E-Government Architecture In Jordan: A Comparative Analysis

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Abstract: This study explains architecture for the E-Government system; its main concepts, objectives, most common applications, famous worldwide experiences and the E-Government in Jordan. It introduces the E-Government model as a modern evolution of Information and Communication Technology (ICT) and how to convert the life of societies to the communication and networked age. It presents the experiences of countries like USA, UK, Singapore, UAE and Egypt. The study focuses on launching the E-Government project in Jordan, the main planning and implementation features noticed there and the main obstacles. It proposes a simplified model for some of the Jordan E-Government Portal Online services.

Key words: E-government, e-government architecture, Jordan, MoICT, ICT

INTRODUCTION

E-Government can be defined as a process of conducting business between the public and the government through the use of automated systems and the Internet network[1]. Its main objectives can be categorized according to the promising benefits each government provides to citizens, businesses and other governmental agencies. The main benefits E-Government provides for the its citizens are: possibility of providing feedback mechanism from the citizen (service customer) to the government (service provider), citizens' ability to receive customized and personalized services, possibility to shorten the delivery time by a great deal and ability to access individual or company information. For the businesses side, governments mainly focus on offering government e-commerce and e-procurement initiatives, opening communication between the public and private sectors and providing huge cost savings and lower transaction costs for most businesses. There are different kinds of objectives each government aims at achieving within its internal architecture. These benefits can be: new ways to integrate databases and networking websites, new tools to support horizontal services (like electronic payments, online auctions, customer relationship management and geographic information) and a new vision to realize important efficiency gains and work more effectively with each other.

E-Government initiative is one of the most important topics relates to E-Government planning and implementation. Determining the initiatives of E-Government is assumed to be the common starting point for planning. However, these initiatives vary widely from one government to another[2.] Globally approved, there are three main initiatives for E-governance:

* **Improving government processes:** E-Administration initiatives deal with improving the internal workings of the public sector. They include cutting process costs, managing process performance, making strategic connections in government and creating empowerment within the government architecture.
* **Connecting citizens:** E-Citizens and E-Services initiatives deal with the relationship between government and citizens, either as voters and stakeholders from whom the public sector derives its legitimacy, or as customers who consume public services. They also include a broader remit like talking to citizens, listening to citizens and improving public services.
* **Building interactions with and within civil society:** E-Society initiatives deal with the relationship between public agencies and other institutions such as public agencies, private sector service providers, non-profit and community organizations. It also deals with the relationship among civil society institutions. They also include a broader remit like working better with business, developing communities and building partnerships within the country[3].

The IBM E-Government Seven Milestones:
* The integration process to found a general vision for the whole system.
* The economic development to manage the related financial issues.
* E-democracy to formalize the government democratic architecture into electronic one.
* E-communities to move towards the fully digital societies.
* Intergovernmental processes to connect all the governmental agencies with each other into strongly connected governmental architecture.

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* Policy environment to make sure that all previous stages are safely tested with no security or privacy conflicts.
* The next generation Internet stage that will explore all the above stages on the World Wide Web (WWW) using the most recently updated technologies in this domain[4].

Achieving these milestones creates competitive advantage in both becoming E-Government and running it. The milestones are contributing to the cumulative attainment of each other. The United Nations Development Program UNDP has proposed four main stages in E-Government implementation listed below:

* Posting information, in which websites post general information and online forms that can be printed as a one-way communication system.
* Two-way communications, in which websites allow informational queries and forms to be completed online as two-way communication system.
* Exchange of values, in which websites allow an exchange of values to take place as government agencies interact directly with clients online, including recording and storing sensitive information.
* Integrated services and exchange, in which there is portal that integrates ranges of government services based on needs and functions, not on department or agencies[5].

We are moving on from Information Technology (IT) to Information and Communication Technology (ICT) and from Information Technology (IT) to Information System (IS)[3]. The penetration of ICT in all facets of human existence is leading to changes in the way humans interact within the society and the way societies involve individuals in the evolution process. The ICT can influence the process of governance in various ways and in varying degrees, from improving the current mechanisms of delivery of services to transforming the entire mechanism and the nature of services themselves. The role played could be purely technical in terms of automation of tedious tasks earlier done by humans, facilitating or supportive role leading to more participatory and all encompassing decision-making and implementation processes, or completely innovative role which involves new services and new mechanisms to deliver these services[6].

EXPERIENCED E-GOVERNMENTS

Several worldwide experiences in E-Government systems have been noticed during the last few years. Some of these experiences are mature and advance and some are still in the beginning stages. The USA, UK and Singapore E-Government efforts, in addition to two Arab promising works in UAE and Egypt are viewed in details below.

