Iowa E-Government Citizen and Business Surveys:
Final Policy Report

Prepared by

Dr. Yu-Che Chen
Assistant Professor of E-Government and Public Management

Dr. Kurt Thurmaier
Professor of Public Policy and Administration Program

Public Policy and Administration Program
Department of Political Science
Iowa State University

November 23, 2005

Table of Contents

Acknowledgements

Executive Summary

This is the final report of the Iowa e-government project funded by the IOWAccess Advisory Board in collaboration with Information Technology Enterprise (ITE) of the Iowa Department of Administrative Services. The board formed a subcommittee to guide the development and implementation of electronic government surveys. Dr. Yu-Che Chen and Dr. Kurt Thurmaier of the Public Policy and Administration Program (PPAP, Department of Political Science, Iowa State University) are the lead researchers for the study. The Center for Survey Statistics and Methodology (CSSM) assisted with survey design and implementation.

This report brings together the findings of both the Iowa business and citizen surveys and seeks to provide ideas for advancing e-government development in Iowa. More specifically, its objectives include (a) providing a developmental model of e-government, (b) comparing and contrasting Iowa businesses and citizens in online access, e-government utilization and demand, and financing, and (c) offering a financing strategy for advancing e-government for the state of Iowa. The researchers conducted an extensive literature review in addition to both surveys to help achieve these objectives.

For internet access, Iowa state government needs to develop different strategies for businesses and citizens to address the lack of access (digital divide) for citizens. In general, internet penetration rates are comparable between citizens (79 percent) and businesses (84%). However, the reasons for not connecting are rather different. For citizens, cost is the primary barrier. As a result, state government may consider investing in providing low-cost or even free access to the internet. In contrast, businesses perceive "no need" as a barrier rather than cost; therefore, state agencies need to provide convenient services to attract businesses to transact with government online.

Citizens are behind businesses in the adoption of online transactions with Iowa state government. The relatively low adoption rates for businesses (25 percent) and citizens (15 percent) indicate opportunities for growth. The current users are likely to continue using these online services, given that a majority of the users are either "very satisfied" or "satisfied" with the services they receive. Moreover, there are significant future demands for online services for those businesses (80 percent) and citizens (70 percent) that are not currently conducting transactions online. If these future demands are realized, the state of Iowa will have 85 percent of businesses and 75 percent of citizens transacting with government online. State government, as an enterprise, needs to develop different online services for citizens and businesses due to their differing needs.

The strong future demand requires Iowa state government to adopt a financing strategy to fund the development and implementation of online services. The preferred approach is a market strategy that relies on a self-financing model. A market approach treats state government as an enterprise in its provision and production of electronic information and services for all user groups including citizens, businesses, other governments, government employees, and other entities. An Iowa eGovernment Enterprise (IEE) strategy has multiple components (figure 5). The first and most important is governance. The governance board must have the policy and fiscal flexibility to be able to plan e-government development strategically, develop a common service-oriented architecture to build a statewide enterprise framework, and choose specific projects based on the strategic plan.

The second component to a market approach is a mechanism to implement online services demanded by the stakeholders of state government. To accelerate the advance of e-government, Iowa state government can adopt an enterprise strategy that involves continuously gauging the needs of citizens, businesses, and all other e-government users as well as understanding their preferences for e-government financing and payment methods.

The Iowa *e*Government Enterprise should be a responsibility of the Department of Management (DOM). With the state CIO as its manager, the primary responsibility of the IEE is development of individual applications to deliver online services to citizens and businesses. DOM would be responsible for producing an annual report and annual tactical plan. The results of the surveys suggest citizens and firms are willing to pay user fees to adopt online transactions options.

The enterprise approach to financing e-government development has several advantages over a system that depends on legislative appropriations specific to an agency budget request. First, development of e-government services would be independent of the budget cycle, permitting a flexible responsiveness to emerging user demands for services. Second, it relies on information about user demands rather than the budgetary skills of an agency head managing the politics of the state budget process. Third, it provides the IEE with the flexibility to invest in one service with a short-term cost recovery period and high return on investment (ROI) and another service with a longer cost recovery term and different ROI. Finally, the enterprise approach provides pricing flexibility so that the overall cost structure of the IEE (including personnel, payment surcharges, etc.) can be financed by the overall stream of revenues of the enterprise.

An IEE approach to further e-government development in Iowa has an additional long-term benefit. By carefully following a strategic plan for the development of online services demanded by businesses, the IEE can reinvest revenues from business services to build the information and communication technology (ICT) infrastructure necessary for providing citizens with online transaction services, ultimately lowering the marginal cost of adding online services for citizens.

The preferences of users drive the development of governance structure for enterprise-wide e-government services and allocation of resources. We develop a pricing framework based on the benefits principle of public finance, with sensitivity to political considerations. We can summarize the general principles underlying the pricing framework as: *The more that benefits accrue to a specific firm, the higher the value to the firm, and the more willing the firm should be to pay a higher charge for the service. Conversely, the higher the social benefits, the greater the justification for the infusion of general fund investments to underwrite at least some portion of the IT infrastructure required to deliver the services.*

The pricing scheme in figure 6 adheres to public finance principles. It is also flexible to cover a wide range of information and services. Revenues come from either user fees or enterprise e-government funds, which then shared with various state government agencies. Iowa state government also needs to pay attention to the provision of integrated services and support and publicizing and communicating new and improved services to the user community. Payment method surcharges (such as a 1-3 percent credit card surcharge) are unpopular with both businesses and citizens. The intelligence on user groups' need for electronic government information and services can be modeled as a knowledge management system. It requires acquiring information from the user communities. This knowledge management system needs to be able to promote information sharing among state government agencies about e-government service needs.

