



ELSEVIER

Government Information Quarterly 18 (2001) 122–136

**Government
Information
Quarterly**

Developing fully functional E-government: A four stage model

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Abstract

Literature reports the experiences with e-government initiatives as chaotic and unmanageable, despite recent numerous initiatives at different levels of government and academic and practitioners' conferences on e-government. E-government presents a number of challenges for public administrators. To help public administrators think about e-government and their organizations, this article describes different stages of e-government development and proposes a 'stages of growth' model for fully functional e-government. Various government websites and related e-government initiatives help to ground and explain this model. These stages outline the multi-perspective transformation within government structures and functions as they make transitions to e-government through each stage. Technological and organizational challenges for each stage accompany these descriptions. At the same time, this paper describes how the e-government becomes amalgamated with traditional public administrative structure. © 2001 Elsevier Science Inc. All rights reserved.

1. Introduction

Governments are going-on line and using the Internet to provide public services to its citizens. David McClure, an Associate Director of the U.S. General Accounting Office, testified about his views on e-government before the U.S. Congress (McClure, 2000):

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Electronic government refers to government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities. It has the potential to help build better relationships between government and the public by making interaction with citizens smoother, easier, and more efficient. Indeed, government agencies report using electronic commerce to improve core business operations and deliver information and services faster, cheaper, and to wider groups of customers.

With many buzzwords such as electronic presence, e-auction, and accompanying stories of success, failure, and new business models from their counterparts in the commercial world and federal counterparts, it is very difficult not to participate in the e-government movement. DataQuest/GartnerGroup forecasts that the U.S. government will spend about \$1.5 billion in 2000 on Internet solutions and this number will reach \$6.2 billion by 2005 (Prince, 2000). This number makes the public sector the second largest vertical market in total spending on the Internet, after financial institutions. (Momentum Research Group of Cunningham Communication, 2000).

However, literature reports the experiences with e-government initiatives as unmanageable and the development of on-line transactional services in its infant stage despite recent federal initiatives on e-government and many conferences on e-commerce (U.S. General Services Administration, 1999; Stowers, 2000; West, 2000). E-government initiatives present a number of challenges (McClure, 2000). While there are many emerging programs and initiatives on e-government throughout the world in all levels of government, it is our contention that it will require implementation over another decade, as infrastructures must be built, policy issues resolved, and interoperability established.

To help public administrators of traditional administrative organizations think about e-government and their organizations, this article describes different stages of e-government development. The stages of development outline the structural transformations of governments as they progress toward electronically-enabled government and how the Internet-based government models become amalgamated with traditional public administration, implying fundamental changes in the form of government. This four-stage growth model is developed primarily based on authors' observations of and experience with e-government initiatives in the United States of America. However, the underlying theory of this growth model shall be applicable to other governments as well.

2. Developmental stages of e-government

Based on technical, organizational and managerial feasibilities and corresponding examples, this article suggests that e-government is an evolutionary phenomenon and therefore e-government initiatives should be accordingly derived and implemented. In this regard, this paper posits four stages of a growth model for e-government: (1) cataloguing, (2) transaction, (3) vertical integration, and (4) horizontal integration. These four stages are explained in terms of complexity involved and different levels of integration as shown in Fig. 1. The overview section below explains briefly these four stages. Detailed explanations and examples of each stage follow the explanation of the model stages.