* There are several objectives or goals most E-Government implementations try to achieve but in different orders according to the country local conditions. The most important objectives are: improving the quality of E-Government services, increasing the transparency of government, improving the responsiveness of the government, creating a positive spin-off effect on the society and improving the efficiency in the government processes[7].
* Most of the main services of mature E-Government efforts are implemented in USA, UK and Singapore. These services are like Government to Citizens (G2C), Government to Business (G2B) and Government to Government (G2G).
* Most federal, state and local government agencies have had some sort of presence on the web for some time, such as providing information about the role of the agency, published reports, printable forms and data files. An E-Government service allows the public to initiate a request for a particular government service and then receive that government service through the website. The government service is delivered without the public going into a government office or having a direct in-person or telephone contact with a government employee. The E-Government in USA consists of both the ability for the public to interact sufficiently with government to receive a service and the government to sufficiently interact with the public to provide a service[1].

Common state e-government services
* Filing personal income tax return.
* Reserving a campsite in a state park.
* Applying for a state fishing or hunting license.
* Renewing a professional license.
* Submitting employment information.
* Registering a complaint against a business or professional licensee.
* Renewing a driver's license.

The UK online (ukonline.gov.uk) will provide an easy to use, trusted and personalized service allowing the citizen to deal with government on a one-to-one basis, whilst presenting government as an integrated organization. It aims to be the citizen's personal window on government and the preferred method for the public to engage with the public sector. The Government Portal delivers a major element of the government's Information Age agenda[8].

The UK online is a national initiative to get every individual, business and community online, involving three main strands of activity listed below:
* Providing easy access to government information and services, such as providing a single point of access to all government information and services available online. The site will be developed to provide a customizable front end for citizens to tailor what they see to their personal needs.

* Getting people online. Getting online is being made easy with a range of training and help available. The UK online centers will offer access and support in local communities, businesses and the high street to people who are new to the Internet and other technologies.
* Helping people succeed in online business to ensure that business is ready for the future of enterprise. The government is devoting considerable resources to support small and medium sized firms[9].

The Government Secure Intranet (GSI) launched in 1998 provides secure electronic mail and web browsing between all major central government organizations, improving the quality and timeliness of communications. Applications already established for the GSI include the Agenda, Electronic Parliamentary Questions and the Knowledge Network[9].

The Government Gateway is the centralized registration service for E-Government services in the UK. It is being developed. It will connect single points of access including the UK online Citizen Portal to back office of the IT infrastructures in Departments, so that transactional services can be delivered directly to citizens. It aims to produce significant benefits in terms of the ease and the efficiency of using online public services and will establish common standards of security. A key aim is to ensure that local government services are integrated into the portal and Gateway as these projects are taken forward[15]. Registering with the Government Gateway enables you to sign up for any of the UK Government's services that are available over the Internet. When you have completed the registration process, you will be able to use a single User ID or digital certificate to send and receive forms, such as tax returns. Such forms can be sent using appropriate Government websites, portals, or third party software packages[10].

The Singapore Government website is the official Internet gateway of the Singapore Government. It is the first-level portal within which all other Government portals and websites reside. It enables the public to locate Government information and services on the web through a top-level directory and search function. The Singapore E-Government vision[11] is "To be a leading E-Government to better serve the nation in the digital economy."

The UAE and Egypt are *accepted.* Currently, there is a lack to the minimum characteristics of the implementation of E-Government. For example, the Ministry of Finance and Industry (MFI) in UAE is responsible for fiscal, monetary and industrial policies and for their performances. The MFI has been given the task to implement reforms within the Federal Government. The UNDP has appointed a special group to undertake this task together with the staff form the Ministry. These improvements are in line with the efforts to implement ISO 9000 and improve the human resource capacity within the government. The MFI releases the Smart Card to be used for the fees of the government ministries services. A very promising E-Government experience in the United Arab Emirates and in the whole Arab World is Dubai Portal Online. The main vision of Dubai E-Government is to ease the lives of people and businesses interacting with the Government and contribute in establishing Dubai as a leading economic hub[13]. Through the Government Portal visitors, they can complete all services offered by departments within the Emirate of Dubai by two methods:

* **Online services**: Services that are available online have been listed and can be accessed from the search box on the government portal, or by visiting the service page of the relevant department if the department is known. If the department offering this service is unknown, the service can be accessed through Services for Residents, Services for Visitors and Services for Businesses.
* **Offline services**: To offer visitors services that are currently unavailable offline. A comprehensive list of services and the required documents needed to complete these services have been compiled and made available to the public.