This report, and the two reports that preceded it, provides critical information to help the state's evolution to a more sophisticated and effective system of service delivery. The framework suggested in this report is an invitation for state policy makers and user groups to engage in the exciting prospects for Iowa's next stage of e-government development.

Electronic Government in Iowa: Scope, Evolution, and Challenges

The Scope of Electronic Government

Electronic government (e-government) refers to the use of information and communication technology (particularly Web-based Internet applications but not limited to) to improve interactions between government agencies and employees, citizens, businesses, nonprofit partners, and other agencies by enhancing the access to and delivery of government information and services and participation in governance. E-government is the deployment of not only information but also communication technologies such as those associated with broadband and wireless access via private or public telecommunication networks.[1] Although Web-based Internet application has been the focus, information technology supporting internal functions of government such as finance, personnel management, and information resource management also fall in the domain of electronic government.[2]

Electronic government provides digital information and services to its various stakeholders. As articulated in the General Accounting Office's report (2001), e-government serves more than citizens and businesses. Governments also provide services to their employees, non-profit partners, and other government agencies. Recent emergency management efforts to help the victims of hurricanes Katrina and Wilma illustrate the need for government to work with all stakeholders to deliver information and services. Federal government agencies need to work with employees of state and local government agencies in coordinating their response. The Red Cross, a non-profit organization, was an integral part of the relief operation. E-government is the use of information and communication technology to integrate the interactions between these stakeholders to solve public problems (Schedler & Scharf 2001).

Beyond digital information and service delivery, e-government also embraces electronic participation in governance. Electronic rule-making allows the public to comment on proposed federal rules. Bill tracking keeps citizens and businesses informed of the legislative proposals in the state capitol. At the local level, city council meetings can be streamed online with the option for citizens to send comments to council members. The Santa Monica project demonstrates the possibility of engaging citizens in the discourse of public policy issues (Rogers et al. 1994). The e-village initiative in Blacksburg, Virginia uses information and communication technology (ICT) to facilitate conversations on community issues (Carroll & Rosson 1996).

A Maturity Model of Electronic Government Evolution

E-government is evolving to be more citizen-centric, where citizens can be broadly defined to the set of stakeholders of government. There are two important dimensions of the stage model (Ho 2002, Laynes & Lee 2001, Moon 2002). One is about the kinds of information and services made available online and the other is the orientation and organizational structure underlying the provision. At the first stage, electronic government is about providing information only, with an administrative orientation. A typical government Web site at this stage has information about the names and descriptions of various government agencies. The organization of the site is based on the organizational chart with the list of departments. In addition, there is usually an event

---

[1] This definition is consistent with the broad definition developed by the United Nations and the American Society for Public Administration: "e-government can include virtually all information and communication technology (ICT) platforms and applications in use by the public sector" (UN-ASPA 2002, p.1).
[2] This is an extension of the definition of digital government as "the larger concept of government that depends upon IT to achieve basic missions" (Marchionini et al. 2003).

calendar to keep citizens and businesses up-to-date. In the late 1990s, most government Web sites were at this stage of electronic government.

Figure 1. Maturity Model of Electronic Government Evolution[3]
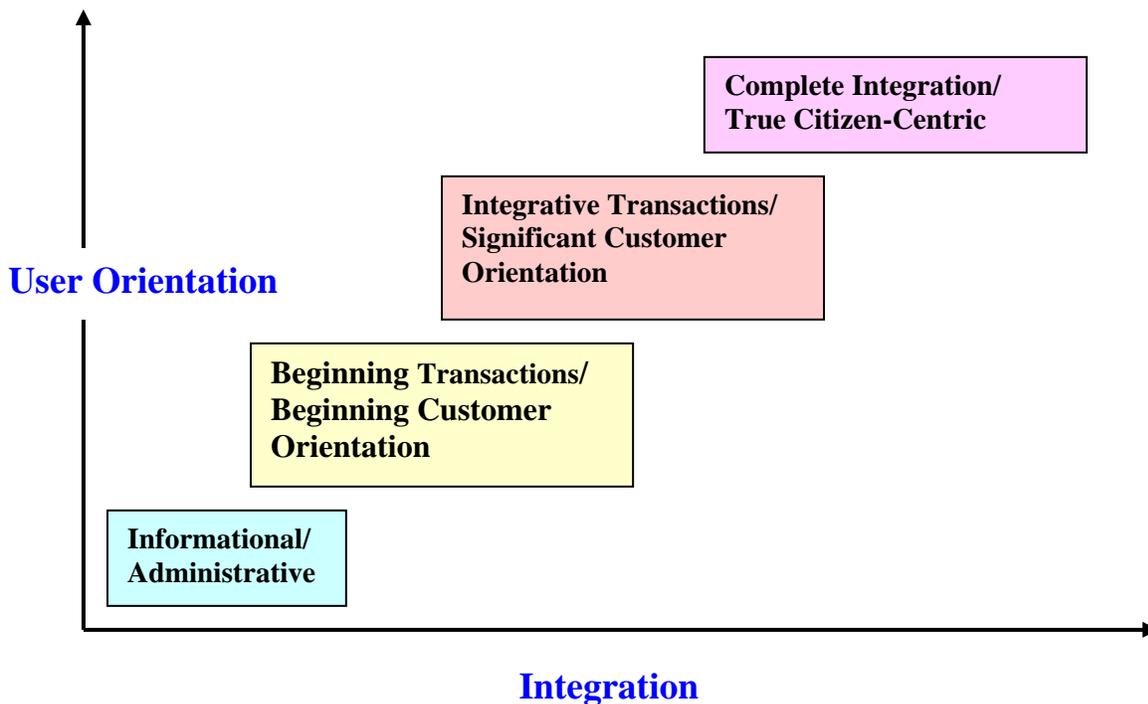
The second stage of electronic government introduces some interactivity characterized by downloadable forms, several searchable databases, and a few sites providing online transactions. For instance, state governments may provide forms for application for state jobs. Interactive information searches may include Uniform Commercial Code (UCC) filing searches and searches for park and recreation (e.g., trail) information. Complete online transactions may be about employment registration, campground reservations, and renewal of driver licenses. The orientation moves gradually away from a departmental perspective to being customer-centric. At this stage, administrative orientation still dominates the organization of information and services. However, within each department, there emerges a Web page that has a complete list of online information and services that helps visitors find what they want fairly quickly.

