical information and end with good services. Now you can find some useful inquiry services such as Car traffic violation information, Visa inquiry services and others."</p>

Most of the interviewees confirmed that there was no clear distinction between the different development stages of their websites. Normally, they started by publishing some static information and then the site grew over time.

“The period of moving from one stage to another is very short except those sophisticated services that we provided at a later stage through the e-government website. For example there were only two weeks between publishing the static information and having those interactive services.”

The interviewees were asked about how they would describe the coordination and cooperation between the different ministries regarding the development of their websites or any other shared public services. They confirmed that there was not any kind of cooperation with that regard. One of them said:

“Initially, there was not any formal communications between the ministries regarding the development of their web-based services. But at the beginning of the year 2000 we start to communicate with each other and there were many meetings at the level of IT managers in all ministries. However, the objectives of those meetings and communications were not related to the web services. The objectives of those meetings were to discuss the ministries infrastructures and to see the feasibility of linking all ministries together. In addition, there were many discussions with respect of having central database and share government data among government officials with the aim of helping them in taking the right business decisions. These activities were under the umbrella of the Supreme Planning council.”

The above quotes indicate that the level of cooperation or coordination between those ministries over their website development was not

satisfactory. This remained true until some government officials, specifically the IT directors of some of those ministries, tried for the first time to link their ministries with a government-wide network and to create a central database (i.e. data warehouse). They sought to link their ministries in order to share their business data amongst themselves. However, the concept of e-government did not appear during those activities although they tried to create a government-wide network and to share their data among their departments. Furthermore, it can be observed that the Planning Council was the sponsor of that initiative.

NNI project

An IT manager of one of the participating ministries in the e-government project mentioned that there was an executive committee that had been formed from different ministries and public agencies under the supervision of the Planning Council to manage the Network of National Information (NNI) project. There were three initial objectives for this project: (1) to improve the ways that public agencies carry out their business and hence reducing the duplication of effort and redundant databases which will then increase the efficiencies of the employees and save their time; (2) to establish criteria and standards for the electronic infrastructures and business applications required for performing electronic processes; and (3) to provide accurate and up-to-date information about the social and economic variables and indicators that help government officials to make correct decisions. However, these initial aims were changed and developed quickly as a reaction to internal and external events. Internally, there were some formal and informal discussions between some of the committee members regarding the committee, its responsibilities, and its future. These discussions led to the idea of having an e-government system rather than focusing on the initial objectives of NNI. One of the e-government executive committee members stated:

“We were asking ourselves why don't we divert the objective of having only central database to a bigger project which is more comprehensive and more efficient than just having central data warehouse. Why don't we start developing electronic services?”

He continued and mentioned that there was also an announcement from the Dubai government (a neighbouring state) that they intended to implement an e-government. That announcement was the external event which attracted the attention of the decision makers in Qatar and encouraged them to think about having a similar project. He stated:

“There was an announcement from the Dubai rulers that they intend to develop an electronic government. Indirectly, this announcement has drawn the attention of the decision makers here in Qatar and encouraged them to think about having a similar project in Qatar.”

After that, some members of the NNI committee decided to propose the idea of having an e-government pilot project at a national level through the proper formal channels to the highest authority in the country. Subsequently, this proposal was accepted and the NNI project was suspended. After that the e-government pilot project was authorised.

E-government pilot project

The same executive committee that was supervising the NNI project continued supervising the pilot project, also under the umbrella of the Planning Council. The obvious aim of the pilot project was to prove the concept of e-government.

“The Pilot Project was performed to prove the feasibility of the e-Government concept”.

However, the project was not planned properly. One of the e-government steering committee members stated: *“The e-government pilot project was not planned as required but fortunately we succeed in delivering the project on time. I remember that when we started there was not any service in our plan so we randomly selected the Residence Permit Renewal service to be the pilot project.”* There were three main parties involved in this pilot project, the MOI, Qatar National Bank (QNB) and Qatar Central Bank (QCB). Their roles were developing and providing the service, developing a payment gateway for the service and hosting the project itself, respectively. The executive committee had decided to contract with a third party software firm to perform the implementation, and another third party firm to manage the project. The selection of those vendors was made without a competitive bid processing due to the time limitation.