Visitors can access the necessary forms from within the portal, complete them and send them to the relevant departments. Some acts are to be considered for the Dubai case: [5] First, the use of Internet by Dubai Ports and Customers Authority allows thousands of freight transport companies to reduce time and cost with 24 hour access to customs clearance services. Second, the overhaul of government services offered to business and individuals in Dubai is estimated to reduce administrative costs by at least 10%.

The cabinet Information and Decision Support Center (IDSC) is leading Egypt's campaign to establish an electronic government and it already has a comprehensive E-Government plan in the works. In Egypt, there is a website supplying a commodity as precious as water: Accurate information. Anyone attempting to negotiate Egypt's bureaucracy will appreciate a resource explaining how to get services, where to go and what to bring along. To access this information, however, you need to be able to read Arabic or enlist the aid of someone who does.

E-GOVERNMENT IN JORDAN

The long-term vision for E-Government is to create a society where electronic government is a contributor to the electronic and social development of Jordan. The E-Government will empower and benefit all the in society through access to government information, public-private partnerships and improved public services, communications and transactions with the government[8]. It represents an opportunity to make a

major contribution to economic development through assisting Jordanian business in reducing their operating costs by providing immediate access to government information and procurement[10]. Jordan can achieve the vision of providing government services to all by enhancing infrastructure, developing skills, modernizing laws and working in partnership with the private sector[8].

Jordan varies in its preparedness to undertake E-Government services to businesses, citizens and within government institutions themselves. The following sections summarize Jordan's readiness in the areas of infrastructure, back-office and management, registration and community education[14].

E-readiness and preparedness for e-government in Jordan
Infrastructure
* FLAG network brings worldwide high-bandwidth connection to Jordan
* Four major government networks exist
* Lack of local "feeder" networks
* High cost of telecommunications and internet access
* Poor internal government interface and lack of intranet
* Few municipalities outside Amman are computerized
* Jordan Telecommunication Corporation JTC will provide nationwide infrastructure by mid 2001

Back office management
* Lack of client-centered philosophy in many government's offices
* No common data standards
* Limited IT expertise in government institutions
* Not all data kept in electronic format
* Policy and Legal:
* Electronic information sharing allowed, but not actively encouraged under law
* Legal barriers to recognition of electronic documents and signature.
* No legislation allowing for electronic payment
* Legal obstacles in intra-ministry submission documents
* Community and Education:
* Low internet penetration in Jordanian homes
* Growing network of internet cafes
* No government-established online access points
* Lack of trust in electronic payment
* Plans to teach computer skills in schools

Major building blocks for e-government in Jordan
* Identifying e-services applications: This will identify and plan the government services to electronically offer to citizens and businesses. The sequence of rolling out these services will depend on the readiness of the particular ministries and institutions and the importance of the particular service to citizens and businesses. Within the e-services programs, eight specific services have been chosen as "Fast-Track Projects"[15].
* Developing technology infrastructure: Without sufficient technical preparation and planning, Jordan's E-Government initiatives will risk duplication of effort and installing physical systems that do not connect efficiently and securely. The Infrastructure Program will consist of three major components; Access Media for E-Government Services, Delivery Networks and Technical Policies and Standards.
* Developing legal and regulatory framework: This discusses legal and regulatory measures that Jordan must take before successfully implementing its E-Government program.
* Reforming education and develop skills: Major national education and training initiatives are required both to provide the resources for E-government development and to provide Jordan's IT sector with the skills necessary to become a leading contributor to economic growth and job creation.
* Designing management and organizational framework: The proposal outlined must embodies the concept of an effective public-private partnership, but has the strong central links to effect change within the government.

Challenges facing the e-government initiative in Jordan
* Low level of Internet penetration: The low level of Internet penetration in Jordan, 0.7 percent of population in terms of account subscribers and 1.9 percent in terms of users, is a significant barrier to the introduction of E-G, citizen-oriented services. The relatively high cost of Internet access and telecommunications services exacerbates this problem.
* Infrastructure constraints: There are significant ICT barriers in Jordan today. They include high cost of telecommunications services and lack of an adequate civilian telecommunications "backbone" network nationwide.
* Digital Divide: a digital exists in terms of geography (most users are clustered in Amman, Irbid and Zarqa), age (users tend to be young), skills (significant portions of the population lack computer skills), gender and income. In the business sector, the inequalities in terms of ICT are even more pronounced; most small and medium-size businesses that account for the vast majority of Jordanian enterprises lack computer skills and ICT.
* Privacy versus security concerns: There are legitimate concerns about the citizens' rights to privacy versus the state's national security concerns. On the one hand, there are concerns that

the government can know too much about people and could use that information inappropriately. On the other hand, there are government concerns the unfettered access to information could undermine national security and therefore social stability.