The next stage of electronic government has a much higher level of interactive and transactional services characterized by a significant level of horizontal and vertical integration. This backend horizontal integration can be seen in the areas of the implementation of enterprise security and privacy policies and common e-mail systems. Vertical integration may involve the linkage between state and federal e-filing as well as application for federal benefit programs run by state government. The orientation is mostly customer-centric with some remaining departmental division of information and services. For instance, firstgov.gov, the official federal

---

[3] This model adapted and modified from Ho (2002) and Laynes and Lee (2001).

government portal, prominently displays information and services for user groups such as citizens, businesses, and other governments. This orientation is made possible by the horizontal and vertical integration of information and services.

The highest level of electronic government is truly citizen-centric, while acknowledging that citizens play various roles such as business owners, employees, and are represented by legislators and various government and nonprofit entities. The orientation is seamless and provides personalized service with meaningful participation in governance. Integration of information and services across departments and various levels of government makes this orientation possible. Information and services are organized by the specific information and service needs of citizens, such as starting a business, participating in rule-making, applying for government benefits, and viewing city council and local public meetings online. When citizens interact with government, they have a one-stop virtual service representative that coordinates government departments to deliver information and services.

Challenges and Opportunities facing Advancing Electronic Government

It is imperative for government to move to a higher level of maturity for electronic government to better serve citizens. Citizens have been gaining more, faster, and anywhere connections to the internet. Moreover, the convenience of e-commerce has played an important role in setting citizens' expectation of what should be available on government Web sites. Since the late 1990s, there has been a steady increase in the percentage of citizens connected online. As of May-June 2005, 68 percent of American adults use the internet (Fox 2005). The first survey of wireless use by Pew Internet and American Life Project in 2004 found that 17% of Internet users got online using a wireless device; getting online with wireless device is particularly popular among young people where about 28 percent of Internet users between 18-27 have done so (Rainie 2004). More importantly, citizens' use of government Web sites has increased. In 2001, 68 million American adults used government agency Web sites (Larsen & Rainie 2002). During a two-year period, the number of American adults that have experience with government agency Web sites increased by 50 percent to 97 million (Horrigan 2004).

However, advancing e-government to a higher level of maturity presents challenges for governments at all levels. First, there is lack of understanding of the demand of citizens, businesses, and other stakeholders for electronic information and services online. The last comprehensive survey of citizen use of government Web sites was completed in 2001 by Pew Internet and American Life Project. The last comprehensive research on business community use was completed in 1999 by the Momentum Research Group (2000). Given the rapid development and deployment of information and communication technology, the findings generated a few years ago are probably not applicable today. The second challenge is the lack of financial resources for the development and implementation of electronic government projects. This problem is particularly pronounced at the local level as reflected in the results of local e-government surveys conducted by the International City/County Management Association (ICMA 2000, 2002, 2004). The last and sometimes most formidable challenge is to break down departmental walls to provide integrated services as needed to move to a higher level of e-government maturity. Consolidation of information technology services at the state level is particularly challenging given the picket fence nature of American federalism, where funds usually come through separate federal agencies to respective state departments.

These challenges also present opportunities. This study is in part an effort to address those challenges and seize the opportunities presented for the state of Iowa. Based on the ranking of the Center for Digital Government, Iowa's state Web portal was ranked as 38th in 2002. This ranking indicates that there is room for improvement. For the last two years, the state of Iowa has made significant progress in the revenue and finance service area. In addition, this study has conducted two state-wide surveys to develop a clear understanding of the demand for online services by key stakeholders. One survey focuses on citizens and the other on businesses. The surveys ask questions about their current and future demand for electronic government. This offers important market intelligence for the state Web portal to be customer-centric. In terms of financing e-government services, this study, in conjunction with other efforts, examines user preferences for funding mechanisms and their willingness to pay for online services. The need for e-government integration presents opportunities for the state to examine existing state business processes and analyze how to realize savings by taking an enterprise approach to e-government.

This report addresses the first challenge of understanding stakeholder demands by comparing and contrasting the results from the citizen and business surveys. The following sections discuss access to the internet and demand for online services. The report then addresses the second challenge regarding the lack of financial resources for e-government projects by analyzing the results of the two surveys with respect to users' willingness to pay for online transactions. The analysis leads to our recommendation that the state should establish an enterprise approach to e-government in order to advance to a higher level of e-government services for Iowa's citizens and businesses.