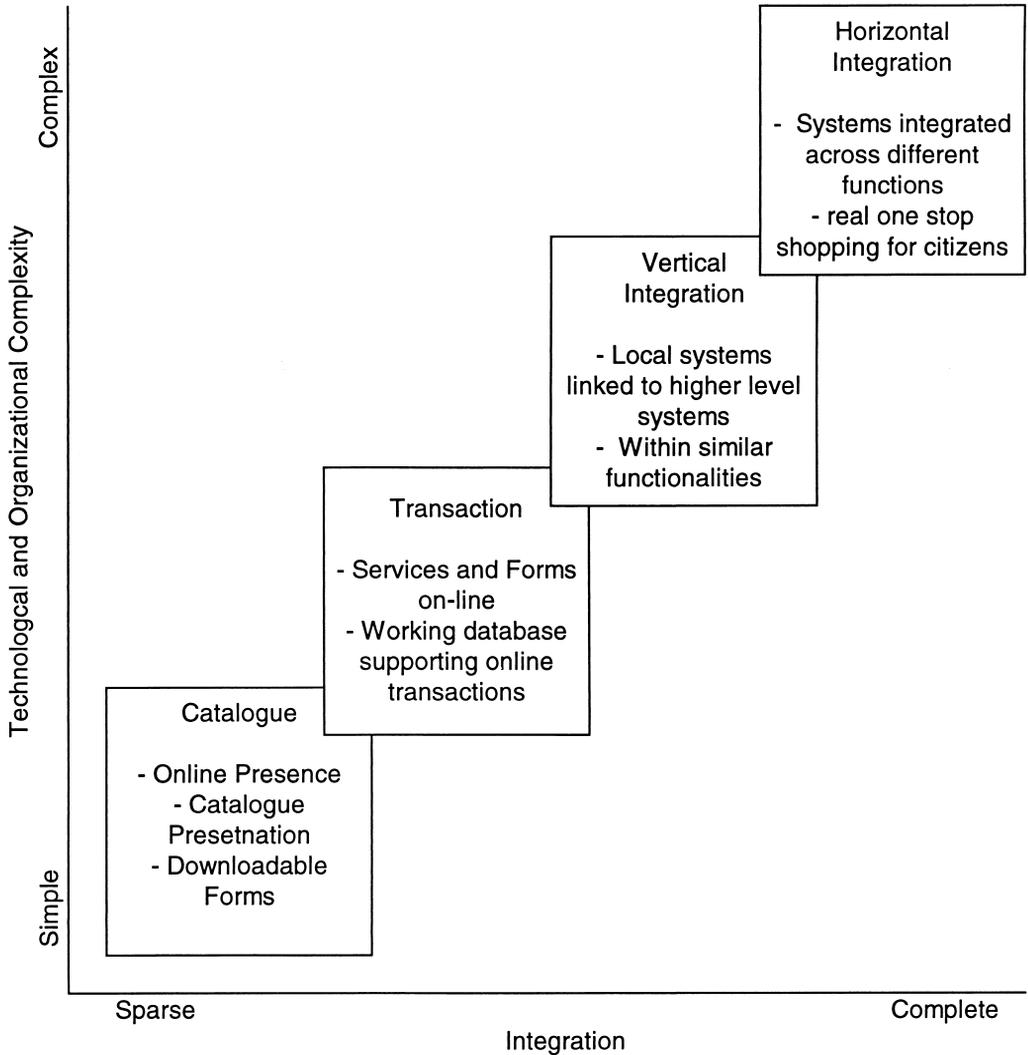


Fig. 1. Dimensions and stages of e-government development.

The discussions and examples in the paper are based on a United States model with its multi-layering of governments among federal, state and local agencies. The discussion initiates from state government because it is the one in the middle of this structure, but the model is also applicable to the federal and local level.

2.1. Overview

In stage one of cataloguing, initial efforts of state governments are focused on establishing an on-line presence for the government. Many state governments’ efforts on web development and forms-on-line initiatives belong to this stage. Examples of functionalities at this

stage are mostly limited to on-line presentations of government information. Sometimes, this information is very limited, according to one recent study of government websites (West, 2000, p. 6). Toward the end of this stage, mostly pushed by citizens' demands, governments begin to establish index pages or a localized portal site in which scattered electronic documents are organized so that citizens can search for and view detailed government related information and download necessary forms. This first stage is called 'cataloguing,' because efforts are focused on cataloguing government information and presenting it on the web.

In the second stage, e-government initiatives will focus on connecting the internal government system to on-line interfaces and allowing citizens to transact with government electronically. This stage can be called 'transaction-based' e-government, and at this stage, e-government efforts consists of putting live database links to on-line interfaces, so that, for example, citizens may renew their licenses and pay fines on-line. As the quantity of these e-transactions increase, governments will be pressed to integrate the states' systems with these web interfaces, or in some cases, build on-line interfaces directly connected to their functional intranet. In ideal cases, web transactions should be posted directly to the internally functioning government systems with minimal interaction with government staff.