In the second quarter of 2001, the project executive committee contracted an international consulting group to evaluate the pilot project and analyse its strengths and weaknesses. The objective was to evaluate the technical adequacy of the e-government pilot project implementation, learn its lessons and propose recommendations for the improvement of subsequent e-service implementations. Generally, the consulting group found that the pilot project was successful as a proof of concept. However, they found that it was not an adequate model for future e-government application development.

Government readiness assessment

The same consulting team was given the responsibility of conducting a comprehensive readiness study (immediately after the assessment of the pilot project) with the aim of assessing the readiness of the ministries and government agencies from business and technology perspectives. The objective of the technological assessment was to

identify the state of readiness of the 24 ministries and agencies that currently have the readiness to provide the technology and support infrastructure to facilitate electronic enabled services, whereas the objective of the business assessment was to identify the services that were to be combined with IT readiness data and form the basis for the electronic services plan. They found that there were 1350 services that could be developed. Then, they applied some filtration criteria to those services with the aim of creating a prioritised list of services. Figure 1 illustrates the overall process which was followed by the consulting group in their analysis.

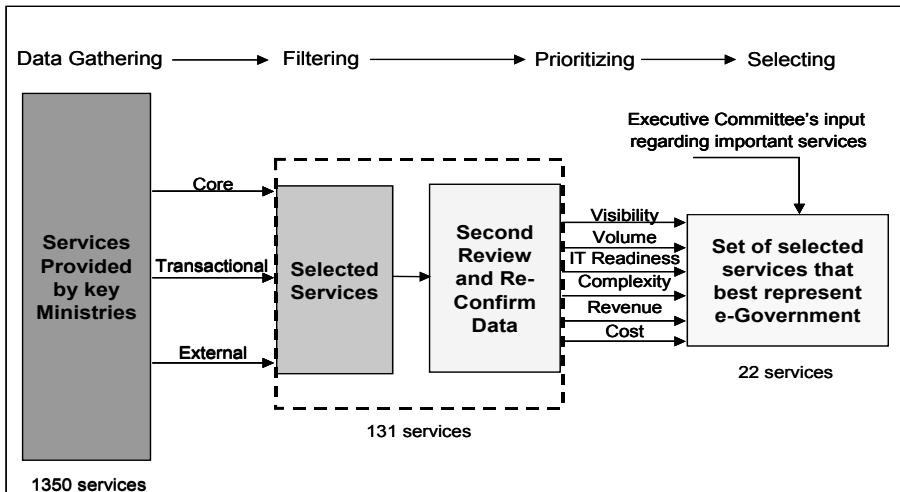


Figure 1: Methodology for selecting e-government services

The 1350 identified services were first manually filtered to ensure that the services were: (1) *External services provided to the ministry's constituents* (i.e. those services that served the citizens, residents, businesses, or visitors of Qatar). In other words, internal and G2G services were excluded; The G2G services were considered as very important services but it was decided that they would be implemented

as a separate project at a later stage. (2) *Core services of the ministry* (i.e. those that were within the mission of each ministry, and serve the ministry's users); (3) *Transactional services rather than information-only*: those services that simply presented information were excluded while those that involved interaction with the constituent and the ministry, and resulted in a payment were included.

The next step was to eliminate and combine transactions from the different ministries involved in providing the same service. By applying the above criteria to the 1350 services, the number of services was reduced, resulting in a list of 131 services (see Figure 1 above). The services were re-reviewed and filtered to remove redundant, services that were included as part of other services, and to ensure that all services had met the previous criteria. The priority list of 131 services was then discussed by the e-government executive committee on June 14th 2001 and agreement was reached on the final list of 22 service groups, consisting of 37 individual services. The group of 22 services was approved to be developed in Phase 1 of the e-government project.

E-services implementation plan

The 22 service group (i.e. the 37 individual services) were classified into two general categories, simple services and complex services. Simple services are services which involve only one ministry and no more than three departments of the ministry while complex services are those services which involve more than one ministry or involve more than three departments within one ministry. Some guidelines were developed for sequencing the services which were discussed and approved by the e-government steering committee. For example, *“the first priority is given to simple services and those that are relatively easy to implement in order to minimise risk and to allow the implementation team to gain knowledge”*.

Consequently, the visit visa and the traffic violations processes were selected as the first candidates that would be implemented because these services are both simple and have a high number of annual transactions. In addition, traffic violations are a precursor to the driver licences and vehicle registration services as both these involve checks to ensure that all violations have been paid.