Access to the Internet: Status and Challenges

Internet and Broadband Penetration Rates for Citizens and Businesses
The utilization of electronic government depends mostly on the access that citizens and businesses have to the internet. Internet use has reached more than three-quarters of Iowa citizens and businesses. About 79 percent of Iowa adults have used the Internet. This number is higher than the national average of 68 percent in 2005, based on the Pew Internet and American Life Project that tracks Internet use in the United States.[4] Due to the development of e-commerce, a higher percentage of businesses is online. *The Iowa e-government business survey shows that, as of early 2005, about 84 percent of businesses are online.* The share will reach 90 percent if those expressing intent to connect online within a year actually do so.

In terms of broadband connections, businesses have a much higher penetration rate (75 percent) in comparison with citizens (48 percent) among those who have internet access. A high penetration rate of broadband service for businesses is probably driven by the demand for bandwidth to handle complex transactions and even host their own e-commerce Web site. For citizens, the broadband penetration rate is comparable with, although slightly lower than, the national average of 53 percent in May 2005 (Horrigan 2005).

A closer examination of internet access by citizens suggests a national phenomenon termed as the digital divide. Studies have shown that people with higher levels of income and education, and younger people, have more access to the internet (Mossberger et al. 2003; Thomas & Streib 2003). The digital divide in the state of Iowa mirrors national trends (Chen &

---

[4] Pew Internet & American Life Project, *February-March 2005 Tracking Survey*, www.internet.org/trends , accessed 14 November 2005.

Thurmaier 2005b, table 3). Having internet access is more popular among young people. For Iowans who belong to the 18-24 age group, the penetration rate is near 100 percent. The penetration rate goes down as we move to the older age group. Income is also an important factor. The use of the internet is 90 percent among those whose household income is between $50,000 and $75,000, but drops to 78 percent among those whose household income is between $25,000 and $50,000. Moreover, the more educated an individual is, the more likely he or she is to be online.

The effort to move services online needs to confront the issue of the digital divide. One of the key ideas is to provide online services as one alternative to conventional ways of interacting with government rather than a wholesale replacement of existing methods. Citizens have expressed their needs for having multiple channels in a national survey (Horrigan 2004). Given the high penetration rate of internet access as well as broadband connections, business should be able to enjoy electronic information and services provided by government. Much less attention needs to be paid to the digital divide issues for businesses than for citizens.

Barriers to Participation Online

Understanding the barriers to participation online is the first step in addressing the digital divide. *For citizens, cost is the leading reason (54 percent) for them to stay offline (table 1).* No perceived need to use the Internet and a lack of interest in using the Internet are ranked as the second and third reasons for citizens to stay offline with 51 and 46 percent, respectively. Security and privacy are of some concern to citizens as they decide whether or not to connect their home computers to the Internet (43 percent). For citizens, resources are certainly an issue. Moreover, the lack of need for connecting online could partly be due to the fact that services and information they are looking for are unavailable or because citizens are unaware that the information and services they desire are available online.

In contrast, businesses ranked the barriers differently. Cost is not their primary concern. *Instead, "no need" constitutes the primary reason (87 percent) for firms not connecting online.* The rest of the concerns are rather secondary, with less than half of the responding businesses indicating a barrier. Security, of the least concern to citizens, is the second most important reason for not connecting online for firms, with 40 percent. Cost, the most important concern of citizens, registered as a concern for only 32 percent of businesses staying offline. The overwhelming response of "no need" has two sources. One is the lack of information about services or the awareness of existing online services that are relevant to them. The other is the size or nature of businesses that do not lend themselves well to having an internet connection. For instance, a small local restaurant does not need an internet connection for performing all its essential activities.

Table 1. Ranks of barriers to internet participation by businesses and citizens.

Barrier Type	For Businesses	Percent	For Citizens	Percent
No Need	First	87	Second	51
Security	Second	40	Fourth	43
Cost	Third	32	First	54
Lack of interest	*		Third	46

*This item is not available in the business survey.

The difference in the barriers to connecting online between businesses and citizens underscores the need to think more carefully about e-government strategies. To address the digital divide among citizens, the solution should address cost and resource issues. To help the business community to connect online, the emphasis should be on providing relevant information and services.

Utilization of and Demand for Electronic Government Information and Services

Types of E-Government and Information Services
The development of e-government portals emphasizes the importance of being customer-centric (Gant et al. 2002; Ho 2002). It begins with a good understanding of the needs of a particular stakeholder group for government services. For example, services for citizens can be organized around life events such as buying a house, filing taxes, or change of marital status. That will serve as the basis for the categorization of information and services online. For instance, the official portal for the federal government organizes its Web portals around primary user groups including citizens, businesses, and government employees. Both Iowa citizen and business e-government surveys took the customer-centric approach in developing lists of government information and services relevant to each group.

Citizens and businesses have different needs for government information. For citizens, they are interested in information about recreation, health, safety, education, and participation in public policy making. Recreational information includes parks, cultural and entertainment activities, state fair, and other tourist information. Examples of health and safety information are updates on road conditions, health inspections of restaurant, and emergency warnings. Citizens are also interested in participation in public policy making by learning more about voting, and commenting on government regulations and programs. In contrast, businesses have different needs for information. They are more concerned about information that helps them comply with government regulations on registration, reporting, permitting, and conducting business transactions. For instance, a small and locally owned restaurant needs information on getting a health permit, registering as a business, and fulfilling reporting requirements.