However, citizens' demands and changes in society will push governments to go further as the critical benefits of implementing e-government are actually derived from the integration of underlying processes not only across different levels of government but also different functions of government. By having similar agencies across different levels of governments and by having different agencies with different functionality talk to each other, citizens will see the government as an integrated information base. Ultimately a citizen can contact one point of government and complete any level of governmental transaction—a "one-stop shopping" concept. Also, from the viewpoint of all levels of government, this could eliminate redundancies and inconsistencies in their information bases for citizens.

This integration may happen in two ways: vertical and horizontal. Vertical integration refers to local, state and federal governments connected for different functions or services of government. As an example of vertical integration, a drivers' license registration system at a state DMV might be linked to a national database of licensed truckers for cross checking. Another example would be the business licensing process. In an ideal situation where systems are vertically integrated, once a citizen filed for a business license at the city government, this information would be propagated to the state's business licensing system and to the federal government to obtain an employer identification number (FEIN). In contrast, horizontal integration is defined as integration across different functions and services. An example would be a business being able to pay its unemployment insurance to one state agency and its state business taxes to another state agency at the same time because systems in both agencies talk to each other or work from the same database.

In defining the stages of e-government development, the vertical integration across different levels within similar functionality is posited to precede the horizontal integration across different functions. Since the discrepancy between different services of government is larger than the discrepancy between levels of government, vertical integration will be attained first before horizontal integration. Movements toward vertically integrated government systems within similar functionality are already visible, such as the national crime databases which take information from local crime databases and forward that information

to the states which in turn compile the data from all localities and forwards those statistics to a federal database. Also, the Family Support Act of 1988 (P.L. 100-485), actually mandated a state child support automated database. This last stage of e-government—vertically and horizontally integrated—represents an ideal situation for citizens, in which citizens have on-line access to ubiquitous government services with levels of government and the functional walls inside government transparent to them.

The next section explains each of these stages in detail. Each stage is described in four different but related aspects: (1) definition of the stage, (2) types of functionality involved, and (3) technological and organizational challenges. After the detailed description of this model, three key issues are presented followed by a conclusion.

2.2. Stage I: cataloguing

2.2.1. Definition

In stage one, governments create a ‘state website’ mostly due to a great deal of pressure from the media, technology-literate employees, demanding citizens, and other stakeholders to get on the “net.” At this stage, governments do not have much Internet expertise, and they prefer to minimize the risk by doing a small project. Parts of the government’s non-transactional information are put on the site. There are several reasons why any government would want to move to this ‘electronic cataloguing’ stage, but mostly, many citizens and businesses have access to the web. As they are able to access information on services from the private sector from the web, they expect the same access from the government.

Accordingly, more and more citizens will look for government information on the web instead of flipping through the yellow pages and going through touch-tone voice processing systems, and they will be disappointed if they cannot find information about their government. From the government side, the web presence is also beneficial because, as much government staff time is consumed in answering basic questions about government services and procedures, the web presence will increase citizens’ convenience and reduce the workload on frontline employees. With the web presence of the government, citizens use this information to learn the specifics of policies and procedures, find out where to go for government services and post-service support. Citizens would still use existing service processes such as a phone call, in-person standing in line, etc, but to a lesser extent. The idea of government services being available to all people, or universal access, requires that some off-line capabilities continue for that percentage of citizens not on-line.

2.2.2. Types of functionality

In terms of the “citizen as customer,” this stage offers the least amount of functionality for the user. As this stage progresses, the quantity of posted information increases, and governments will begin to see the need for an index site that provides links to other sites. Usually at first the index site is organized on the basis of functions or departments as opposed to service access points. Consequently, if the citizen is unsure of which department he or she is searching, a search for the necessary agency will be required before being able to obtain the information about the process. The typical government department home pages at this stage have a description of the department, usually a photo if the head is an elected official,

and some links to other pages. It establishes a departmental “presence” as opposed to providing service access points to the customer.