Pre-implementation activities

The e-government steering committee assigned the responsibility of developing some necessary plans and project management documentations to an international consulting company. These tasks involve: helping them in developing the e-government mission, vision and objectives; forming a business model for the e-government organisation and developing its organisation structure; the development of the e-government IT strategy, architecture, development standards, operations standards and policy; the development of the e-government risk plan, communication plan, e-government management quality plan, e-transaction issues and the development of key performance indicators.

Forming an e-government entity

Having assessed the ministries/public agencies' readiness from the business and technology perspectives and having selected the services that needed to be implemented in the first phase of the project, it was decided to assign a team that would be responsible for managing the implementation of the selected services country-wide. The team had to be organised in a way that would allow it to perform the task as planned (within the specified budget and time) and the organisation of that team had to be flexible enough to allow further improvement and capacity for implementing the next phases of this national initiative. The consulting team recommended a public sector corporation as an

organization model. In addition, it recommended that it must be owned by the government of the State of Qatar, operated on a commercial basis, focusing on cost efficiency, cost recovery, accountability and transparency, have the flexibility to act quickly and competitively in staffing the operation and executing the detailed implementation plan, and would not be viewed as a political rival of line ministries and would be better positioned to elicit cooperation from ministries and agencies which use the e-government framework. Accordingly an e-government steering committee was formally established by virtue of the Emiri decree number 25 on the 7 October 2002. It stated clearly that the steering committee is an independent authority, had its own budget and belonged to HH the Emir's office directly. It named three members of that steering committee one of them was the chairman of the committee and at the same time the e-government project director. The decree specified 31st March 2005 as the deadline for the steering committee to complete the project (i.e. the first phase).

E-services implementation

The e-government management assigned the task of developing the recommended infrastructures to a third party (i.e. contractor) while the development of the approved services was assigned to another contractor. In addition, the e-government steering committee assigned the management of the daily activities of the project to an international consulting team. The contracted companies started performing their assignments immediately after the contracts were awarded. With respect to the development of the required infrastructures, Qatar e-government made some progress, particularly the development of the required authentication system and the payment gateway. As mentioned above, they planned to implement 37 individual services (i.e. 22 services group) within 30 months. Unfortunately they did not implement even half of the planned services, even after more than 30 months.

The contractor of the e-services development started developing the first e-service which is VISA visit service. The VISA visit service was developed and completed by the 5th of April 2003. In the third quarter of the same year another four services (i.e. driving license service, traffic violations service, Kahramaa (i.e. electricity and water billing payment service) and ZAKAT fund service) were completed and published on the e-government portal. Another service was completed in the first quarter of the year 2004 which is the Qatari e-employment service. While in the second quarter of the same year another three services (e.g. Health Cards service, Red Crescent and the Residence Permit services) were developed and linked to the e-government portal. Table 3 shows the completed services, the date (quarter) in which each service was completed in (the first quarter occurs the row with a non-zero entry), and the number of transactions performed by the e-government constituents for each service. This report has been extracted from the e-government reporting system (i.e. directly from the e-government portal database) on 21st November 2004. With the exception of birth certificates, they did not develop any further services until the date of completing the data collection processes (i.e. the 30th April 2005).

From Table 3, it can be seen that by the end of 2004 only nine services were developed out of the planned 22 service groups. Secondly, according to the implementation plan, none of these services was implemented within the timetable planned. Thirdly, by the 30th April 2005, the whole project was very far behind schedule. Also the usage of each service shown above is very low compared to the expected usage in the e-service detailed plan. For example, it was expected in the cost-benefit study that the usage of the visit visas service would reach 62999 transactions by the end of the second year (i.e.2004). However, by comparing this expectation with the real usage shown in

Table 3 (i.e. 8969 transaction), it is clear that the usage is well below the expectations. Finally, it is very important to note that the e-government team had developed new services that were not planned in the detailed implementation plan, specifically the Qatari e-employment service and the Red Crescent service. One of the steering committee members commented on this by saying:

“We are developing software and business applications which cannot be sometimes finished and completed on time due to many reasons such as the ministries’ readiness to provide or develop the planned e-services or due to some cooperation problems.”