With one exception, citizens and businesses also have different service needs in terms of online transactions with state government. One common service area for citizens and businesses is that both groups are required to file taxes. Citizens need to file state and local income taxes. Businesses need to pay their income, sales, property, or other taxes. Otherwise, the two groups have different demands for online services. The transactions that citizens have with state government generally fall into several categories. First, citizens register for government programs such as grants, loans, housing, or medical assistance. That involves downloading forms or completing forms online. Second, citizens apply for licenses or permits, such as a hunting or fishing license. Application for state jobs and public schools is another area of activities. Lastly, citizens can purchase tickets online or pay bills or fees associated with services rendered by state government or its affiliated entities.

Businesses conduct online transactions with state government mostly to comply with government regulations and seek business opportunities. Businesses file reports or claims such as wage reports or UCC filings. In addition, businesses apply for or renew a variety of permits such as building, health, and operating permits. Businesses can also bid for state contracts, which is

certainly different from citizens. Working with state government to get professional licenses or certification is another main area of activities for citizens.

Utilization and Satisfaction

Survey results suggest that businesses use online services more than citizens. Of the transactions that businesses conduct with state government, only about 25 percent are conducted online. The utilization rate of online state government services by citizens is close to 15 percent. In both cases, the online share varies by type of service. For example, 29.6 percent of the responding businesses are filing reports or claims with the state government online (e.g., UCC filings, wage reports, etc.). Similarly, only 28.4 percent of the sample businesses are requesting permit applications or renewals online. For license applications and renewals, 24.4 percent of businesses are conducting these transactions online. The lowest percentage, 14.7 percent, represents businesses that are making bids for state contracts or registering company vehicles online.

Online use for state government services by citizens shows similar variation. About 16 percent of the internet users report experience with applying for state jobs or applying online for admission to public schools or universities. Slightly fewer (15 percent), report paying bills, tickets, or fees online with state offices or agencies. About 13 percent reported some online activities with registration for government assistance such as for state grants or loans, housing assistance, or medical benefits. Applying for hunting or fishing licenses, a new online service available at the Iowa Department of Natural Resources Web site, has already attracted about 3 percent of individual Iowa Internet users.

Those citizens and businesses who have transacted with government online are generally satisfied with the services. For businesses, every type of transaction received a median rating of at least 4.0 on a scale of 1-5 (1 meaning "very dissatisfied" and 5 meaning "very satisfied"). That translates into over half of the businesses that used the online services are at least satisfied with the services. Several areas of online services even receive a median score of 5, meaning over half of the businesses that conducted the transactions are "very satisfied." These services include applications for permits and filing reports. Citizens also gave good ratings for their online transaction experiences with state government agencies. Every type of online transaction received a median rating of at least 4.0 on the same scale of satisfaction used by the Iowa e-government business survey. A median rating of four indicates that at least half of the citizens with online transaction experience are at least satisfied with their experiences. Filing state income taxes, and paying bills, tickets, or fees online received a median rating score of 5. The rest of the services such as applications for schools and registration for government benefits receive a median rating score of 4.

The low online utilization rates of 25 percent for businesses and 15 percent for citizens present challenges and opportunities for state government. These rates are calculated based on those who have internet access. State government needs to think about strategies to increase online adoption since higher rates of online adoption will increase return on the investment in online information and services. More fundamentally, it is a better use of taxpayers' money. Later in this report we discuss strategies to remove these barriers to adoption.

Future Demand for Online Services

Future demand for online services is strong among both businesses and citizens. *For businesses, on average, approximately 75 percent of those not conducting transactions online would like to in the future.* This demand is strong across various kinds of transactions. More specifically, of

those businesses filing reports, submitting claims, and making permit applications and renewals with the state, 78 percent would like to conduct these transactions online. Closely behind this percentage, about three-quarters of Iowa businesses are willing to apply for and request renewal of licenses and certificates on line. Finally, 72 percent of businesses look forward to offering bids for state government contracts online.

For citizens, on average, approximately 70 percent of those not conducting transactions online would like to in the future. The demand for online services is strong across various transactions. More specifically, 76 percent of the citizens who currently have not registered for grants, loans, or other assistance online expressed a desire to conduct these transactions online with state government. Similarly, 75 percent of those who have yet to file state income taxes online wish to do so in the future. Paying bill, tickets, and fees online also received strong demand from those who have not conducted these transactions online before, with 69 percent expressing an interest in doing so in the future. The demand for application for fishing and hunting licenses online and application for state government jobs or school admissions online are almost equally as strong. The former is likely to attract 67 percent of those Iowa online adults who have not used the service. The latter is the interest of 65 percent of Iowa online adults.

A vast majority of businesses want to conduct online transactions with government in the future. For those who are not currently conducting any online transactions with government, on average about 80 percent say they would like to do business online in the future. This translates into a significant opportunity when only about 30 percent of the businesses currently are using transactions online. Strong demand from businesses can move online adoption rates from the current 30 percent to 86 percent of the entire online population in the future. A similar story can be told about citizens. The adoption rate of online services by citizens can move from 15 percent to 75 percent. *Given that only 15 percent of citizens are currently conducting transactions with government online, we calculate that another 60 percent of citizens would participate online in the future.* If these demands are realized, over three-quarters of Iowa's citizens and businesses with internet access will be transacting with government online in the future.