The next step in this natural progression is to re-organize information by services, by different actions or by different events. An example at the federal level is the Firstgov.gov site (<http://www.firstgov.gov>) and at a state level, an example would be the forms clearing house implemented as a portal project by the State of Nevada (<http://silversource.state.nv.us>). This clearinghouse provides a central site that presents a comprehensive list of forms to be downloaded by the user, organized by services. No transactions take place electronically, but the form can be filled out before arriving at the state facility (Nevada State Governor’s Office, 2000).

2.2.3. Challenges

Though the technology at this stage is relatively simple, there are several challenges on managing these sites. Different departments require different amounts of on-line presence and demand resources allocated to them. Resource allocation in a political organization is always a problematic issue. Another important issue is the maintenance of the information. Along with procedural and policy changes, web pages need to be maintained and some data presented on government websites may be temporal. Date and time stamping may be essential at this stage, along with issues of consistency in format and user-interface from one agency to the next.

Privacy will also surface as an issue at this stage, as it is possible for the government to track on-line activities like frequently accessed products, the length of time spent on each page, and the length of time spent searching. While this tracking information can be used toward improving the website and its offerings, the temptation to sell this information to external parties may also exist. Thus, several policy issues must be decided by the agency in establishing the site.¹

Based on the reduced scope of the web site under this stage, organizational challenges are limited. The first challenge is assigning responsibility for the overall coordination and planning of services on the state web site as well as having each agency assign responsibility for the maintenance of a web site. One central agency may assume responsibility for the coordination and planning efforts, such as a department of information technology, or an ad hoc group may be convened for this purpose. In Nevada, the Governor’s Executive Order decreeing a website presence also created the Silver Source Steering Committee which was assigned the task of developing a plan for “utilizing electronic technology to improve the delivery of governmental services and to expand the opportunity for economic development” (Nevada State Governor’s Office, 2000). The Governor’s Chief of Staff chairs the committee, and the state department of Information Technology was to coordinate the “E Government program and establish the electronic infrastructure, and develop policies and procedures related to E-Government initiatives” (Nevada State Governor’s Office, 2000).

Individual agency assignment of website development and maintenance is more problematic. Outsourcing to a private vendor or state information technology agency is one solution. Outsourcing at this level may present problems in terms of the allocation of maintenance responsibility once the site is developed. In many cases, at this stage, an internal champion emerges among internal employees who have non-technical job classifications. Many de-

partment directors in the state of Nevada indicated that an internal person was assigned the maintenance responsibility for the site. Often these people's jobs are related to information technology, e.g., the staff person working for the Commission on Educational Technology handles the Department of Education website.² Over a period of time, this part-time responsibility may create problems of an inappropriate use of resources as the person may come to spend more and more time on site development and maintenance. Having an internal person whose skill at developing web sites is secondary to other skills may limit the ability of the site to meet customer needs.

The second problem is assigning responsibility for the answering of e-mails. Web sites often include an email address for questions from site users. Often these questions may be wide ranging and beyond the ability of the web master. Some procedure must be established to address how these emails will be handled and how quickly. The Nevada Attorney General noted that this was a problem until a procedure was established for promptly routing the inquiry.²

2.3. *Stage II: transaction*

2.3.1. *Definition*

As government websites evolve, officials as well as citizens come to realize the value of the Internet as another service channel for citizens and want to exploit it. Citizens demand to fulfill government requirements on-line instead of having to go to a specific location to complete paperwork. Electronic transactions offer a better hope for improved efficiency for both the customer and the agency than simply "cataloguing information." In addition, such capabilities provide the opportunity for a broader democratic process by holding interactive conversations with constituents who are reluctant or unable to attend public hearings.

There is no question that fully functional e-government will make service delivery more efficient and increase savings for both government and the citizen. This second stage is the beginning of the e-government as a revolutionary entity changing the way people interact with their government. This stage empowers citizens to deal with their governments on-line anytime, saving hours of paperwork, the inconvenience of traveling to a government office and time spent waiting in line. Registering vehicles or filing state taxes on-line are only the beginning of such transaction-based services (U. S. General Services Administration, 1999, p. 8).