The engagement in developing the PKI (i.e. public key infrastructure) and the payment gateway was mentioned as one of the reasons behind the delay in developing all the planned services although these tasks were part of the project infrastructures that were planned to be developed in this phase and before using those transactional services. Furthermore, it is worth noting that although the e-government steering committee contracted vendors to develop the planned transactional services, the backend development was part of each ministry’s responsibilities towards the e-government project. Vendors were required to develop the services from the front-end and then link those services to the backend-end through the e-government portal. Moreover, some key organisations were asked to participate in developing the e-government infrastructures. For example, the development of the PKI was assigned to the MOI which contacted another vendor to build the system. Another example is the payment gateway which was assigned to QNB. QNB also partnered the service with another international third party. A further important point is that although the e-government organisation started implementing the planned transactional e-services, other ministries and public organisations continued in developing their informational and

interactive web services. A final important observation is the absence of an electronic law (e-law) that protect the parties involved in the development of the e-government systems as well as the e-government users. The e-government director commented on this point by saying:

“We have also participated in the preparation processes of the e-law and completed it last year [i.e. 2004]. It has been sent for approval but till today we did not get any update”.

Discussion and lessons learned

The case study findings showed that there were parallel, uncoordinated and unplanned activities that related to providing online web services. In addition, while most of the ministries and public organisations continued improving their websites services individually, there were national activities that took place under the planning council supervision. Those national activities started with the planning implementation of the NNI project and ended with the implementation of the e-government pilot project, which provided for the first time, a transactional service at the national level. The implementation of the e-government pilot project was the starting point of thinking about a national e-government system. Thus, this phase can be regarded as a transforming phase although, there were some ministries and other public organisations that did not introduce any type of online services at that time.

By comparing these activities with those models found in the literature, it can be observed that these activities span the whole range of stages of the Howard (2001) model. In addition, while they span the first, second and third stages of the Moon (2002) and McDonach (2002) models, they span only the first and the second stages of the Layne and Lee (2001) and Deloitte Research (2000) models. However, this comparison considers only the technological criteria.

For example, although these activities can be mapped into the first and the second stage of the Lyne and Lee (2001) model, they did not cover all the activities mentioned in the second stage of that model. Lyne and Lee (2001) mentioned that the second stage of their model was not only conducting online transactions by citizens, but also participating through online forums that allow citizens to talk directly to government officials or take an active role in public hearings. This was not the case in the early activities described or the pilot project. Table 4 shows where these preliminarily phase activities as well as the pilot project can fit in the models found in the literature.

Table 4: Placement of the preliminarily phase activities and transforming phase activities in other models found in the literature

Stage No	Preliminary phase & transforming phase activities					
	<i>Howard, (2001)</i>	<i>Layne & Lee (2001)</i>	<i>West (2004)</i>	<i>Moon (2002)</i>	<i>McDonach (2002)</i>	<i>Deloitte Research (2000)</i>
<i>Stage 1</i>	✓	✓	✓	✓	✓	✓
<i>Stage 2</i>	✓	✓	✓	✓	✓	✓
<i>Stage 3</i>	✓			✓	✓	

There are four main lessons that can be learned from the above comparisons and discussions. First, classifying the e-government implementation stages based only on the web services characteristics and the type of the services introduced is a misleading classification. In other words, although all types of services (i.e. informational, interactive or transactional services) were provided in the early activities as well as in the pilot project, it cannot be said that the e-government in Qatar was in the second or third stage of its development lifecycle. This is simply because government officials were still testing the feasibility of having an e-government system at a national level.

Secondly, although government officials were able to implement a pilot project that provided transactional service, there were other ministries that still did not have any presence on the web. That means, should any government seek to implement an e-government system at a national level, it is not necessary for that government to shift gradually from informational services through interactive services to transactional services. Again this confirms that classifying e-government stages based on the type of the services provided is an inadequate measurement.

Thirdly, it was mentioned that 24 ministries and public agencies were assessed from the technological and the business perspectives. The focus of the assessment process was on transactional services only. Informational, interactive, and G2G services were excluded. Informational and interactive services were left to be developed by their respective ministries while G2G services were left to be developed in a separate project. From this process it can be seen that the e-government implementation in Qatar will pass through at least two stages, with the first stage being the implementation of the approved 22 service groups, and the second possibly being the one dealing with G2G services. In other words, it was clear that the development of e-government in Qatar is a long term plan. Comparing this long term plan (i.e. phased project based on a priority list of services) to what was found in those models mentioned in Table 3, it can be noted that none of those models succeeded in highlighting such government readiness activities, services priority system, and long term implementation plans. Finally, the case study showed how the selected e-services were planned to be implemented and showed how the e-government team had not succeed in delivering even half of those services within the

allocated period of time. This suggests the importance of determining development measurements other than those found in the literature. Suggested possible measurements are extracted from the case study findings and discussed below.