The future demands of various online services also point out areas of opportunity. *For the business community, permit application and renewal and report or claim filing are the online service areas with strongest demand.* Application and renewal of license or certificates is closely behind. Bidding for government contracts or registering a commercial vehicle, the types of service with the lowest demand, still enjoy a future demand of 72 percent. There are also opportunities for government to provide online services to citizens. *A primary area of citizen demand is registration for grants, loans, housing or medical assistance. A second area of demand is for filing state income taxes online; Iowa already enjoys the highest level of e-filing of income taxes in the US, but this result suggests that there is still room for improvement.* The other service areas include paying bills, tickets or fees, application for hunting or fishing licenses, and application for state jobs or school or university admission. These are opportunities for state governments since all areas of online services see a future demand of 65 percent of more.

Barriers and Benefits

The surveys attempted to identify the incentives and barriers citizens and businesses face to transact with government online. The incentives are framed as benefits. The lists of priority benefits for citizen and businesses present valuable information for government on where to concentrate their resources. The information on the main barriers can help state government develop more effective strategies to address specific concerns of citizens and businesses.

Citizens and businesses ranked their barriers to using online government services differently. The number one concern for business is inability to ask questions. This probably concerns the assistance that businesses seek in getting the relevant forms or filling them out online. *Citizens ranked difficulty in finding relevant information as the number one barrier.* This is probably attributed to the lack of organization of information and services for citizens to navigate. Security and privacy issues also are prominent in the minds of citizens. This is probably due to citizens worrying about identity theft and protection of their personal data. In contrast, businesses seem to be relatively comfortable with the protection of their data.

An important contrast between citizens and businesses is that citizens are much more concerned about unreliable internet access than businesses. Unreliable internet access is the least of businesses' concern. In contrast, it ranks as one of the top three concerns of citizens. One explanation is the higher penetration rate of broadband access in the business community compared to citizens. Over half of the citizens use dial-up services and may encounter slow transmissions or sudden disruptions that render transactions incomplete. This is particularly the case when users need to go through multiple steps to complete a transaction.

In terms of e-government benefits, both businesses and citizens agree that the convenience of having up-to-date information is the most important benefit item. However, that is where the agreement ends. *Businesses perceive that the increase in the speed of transactions and no-waiting in line are the main benefits for them. In contrast, citizens feel that the convenience of 24/7 services and doing transactions from any location are important benefits for them.* The difference is probably best explained by how these groups normally conduct their businesses. Businesses tend to handle all transactions during regular businesses hours. As a result, the convenience of 24/7 does not constitute a premium. In contrast, with busy schedules, citizens would appreciate having services available online 24/7 so that they can handle those transactions according to their own schedules. Businesses are probably more sensitive about the cost of staff time in handling transactions. Therefore, increased speed of completing transactions and elimination of time waiting in line constitute real savings. In comparison, citizens may not do a conscious calculation of the economic cost of doing transaction via traditional methods.

Financing E-Government Services

Among the barriers to realizing the potential of e-government, financing online transactions has been identified as one of the top concerns (Holden et al. 2003; Johnson 2002; Norris and Moon 2005). Wisconsin, Washington, Michigan, Oregon and Iowa are among the states pioneering the development of e-commerce by state governments. For example, Michigan launched a process in 2003 that allows permitted facilities to send the data directly to a state database for EPA monthly reports (Perlman 2004); Iowa has the nation's highest rate of e-filing of state income taxes, and firms can now pay sales and withholding taxes online (Glover 2004). There are basically two strategies to financing the development of e-transactions with governments.

One option is to fund development of e-transactions as capital investments using general fund dollars to pay for hardware and software development for each service. This strategy implies that services will develop within each agency to the extent that general fund monies are budgeted for that purpose by legislatures in each budget cycle. General fund dollars will also need to be allocated to maintain the operability of e-transactions services. There are important limitations to this approach. First, this option holds e-transactions development hostage to the overall general fund budget condition of state government; when funds are tight, one can expect few dollars to be available for service development and expansion. Most states have not made

the expansion of e-government a budgetary priority. Many states, including Iowa, are seeing only modest revenue growth and the general fund often must repay internal "borrowing" from special revenue funds that were used to balance budgets. Consequently, general fund revenues for e-government development are likely to remain scarce at all levels of government for the foreseeable future.

An alternative strategy to the general fund approach to e-government development is a market approach that relies on a self-financing model. An effective self-financing model must meet certain conditions. First, the pricing scheme must be effective in generating revenues to fund infrastructure development. Second, the pricing scheme should adhere to public finance principles, including the benefits principle. Third, the model should provide flexibility and breadth of scope to manage the development of e-transactions at an enterprise-wide level (e.g., across the whole of a state government) to maximize operating efficiencies and enhance allocative efficiency. In effect, state government treats government-to-business (G2B) services as business-to-business (B2B) services. The results of the business and citizen surveys suggest that a market model with a self-financing enterprise mechanism is appropriate for state government in Iowa.

User Fees for E-Government Services

A market approach to service development is dependent upon the demand for e-transactions by users that do business with governments. As such, governments must be cognizant of the users' preferences for services. Government should only develop online what users demand and are willing to pay for. Governments that develop e-transactions based on preferences of government agencies risk developing expensive service options for which there is little or no demand; the agency staff may be rightly proud of a state-of-the-art web portal with efficient services, but if the service provided does not meet user demand, then funds will not have been used in the most effective manner. We discuss in a moment some political considerations that preclude a "pure" market approach to developing online services, and we reiterate here that the state has the option of pursuing a market strategy for business services and a mixed market-general fund strategy for the development of online services for citizens.