2.3.2. *Types of functionality*

At this stage, citizens can be served on-line by 'e-government.' While the cataloguing stage helps citizens' fact-finding process, this transaction stage e-government presents government on the other side of the Internet as an active respondent. It is now a two-way communication. Citizens transact with government on-line by filling out forms and government responds by providing confirmations, receipts, etc. More importantly, citizens move from a passive to active role by not only conducting transactions on-line, but also participating through on-line forums that allow citizens to talk directly to government officials or take an active role in public hearings (U. S. General Services Administration, 1999, p. 8).

The First Annual Report of the United States Working Group on Electronic Commerce

stated “that fewer than 10 million people were using the Internet in 1995, and that more than 140 million people world wide were using the Internet in 1998” (U.S. Department of Commerce, 1999, p. 1). This report also projects that more than one billion people worldwide will be using the Internet in the first decade of this century.

With this increasing number of citizens connected by the Internet, governments at all levels have no other choice but to think of e-government both externally and internally as a service channel. Internally, this trend consists of offering personnel services, benefits administration, payroll and timekeeping functions, supply ordering, travel services, conference arrangements and on-line training. This reduces response times for the agency and is clearly a response to a “citizen-customer” demand. Consequently, instead of simply having the availability of downloading a form, but then having to take that form to a state facility, the form can be completed interactively on-line.

More importantly, the citizen-customer enters through a portal that looks at the service needs of the customer as opposed to requiring the citizens to traverse numerous sites to find the information needed. This one stop on-line help center will be available through a portal, similar to that developed by the federal government through its FirstGov.gov (<http://www.firstgov.gov>).

2.3.3. Challenges

The issue of transaction fulfillment is most critical at this stage. Government must answer a lot of questions. Should fulfillment be outsourced? How will the responsiveness and quality of the on-line system compare to the off-line system? The issue of integration comes onto the scene. Governments must answer questions like “should the web interface be integrated with existing functional systems?” If not, what kind of legacy system information is necessary to support the on-line activities? When and how are on-line and offline systems going to be integrated? How expensive will the integration be? How long will it take? As much of the information collected by governments may be politically sensitive, installation of appropriate security mechanisms may be an important technical consideration. At the same time, many other policy issues need to be resolved, such as authentication and confidentiality.

Organizational challenges are much greater in this stage. Existing electronic databases must be reprogrammed to handle such changes requiring internal committees to assess user demands and user interfaces in current systems. Issues of confidentiality and security must be addressed by the organization as a whole. This requires study of existing legislation to determine how public or private the database is for the agency. Although many public applications were no doubt upgraded during the Y2k crisis, many legacy systems still remain. It may not be possible to provide an interface for the citizen-customer without considerable investments.

2.4. Stage III: vertical integration

2.4.1. Definition

At this stage, the focus is now moving toward transformation of government services, rather than automating and digitizing existing processes. Making government electronic is not simply a matter of putting existing government services on the Internet. What should and

will be happening are permanent changes in the government processes themselves and possibly the concept of government itself. Just as electronic commerce is redefining private business and society in terms of processes and product, electronic government initiatives should be accompanied by re-conceptualization of the government service itself. In the long run, the full benefit of e-government will be realized only when organizational changes accompany technological changes.

After on-line transaction services become prevalent and mature, citizens' expectations will increase. Most transaction stage systems are localized and fragmented. A natural progression will be the integration of scattered systems at different levels (vertical) and different functions (horizontal) of government services. Agencies often maintain separate databases that are not connected to other governmental agencies at the same level or with similar agencies at the local or federal level. For example, a state business license database is often separate from a local business license database. Further, that state license system is probably not connected to the state vendor database.

It is expected that vertical integration within the similar functional walls but across different levels of government will happen first, because the gap between levels of government is much less than the difference between different functions. Many state agencies interact more closely with their federal and local counterparts than other agencies in the same level of government.