Determining e-government development measurements

Without having clear key development indicators, it is very difficult for e-government implementers to identify the different stages of their e-government system and the development requirements for each stage. At the same time, it is not an easy task to find exact development indicators that classify the development stages. By reading carefully through the different activities of the case study, there are some 'measurements' that can be deduced. These measurements are classified into three main categories, specifically milestones category, advanced technology features category and services category. The milestones category can be divided into four main milestones; these are:

1. ***Forming an e-government entity:*** since the e-government system will be implemented at a national level then there should be an organisation/authority that will be responsible for coordinating, developing and managing all the activities related to that e-government system nation-wide. This involves all the required resources such as having an adequate budget and sufficient human resources.
2. Providing transactional services requires a secure and a convenient payment gateway that enables e-government constituents to pay for those services. Hence, ***developing a secure payment gateway*** is a must as this will support e-government users to pay for their transactions online and protect them from any unanticipated risks. Al-Sebie *et al.* (2005), suggest allowing e-government customers to perform online financial transactions

such as payments of bills and fines to be one of their criteria for reaching e-government transactional stage. Transactional services require users to pay online and hence e-government users will not trust the e-government services and will not expose themselves to the risk of paying online unless they feel that there is a highly secure payment gateway.

3. ***Developing secure authentication system*** (e.g. Public Key Infrastructure) since e-government will deal with highly sensitive information which must be protected from ‘hackers’ and internet criminals. Again Al-Sebie *et al.* (2005, p. 457) consider “*providing a secure connection by enabling customers to complete their transaction with the required government organisation online, safely and with trust in the system*” to be one of their criteria for reaching e-government transactional stage. Indeed, the presence of a highly secure authentication system that protects the e-government users and e-government system from any unauthorised users or hackers is a key requirement for using online transactional services.

4. ***Developing an electronic law (e-law)*** that supports and protects e-government constituents legally. This include some necessary strategies for handling those sensitive issues such as data security and integrity, user authentication, privacy protection and legal liabilities which must be in place before automating any government services (Caffrey, 1998; Wimmer, 2002). The case study findings showed that there was a lack of e-law although e-government officials started implementing transactional services. However, it is dangerous to use whatever e-services are available online as e-government users will be exposed to a very high risk and there will be no e-law that

can protect them. This issue had seriously adversely affected the usage of the e-government services (this issue will be discussed below further). E-law must protect not only the e-government users, it must protect all e-government stakeholders legally.

Advanced technology features:

the second main category (i.e. advanced technology features) is divided into three elements, namely:

1. ***Single sign-on portal:*** This feature enables e-government users to sign-on only one time whenever they access the e-government portal to use some services. Thus, there is no need for the e-government users to sign-on for each service independently as long as s/he does not log-out.
2. ***Single point of access (i.e. one stop-shop government):*** Ultimately, all e-government services will be accessed through a single interface. “*One single point of contact for all services would be the ultimate goal*” (Basu, 2004, p. 113). From that interface users can access all the e-government services so there is no need for the e-government users to memorise an unlimited number of website addresses. Single point of access can be used to provide e-government users with services they require and provide the agency with efficient transaction functionality (Akman *et al.* 2005).
3. ***Number of access channels:*** one of the e-government objectives in Qatar was to “*Create multi-channel government access through the internet, IVR, WAP, Digital TV, Kiosks, etc.*” This objective means that e-government will reach an advanced level of technology and hence this element can be used as one of the main elements of the advanced technology category.

Service category:

the third category is the service category which is composed of three main elements. These elements are:

1. ***Number of developed transactional service of type of complex:*** The case study findings showed that the transactional services were classified into two types; simple and complex transactional services. The number of developed transactional services of a complex type is a good criterion that can be used as one of the development measurements. This measurement is proposed to force e-government implementers to develop realistic implementation plans and to consider other issues that might hinder those plans such as the organisational and technological issues.
2. ***The usage percentage of the developed transactional services:*** since government possibly spent millions in developing those e-services and since one of the key objectives of developing them is to reduce their operational costs in the long term run, then it is necessary for them to measure the usage percentage of those transactional services in comparison with the expected totality of transactions for the same services by using all other possible means (i.e. traditional means). Table 5 shows the expected usage percentage of 22 service groups for the first two years (i.e. according to the e-service detailed plan). As shown, e-government officials expected that 12 % of those services would be performed through the e-government portal by the end of the first year and 26% by the end of the second year. However, the percentages achieved were much lower than this. Table 6 gives some examples of the real usage of the implemented services through the e-government portal

comparing to those that can take place through the traditional means for the first two years.