* Limited Information Technology IT skills: There is a fundamental lack of computer literacy in Jordan that would limit the participation of citizens, businesses and government institutions in E-G.
* Limited public sector reform efforts: The E-Government is not a substitute for public sector reform. The limited state of public sector reform efforts in Jordan mean that E-Government initiatives need to be tightly focused on specific service areas.
* Lack of an enabling legal framework: The legal and regulatory framework to enable a full range of E-Government services does not currently exist in Jordan. E-commerce is deterred by the lack of adequate legislation and implementation capacity.
* Lack of awareness: The general population and the government and business sectors currently have very limited idea about what E-Government is and how to benefit from it.

Fast track projects in Jordan
Business regulation (G2B)
* Reduction in cost associated with registration and submission of forms.
* Reduction in error and redundant data entry at the point of submission of registration.
* Consistency among company data sets maintained at different organizations.

Taxation and social security (G2B)
* Reduction in cost associated with registration and submission of returns for business and government.
* Consistent, accurate and up-to-date information for businesses on legislative requirements.
* Access to an up-to-date, accurate statement of a taxpayer's financial standing.

Selling to government (G2B)
* Reduced time spent searching for forthcoming government procurements.
* Automatic notification of forthcoming procurements.
* Reduced costs in production of paper documents.
* Clear understanding of the procurement process.

Telecommunications licensing and regulation (G2B)
* Reduction in cost associated with registration and submission of forms for telecommunications operator licenses.
* Reduction in error and redundant data entry at the point of submission of registration.
* More accurate processes for notification on spectrum auctions, new licenses and/or regulatory changes.

Motoring services (G2C)
* Accurate and up-to-date information related to motoring services.
* Ability to communicate directly and promptly with all stakeholders.
* Reduction in cost and staff time associated with processing transactions.
* More efficient collection of revenues for the municipalities.
* Real Estate Services (G2C):
* Ability to get accurate and up-to-date information on real estate services.
* Ability to communicate directly and promptly with all stakeholders.
* Ability of commercial banks to get accurate information regarding ownership of land and mortgages.
* Reduction in cost and staff time associated with processing transactions.

Government personnel directory (G2G)
* Greater transparency and openness of government.
* Speedier communication with public and within government.
* Improvement in internal communications leading in reduction in delays.
* Reduction in costs of creating, storing and retrieving documents within government.
* E-Government Policy and Practice (G2G).

One way to limit the problem with the connected network is to use wireless E-Government in Jordan. Indeed, at least 30% of government workforce has always been mobile. Some examples are police officers, fire fighters, parole officers, traffic enforcement, health inspectors, building inspectors, transportation inspectors, fire inspectors, internal mail carriers, social services case workers and transportation officials.

As previously presented, most of the official efforts within Jordan E-Government system era didn't go beyond the elementary design stages and a portion of the implementation stages. The Jordanian government and its E-Government National Task Force (NTF) have presented a primary study; demonstrating the local preparedness and the fundamental building blocks needed to achieve the system targets. In addition, more detailed studies have been proposed in this area; presenting a fundamental blueprint which can be considered as a road map for the Jordanian E-Government path. However, it has been noticed that our government official work still in the phrase of proposals generalization. As most of the governmental efforts are spent in the area of elementary designs and visions, most of the projects are being proposed and received locally as commercial bids.

Jordan NIC seventeen major e-government domains: The National Information Center (NIC) lists these seventeen domains as the major domains of the E-Government initiative in Jordan:

* Communication
* Economics
* Education and Training
* Health
* Industry
* Labor
* Natural Resources and Environment
* Population and Human Settlements
* Tourism and Antiquities
* Transportation
* Geography
* Agriculture
* Law and Legislation
* Research, Science and Technology
* Society and Social Conditions
* Political Affairs Culture

These categories will be used as the basis for the E-Services that the government will provide for the citizens.

Considerable efforts have been made to collect the main transactions or services provided by each governmental category. This process includes a sequence of re-engineering processes within governmental agencies, depending on each agency's managerial and financial hierarchies and connectivity.