Consequently, at stage three federal, state and local counterpart systems are expected to connect or, at least, communicate to each other. While some jurisdictions' websites currently provide links to other governmental agencies at different levels, vertical integration goes beyond this simple interconnection. If a citizen conducts a transaction with a state agency, the transaction information will be propagated to local and federal counterparts. These various levels of systems are connected and talk to each other so that results of transactions from one system can be interchanged with another system (U. S. General Services Administration, 1999, p. 8). Physically, this may be integrated as a central database or a connected web of databases communicating with each other.

2.4.2. Types of functionality

According to a survey by the Momentum Research Group, citizens prefer to access information through their local portal because they are most familiar with the services offered by the local government (Momentum Research Group of Cunningham Communication, 2000, p. 3). Not all community services are, however, offered directly by the locality. The citizen-user still should be able to access the service at the state or federal level from the same entry in the local portal, because the local systems are connected to upper level systems, directly or indirectly.

One application of vertical integration could be the business license application process. In many states, a business must obtain both a local and a state business license. Under the scenario of stage three, a citizen would file for a business license at the local government transaction server, and the local server by accessing the state database would check state and federal databases, retrieve corresponding records, propagate changes, and calculate the total license fee. The reverse could also occur. The state could check local licensees to make sure locally licensed companies also had a state license. One example of this "vertical" integration

can be found on the Washington State website, in which a federal employer identification number (FEIN) can be requested through the same process as a state business license (<http://www.wa.gov/dol/bpd/startbus.htm#Aret>). Since citizens often do not know where to start looking for a particular service, vertical integration would resolve much of that search.

Perhaps at this stage, more important than citizen-customer interactions are what might be considered “business to business” transactions or “government to government.” In this respect, many national level databases will emerge. These databases may not be located physically at one place or be physically one, but by talking to each other, the connection will become more and more transparent to citizens. For example, truckers who become licensed in a state would also become a part of a national database of truckers at the federal level, and this vertical integration would ensure a trucker who lost a license in one state would not be licensed easily in other states.

The target of vertical integration is to seamlessly integrate the state’s system with federal and local systems for cross referencing and checking, and it has an effect of linking states to other states. An example would be the construction of a national crime database, which includes DMV files with respect to vehicle registrations and drivers’ licenses, a master name index file for serious arrests, and traffic accidents. However, most of these systems are currently law enforcement accessible only, and are not available to the citizen.

2.4.3. Challenges

Beginning in stage three, communication and integration-oriented technologies become more important. As stage three targets to integrate agencies in state governments with their local and federal counterparts, technically, a web of remote connections is a prerequisite. In this remote connection and virtual transactions, several technological issues emerge: signal authentication, format compatibility of electronic data interchange, exposure level of internal legacy system to outside, etc. A critical issue of where to stop arises when integrating the entire ‘value chain’ of governmental levels. As systems in federal, state and local governments become vertically integrated, boundaries at different levels of government become less distinguishable as the lines between them blur and functions move back and forth between what was once federal and the state from a citizen’s perspective.

Accordingly, the role played by the government employee changes. In the old traditional off-line government, many government employees are responsible for processing localized governmental transactions. Once systems are integrated and automated, most transactions are automated, and government employees are now becoming more an overseer of the process than a simple task-oriented assembly-line worker. The scope of activities performed by each employee will extend beyond functional department boundaries.

Vertical integration is not a new concept. State universities and local school districts have worked together for years by having high school students take university level classes. A number of localities have automated fingerprint identification systems, which send data to the state fingerprint system based on certain criteria.

Stage three development does require various levels of government to allow some flexibility in the development of their databases that meet not only their needs. Agencies have to become less proprietary about their information. The 1988 Family Support Act required each State to develop a statewide automated data system that had the capability to

control, account for, and monitor all processes for determining paternity and collecting children support (P.L. 100-485). By the 1997 deadline that represented a two-year extension of the original 1995 deadline, six states still did not have a system. All states complained that they could not transfer another state's system because the existing State systems they tried to transfer "did not meet the diverse needs of individual states and counties" (Department of Health and Human Services, 1997, p. 14). Similar types of issues may greatly constrain vertical integration.