Table 5: The expected usage percentage of 22 service groups for the 1st two years

	Total universe of transactions for 22 services	Total transactions through e-government portal	%
Year 1	706,291	85226	12%
Year 2	2,172,139	568576	26%

Table 6: Comparison between the usages of the implemented services through the e-government portal and the traditional means.

Service name	Usage Through traditional means	Real usage through e-government portal	%
Visit Visas	229085	7607	3
Driving license	12892	132	1
Traffic violations	34394	204	.5
Kahramaa bills	158505	3263	2

As shown in Table 6, it is unlikely that all the e-government users would shift overnight to the Internet or other electronic means to carry out their transactions. Therefore, it is suggested that only 10% (i.e. less than their assumption; 12%) should be the usage measurement percentage for the implemented services which have been available online for one year or more. The more e-government becomes mature, the more this percentage will increase (see Table 5). This is a very important measurement as it will draw the attention of the e-government implementers to the need to improve their current services and will enforce the execution of more marketing programmes before they proceed further in their development. In addition, this measurement will force e-government implementers to improve the quality of the

provided services. Furthermore, this measurement is necessary to avoid e-government implementers being technology driven. “*As a consequence of recent software and technology focus, many systems development approaches to e-government continue to be rather technology-driven*” (Traunmudller and Wimmer 2003, p. 6). There is no point in having many transactional services online and a very low usage of those services.

3. Informational and interactive services.

This is the third element of the services category.

Having identified the key implementation indicators (or development measurements), these measurements can be mapped to various stages of development. According to Al-Sebie *et al.* (2005) analysis of different models of stages of e-government, they confirm that it is evident that most studies have classified e-government into four stages. They said: “*It would appear that the four stages model for e-government is the nearest to reality*” (Al-Sebie *et al.* 2005, p. 453). In light of this assumption, the above measurements will be mapped to the suggested four stages. Table 7 shows how these key measurements might be mapped to the different stages of development.

Table 7: Mapping the development measurements to the suggested four stages of development of an e-government system at a national level

Measurements		Stage 1	Stage 2	Stage 3	Stage 4
Milestones	E-government entity	Formed and in place			
	E-law	In planning	In place		
	Secure payment gateway Secure authentication system	In planning	In place		
Technology	Single sign-on Single point of access (one stop-shop)	In planning	Developing	In place	
	Access channels	In planning	Developing	At least three access channels must be in place	
Services	Number of developed transactional services of type complex	Pilot	10% of total transactional services that need to be developed must be in place	50% of total transactional services that need to be developed must be in place	Continuous increase in the implemented transactional services of both types simple and complex
	% usage of all transactional services available on the e-government portal and which last at least one year	Pilot	10 %	50 %	Continuous increase in the usage of implemented transactional services
	Informational and interaction services	Developing at all the ministries' and public organizations' levels and can be accessed independently using different domain names (i.e. Different website addresses; i.e. different URLs)	Developing at all the ministries' and public organizations' levels and can be accessed independently using different domain names (i.e. Different website addresses; i.e. different or URLs)	Developing at all the ministries and public organization levels but can be accessed only through the e-government portal	Continuous increase in the implemented informational and interactive services

Summary

Managing any IT project requires breaking the project into certain stages and milestones and hence identifying other important issues such as risk factors, success factors, implementation plans, and resources required. Similarly implementing any e-government system at a national level requires its implementers to classify the implementation into different stages, identify the requirements of each stage, identify the milestones that need to be implemented in each stage, identify the main measurements that can be used to differentiate between the different stages, and identify the major challenges that might restrict its implementation. Based on a detailed case study analysis this paper suggests some key development measurements that can be used to differentiate between the different development stages. In addition, an example was given to show how these measurements can be mapped to the different development stages. It is hope that these measurements will contribute to the debate over the number of stages required to implement an e-government system, as well as providing a useful tool to those governments usually planning of e-government system at a national level.

References

Akman, I., Yazici, A., Mishra, A., and Arifoglu, A. (2005) E-Government: A global view and empirical evaluation of some attributes of citizens. *Government Information Quarterly*. 22, 239-257.