A market approach to e-transaction services provision defines demand as both a preference and willingness to pay (WTP) for a service. If there is no WTP weight on a preference, it is difficult to assess the relative demand for a service, i.e., which service has the strongest demand from users. A market approach relies on pricing signals from the end-users to guide decisions about which services to develop and how much to charge for the use of e-transactions services. Finally, a market approach is dependent upon the ability to exclude a user from using the service unless they are willing to pay for it. We will discuss political and institutional constraints to a market approach below, including digital divide issues; for now we note that users retain the traditional "bricks and mortar" option to comply with regulations and so on. They are not compelled to use the e-transaction service for licensing, bidding, or other transactions with governments; if they use the e-transactions option it is because they choose to do so.

Citizens and businesses think differently about user fees as a general concept (figure 2). About 47 percent of businesses prefer the principle of user fees and about 45 percent prefer the alternative of taxes to support e-government development. In contrast, about 67 percent of citizens support user fees as a general principle. In both cases, we find stronger support for user

fees when specific beneficiaries are identified for a specific service. Support for fees by citizens is even stronger (83 percent) when they learn that it is for a specific group of people.

Figure 2. General Preferences for Financing E-Government Developments

General Preferences for User Fees or Taxes to Finance Egov Developments

Citizens 4%

Firms 8%

Citizens 29%

Citizens 67%

Firms 47%

Firms 45%

- User Fees
- Taxes
- Other
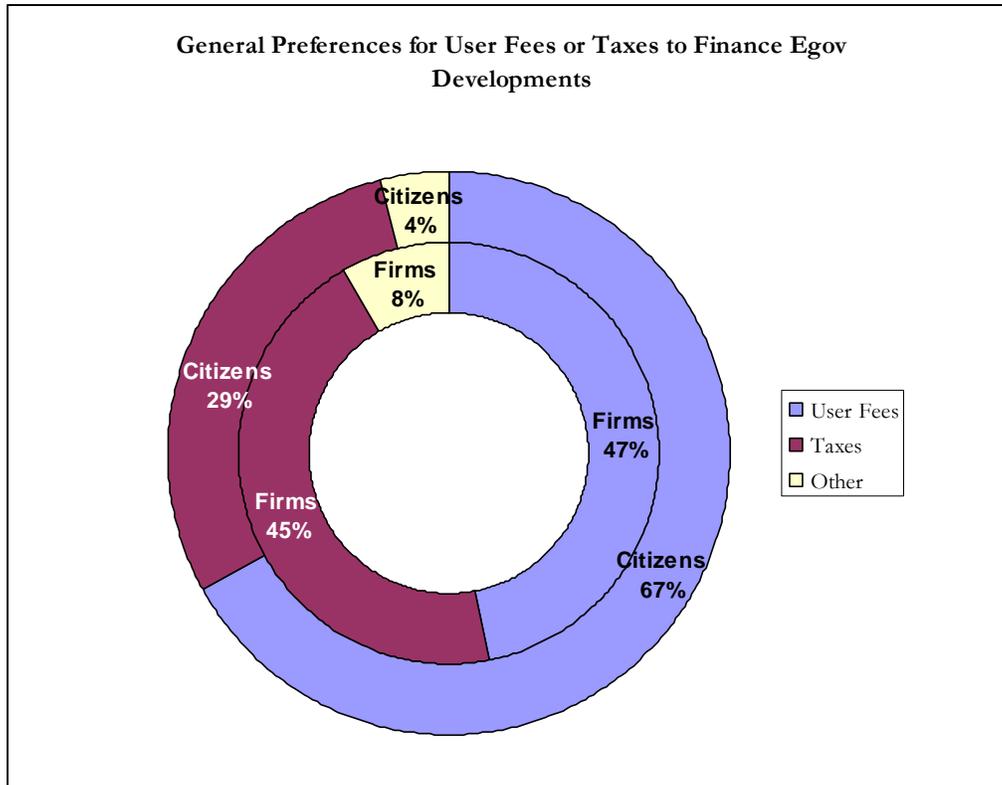
Willingness to Pay for Online Transactions

An important finding from both surveys is that businesses and citizens are willing to pay for online services that directly benefit them. We define demand for services as both [1] a preference for a service *and* [2] the willingness to pay for that service. If a user (citizen or firm) is willing to pay something for a service, it is more likely that the user will adopt the service if it is available. Willingness to pay will be affected both by the preferences a user has for a specific service, and the price of that service relative to other service options.

To gauge how willing citizens and firms are to pay for online transaction with state agencies, respondents were first asked about the transactions that they would like to conduct online with a state agency. Against that backdrop, they were made aware that the full economic cost of conducting a transaction with state agencies offline may involve various costs such as travel expenses, travel time, waiting in line, postage costs, or mail delay. The survey then asked whether they would be willing to pay $1, $2, and $4 for the convenience of online transactions in general. They were then asked for the highest user fee they would be willing to pay to conduct their preferred transactions with a state agency online. This question also gave them the opportunity to indicate a value of less than $1. Figure 3 presents the demand curves for businesses and citizens.