Even though stage three may provide improved efficiencies, privacy and confidentiality issues must first be considered. According to a report from the Intergovernmental Advisory Board, the "foremost" issue when developing such systems is "ensuring the privacy of the citizen requesting the service" (U. S. General Services Administration, 1999, p. 8). Thirty-four percent of all on-line users think that the Internet is a serious threat to privacy. A conceptually centralized database might be viewed with alarm as opposed to increasing efficiencies. The Intergovernmental Advisory Board report suggests that privacy notices post the use of any information collected. One suggestion is: "An on-line form should have a clear and specific purpose and be directed to specifically authorized entities. Governments must consider the appropriate balance between the privacy of personal information and the right of individuals to access public records" (U. S. General Services Administration, 1999, p. 8).

2.5. *Stage IV: horizontal integration*

2.5.1. *Definition*

The full potential of information technology, from the citizen's perspective, can only be achieved by horizontally integrating government services across different functional walls (or "silos"). The limitations of the functional nature of both the public and private sector will become clearer as more public administrators begin to see the vision opened by the Internet. Typically, citizens requiring assistance from governments need more than one service. Those requiring housing also need governmental assistance for education, housing, food, medical attention, etc. To overcome this problem, some localities provide one stop service centers where, for example, the homeless can come and obtain information about jobs, clear any outstanding warrants, obtain medical assistance, etc. Governments continually fight the battle of getting services to the people who need them the most.

The horizontal integration of the stage four will considerably improve those efforts. Databases across different functional areas will communicate with each other and ideally share information, so that information obtained by one agency will propagate through out all government functions. Currently, two "Access America" sites, one for senior citizens (<http://www.seniors.gov>) and one for students (<http://www.students.gov/index.html>) locates multiple services available to these two groups at all levels and functions of government, although databases are not currently shared (U. S. General Services Administration, 1999, p. 20–21). In addition, citizens could conduct business across a wide variety of requirements. As an example, when a citizen applies for a driver's license after moving to another state, the basic residence record could be propagated to different functional service branches of government such as the Social Security Administration and the local election department so that the citizen does not have to fill out a personal record form for each governmental agency.

Horizontal integration refers to system integration across different functions in that a transaction in one agency can lead to automatic checks against data in other functional agencies.

2.5.2. *Types of functionality*

There is no current and complete example of the e-government at this stage four. However, there is movement in this direction as witnessed by the Access America sites mentioned above. Particularly interesting are the efforts of the U.S. Department of Education, Veterans Affairs (VA) and the Department of Labor on the students.gov site (<http://www.students.gov/index.html>). This site will allow students to access financial aid transactions and register locally through campuses or on-line, using a digital signature and an assigned account code (ePIN) (U. S. General Services Administration, 1999, p. 21).

The horizontal integration of government services across different functions of government will be driven by visions of efficiency and effectiveness in using information technology, but pulled by citizens' demands on an 'inside-out' transformation of government functions to more service oriented ones. The stage-four e-government offers the best hope for improved efficiencies through administrative reform because of both its vertical and horizontal integration. Such integration will facilitate "one stop shopping" for the citizen. Each organization may have to give up some power to move to this stage.

2.5.3. *Challenges*

Technically, integration of heterogeneous databases and resolving conflicting system requirements across different functions and agencies are major stumbling blocks for any government to reach this stage. Data and process requirements in health systems may not be comparable to the requirements in transportation systems.

However, it is not only a technical challenge but also a management challenge, as demonstrated by Fig. 1. Horizontal integration requires a change in the mindset of government agency directors. When thinking in terms of information needs or transactions, many directors perceive their department as most important and disregard other agencies. This 'silo' structure may have worked well in industrial settings in which functions and services are specialized for economies of scale. However, with the support of the Internet, the government processes defined by specialization may not be efficient, effective, or citizen-friendly. The concept of governance and management of government staff may be subject to re-evaluation from the perspective of e-government. Functional specialization may not be suitable as a governing structure in e-government.