The proposed architecture for Jordan e-government portal: The proposed architecture contains the following services and sub-services. The hierarchy of services have been determined after a complete scan for all Jordan governmental sites on the web aided by a general knowledge of the governmental hierarchy in Jordan. The hierarchy was as the following:

* Communication Services: Mail & Postal parcel services {Internal outgoing postal parcels service, Internal ongoing postal parcels service, External outgoing postal parcel service, External ongoing postal parcel service}, Postal Money order & Postal Saving Bank services {Get a new postal saving bank, Get citizens salaries, Withdraw governmental postal money order}, Express Mail Services, Facsimile and Official Mail Services, Subsidies the following on behalf of the government and non-governmental bodies {Telephone, Telegram, Water and Electricity bills , Telephone and fax services , Construct a new telephone ,Transfer a telephone, Subscribe in automatic call service, Telephone repairmen's , Additional telephone options}.
* Economic Services: Trade Mark Registration Trade Name Registration, Patent Registration, Get permission for importing row materials, Export Registration, Importer Registration, Taxation Remission, New Settlement Certification, Get Taxation's report, Change importer/exporter profiles, Get Official Report for settlement, Renewal Importer registration, Renewal exporter registration, Complains.

* Education and Training Services: Get education certification, Scholar transformation, Private studying registration, Attend kindergarten, Attend primary school, Attend secondary school, Scholarship applications, Royal Gantt applications.
* Health Services: Birth date certification, Death certification, New medical construction permissions {Private clinic, Pharmacy, Dental clinic, Medical center} Immunization {Children, Adults}.
* Industry Services: Industrial register entry, Permission to construct new project, Permission to change the project pivot.
* Labor Services: Graduation application, Get skillfulness certification, Get retarded certification.
* Natural Resources and Environment: Evaluate environmental effects of the constructions, Environmental library, Procedures of finance from environmental protection box.
* Population and Human Settlements Services: Book a housing/professional unit, Book an industrial project land, Book a land for population/services projects.
* Tourism and Antiquities Services: Get form to construct tourist constructions, Get a tourist guide license, Renewal the license of the tourist guide.
* Transportation Services: Port of Aqaba (Marine Transportation), Post and Communication Company, Air Transportation (Royal Jordanian Airlines), Jordan Travel Directory, Transportation Organizations and Jordan Traffic System.

The actual process of any service above is considered to be of two or three tiers. The first tier connects the specific system with the authorized centers databases that are responsible for that particular section. The middle tier represents the buinsess logic layer. The last tier is the credit cards databases that are responsible for the e-payment section such as the e-Payment Gateway.

Most of these layers have not been fully implemented due to the lack of technology infrastructure support at this time. So the paper proposes enterprise authorized centers, which are distributed geographically over the kingdom, with certified assignments in the particular needed inspection domain. Any transaction on these centers database will be released over the Internet concurrently.

Similar solution has been presented for the last tier, assuming an enterprise financial network that will serve the whole kingdom. This network will introduce considerable economical services as credit cards service, e-paying, e-banking and greater e-commerce facets.

Upon completing above process, the use will receive an acknowledgment note in wireless format through short massage services (SMS) for each user mobile account in addition to another acknowledgement for each user email account.

So far, such an acknowledgment needs enhanced mobile connections. So, the paper proposes a separate enterprise network that combines all mobile communication companies together to achieve a formalized mobile service. Also a better security assurance logout process must be completed.

Finally, The above was just a suggested procedural perspective for our vision of the Jordanian portal On Line. Taking into consideration that this architecture has several applications under construction due to the current lack of a complete perspectives in the governmental management procedures, so that the reengineering process is a must to go through the actual future implementation and for the specific design features such as welcome notes, peripheral links, advertisement banners, copyrights and notes and bilingual option must all be well studied and unified for the government websites.

CONCLUSION

An E-Government system has been presented along with its main concepts, objectives, most common applications, main worldwide experiences and its case in Jordan. The E-Government in Jordan has been introduced as a modern evolution of ICT and how to convert the life of societies to the communication and networked age. The E-Government systems in the USA, UK, Singapore, UAE and Egypt have also been presented. Then, the study focused on the E-Government project in Jordan, the main planning and implementation features noticed there and the main obstacles facing it. Finally, it proposeed a general simplified view model for Jordan E-Government Portal Online.

Here are some suggestions for how to speed up the process of E-Government in Jordan:
* Ensuring access by expanding of the existing programs that provide the public access to PCs and Internet through schools, libraries and community-based organizations. The digital divide can be bridged by supporting competition, facilitating infrastructure, investing E-Government and testing successful pilot projects.
* Protecting information privacy. The legislature needs to ensure confidential information, sharing information and changing information by who provides it.
* The use of digital signature and PIN for authenticating services recipients will have to be explored.
* Modification of the existing systems to work with the E-Government.
* Setting specified deadlines for the projects and not leave many projects open ended so that we can reach the goal in a shorter time.
* Use the successful experiences of the countries that are close to us in size and resources.

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