Al-Sebie, M., and Irani, Z. (2005) Technical and organizational challenges facing transactional e-government systems: an empirical study. *Electronic Government*. 29(3), 247-276.

Al-Sebie, M., Irani, Z. and Eldabi, T. (2005) Issues relating to the transaction stage of the e-government system. *Electronic Government*. 2(4), 446-459.

Basu, Subhajit (2004) E-Government and Developing Countries: An Overview. *International Review of Law Computers*. 18(1), 109-132.

Benbasat, I, Goldstein, D K and Mead, M (1987) The Case Research Strategy in Studies of Information Systems. *MIS Quarterly*. 11(3), 369-385.

Caffrey Larry (1998) *Information Technology & Globalization: Information Sharing Between & Within Governments*. The Commonwealth Secretariat, London, UK.

Deloitte Consulting and Deloitte & Touche , At the dawn of e-government: The citizen as customer, *Deloitte Research Report*, 2000, in (Silcock, R. (2001) What is e-Government? *Parliamentary Affairs*. 54, 88-101).

Eisenhardt, K M (1989) Building Theories from Case Study Research, *Academy of Management Review*. 4(4), 532-550.

Evans, Gloria (2003) *Implementing e-government: An Executive Report for Civil Servants and their Advisors*. Gower Publishing Limited, Hampshire, England.

Gupta, M. P. and Jana Debashish (2003) E-government evaluation: A framework and case study. *Government Information Quarterly*, 20, 365-387.

Hartley Jean F (1994) *Case Studies in Organisational Research*, In (Cassell, Catherine and Symon, Gillian (1994) *Qualitative Methods in Organisational Research: A Practical Guide*. London: Sage Publications).

Ho, A. (2002) Reinventing local governments and the 'e-government' initiative, *Public Administration Review*. July/August 2002, 62(4), 434-444.

Holden, Stephen H., Norris, Donald F. and Fletcher , Patricia D. (2003) Electronic Government at the Local Level: Progress to Date and Future Issues. *Public Performance and Management Review*, 26(4), 325-344.

Howard, M. (2001) E-government Across the Globe: How Will "e" Change Government. *Government Finance Review*, 17(4), 6-9.

Irani, Z, Ezingard, J N, Grieve, R J and Race, P (1999) A Case Study Strategy as Part of an Information Systems Research Methodology: a critique. *Int. J. of Computer Applications in Technology*. 12, Nos. 2/3/4/5, pp. 190-198.

Klein, H. K., and Myers, M. D. (1999) A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*. 23(1), 67-93.

Layne, K. and Lee, J. (2001) Developing fully functional E-government: A four stage model. *Government Information Quarterly*. 18, 122-136.

Marshall, Catherine and Rossman, Gretchen B (1999) *Design Qualitative Research (3rd Edition)*. London: Sage Publications.

McDonach, Maeve (2002) E-government in Australia: the Challenge to Privacy of Personal Information, *International Journal of Law and Information Technology*. 10(3), 327-343.

Miles, M. B. and Huberman, A. M. (1984) *Qualitative Data Analysis: A sourcebook of New Methods*. Newbury Park, CA: Sage.

Moon, M. J. (2002) The Evolution of E-government among Municipalities: Rhetoric or Reality? *Public Administration Review*, 62(4), 424-433.

Sharifi, Hossein and Zarei, Beharouz (2004) An adaptive approach from implementing e-government in I.R. Iran. *Journal of Government Information*.30, 600-619.

Silcock, R. (2001) What is e-Government? *Parliamentary Affairs*, 54, 88-101.

Traunmüller, R. and Wimmer, M.A. (2003) e-Government at a Decisive Moment: Sketching a Roadmap to Excellence. Springer-Verlag Berlin Heidelberg.1-14.

Walsham, G (1997) *Interpreting Information Systems in Organisations*. John Wiley and Sons, Chichester, UK.

West, Darrell M. (2004) E-Government and the Transformation of Service Delivery and Citizen Attitudes. *Public Administration Review*, 64(1): 15-27.

Wimmer, Maria A. (2002) A European perspective towards online one-stop government: the eGOV project. *Electronic Commerce Research and Applications*.1: 92-103.

Yin, R (1989) *Case study research: Design and methods. (Rev. ed.)*. London: Sage Publications.

Yin, R (1994) *Case study research: Design and methods (2nd ed.)*. London: Sage Publications.