Robert Denhardt echoes this argument in discussing the future of public administration (1999, p. 285):

In our view, these emerging trends will turn public management both inside out and upside down. Public management will be turned inside out as the largely internal focus of management in the past is replaced by an external focus, specifically a focus on citizens and citizenship. Public management will be turned upside-down as the traditional top-down orientation of the field is replaced—not necessarily by a bottom up approach, but by a system of shared leadership.

In many respects, horizontal integration provides more access for other governments and possibly businesses than it does for the citizen. However, it is important that the citizen does not perceive horizontal integration as the beginning of Foucault's panopticon society in which the electronic data collected is used to glean information about the individual (Blanchette and Johnson, 1998). The individual remains in control because it is the individual who chooses to use or not use the capabilities of a website.

3. Discussion

This paper presents four developmental stages of e-government based on observations of current practices. Technological and organizational challenges have been discussed for each stage. Currently, e-government initiatives at federal and state levels are rapidly evolving, but many challenges are still to be met. Among these challenges, it is the authors' contentions that the following three issues are fundamental ones governments have to take into consideration as they want to evolve into efficient and effective e-government in support of citizens' demands: (1) universal access, (2) privacy and confidentiality; and (3) citizen focus in government management. Details are discussed in the following sections.

3.1. Universal access

The omnipresent nature of the Internet may be misleading in that any service can be accessed by anybody from anywhere anytime. Though the Internet population has grown exponentially recently, there is a portion of the people who may not be able to access e-government for various reasons (U. S. General Services Administration, 1999, p. 7). Though the concept of e-government is very persuasive in increasing efficiency and effectiveness of government, service should be available to one hundred percent of citizens for e-government initiatives to be successful. However, universal access is still a mirage. Similar services must be maintained outside the web, such as physical service facilities and automated telephone response systems. Governments may want to provide Internet access through public terminals as a part of their universal access efforts.

3.2. Privacy and confidentiality

Another critical obstacle in realizing e-government is the citizens' concern on privacy of their life and confidentiality of the personal data they are providing as part of obtaining government services. The word-of-mouth guarantee by government will not suffice unless accompanied by technical solutions, transparency of procedures and possibly independent auditing. Privacy and confidentiality has to be highly valued in establishing and maintaining web sites. Data should be collected in a secure fashion, privacy notices on web sites will be mandatory and independent auditing groups composed of citizens' representatives will also help in soliciting participation of citizens (U. S. General Services Administration, 1999, p. 6).

3.3. Citizen focus in government management

Practical realization of e-government requires reconceptualization of government. As e-government becomes more and more prevalent, the public sector organizational structure will change accordingly and it will happen in two aspects: internally and externally. The focus of change will be on, internally, the system efficiency, and externally, the citizens. Internally, the power conflicts over departmental boundaries and control of services will surface as integration progresses. Externally, government processes will be organized for citizens' convenience instead of the convenience of the government.

In other words, the integration should not be driven by efficiency and effectiveness alone. Focusing on efficiency and effectiveness will lead the e-government initiatives into a "Big Brother" government if it loses citizens' focus. It may be necessary to allow citizens to have the option of deciding whether or not they want information to go to another agency beyond the one with which they are dealing. A check-off box might be a "good enough" solution. Similar to the current concept that asks a user if they do not want advertising from other companies to "check the box," a citizen would have the same option in allowing other governmental agencies to access the information entered. As systems are becoming more and more integrated, citizens' review boards may be established in order to review and observe how system integration occurs and its impacts.

Conclusion

The four stages offer a path for governments to follow and suggest challenges, both in terms of the organization and technical aspects. In addition, these stages emphasize the citizen as a user of governmental services. In so doing, they suggest that major rethinking about how governments provide services may be needed. Finally, universal access and privacy and confidentiality issues as well as citizen-focused change must be considered throughout e-government development.

Notes

1. Darrell West, *Assessing E-Government*, p. 8, notes that "many" government websites do not have a privacy policy; U. S. General Services Administration, Intergovernmental Advisory Board, *Integrated Service Delivery*, p. 6, also sees privacy as an issue.
2. Unpublished interviews conducted with department directors and elected officials in the State of Nevada by the authors during March–April, 2000.

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