About 14 percent of citizens and about 20 percent of businesses do not want to pay any fee (figure 3); these groups indicated a zero dollar fee is the highest amount that they are willing

to pay for online transactions. That said, the demand curves in figure 3 generally suggest that online transactions exhibit a classic downward slope. The demand by firms for online transactions is less sensitive to increases in price than is the demand by citizens. Firms (on average) are willing to pay more than citizens (on average) for online transactions that directly benefit them. As seen in figure 3, while about 33 percent of firms are willing to pay $2 per online transaction in a user fee, only 25 percent of citizens are willing to pay the same. If the demand is aggregated from $2 or more, it appears that about 57 percent of the firms are willing to pay at least $2/transaction compared to only 48 percent of citizens who are willing to pay at least $2/transaction.

Figure 3. Demand Curves for Business and Citizen Transactions
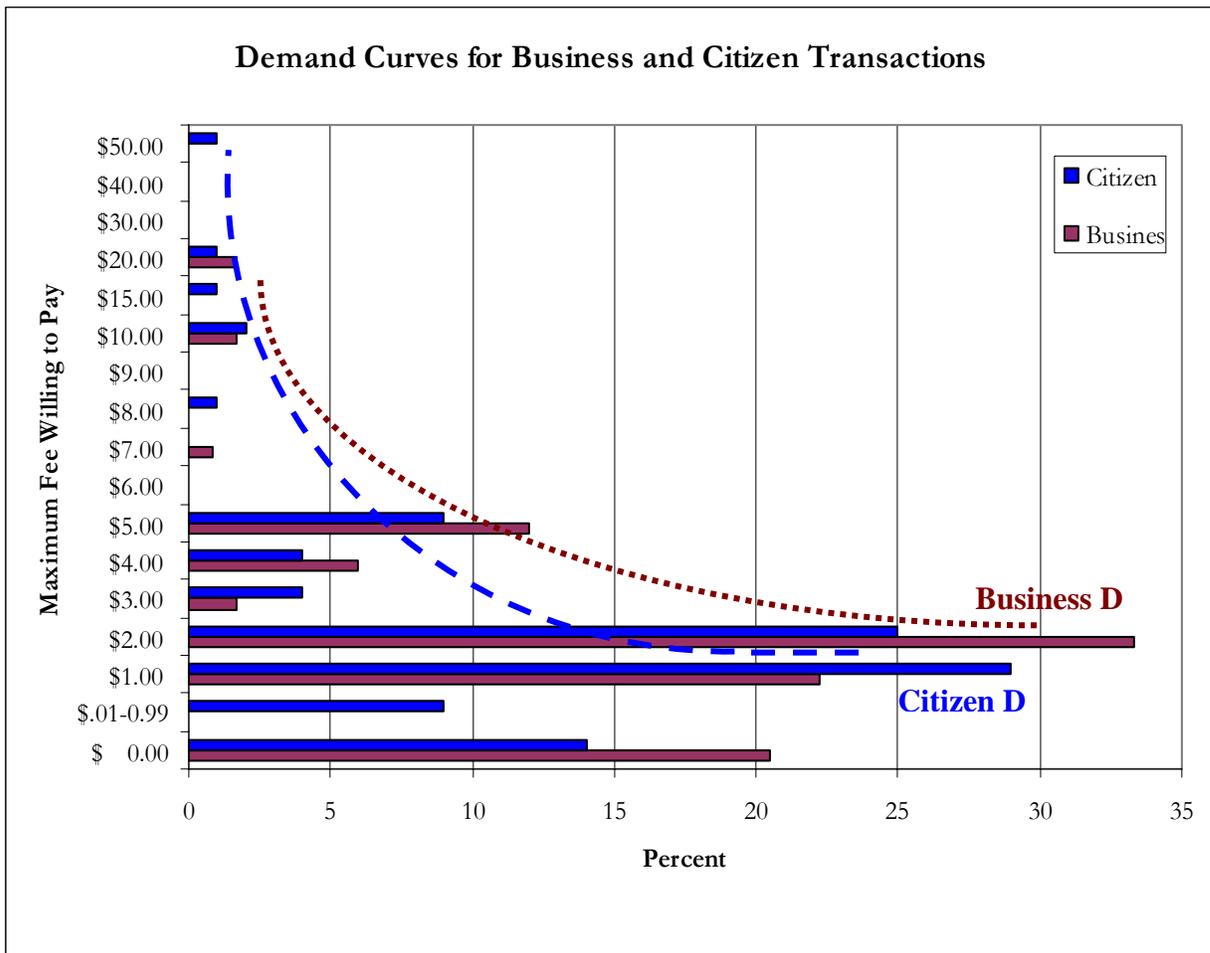
The demand curve analysis has important implications for the pricing structure of online transactions for state services. First, the user tolerance for a specific user charge is directly related to a specific service. Higher fees can be charged for services with a stronger demand by users. Second, determining the appropriate market fee requires market research about user preferences; the most important question is not what service does an agency want to develop online, but what online services do citizens and firms want to be developed.

Payment Methods and Surcharges

It is important for the state to distinguish between the willingness of users to pay a user charge for an online service that directly benefits them and their willingness to pay a visible surcharge for a transaction (online or traditional paper) based on the method of payment for a service. Specifically, *payment method surcharges (such as a 1-3 percent credit card surcharge) are unpopular with both businesses and citizens.* About 64 percent of citizens and 86 percent of firms would not want to be charged an additional 1% for a service fee. This is important because electronic funds transfers are cited by both businesses and citizens as the best option for paying for online transactions, and other electronic payment methods are also popular (figure 4). Small businesses tend to prefer traditional checks more than large firms.

Figure 4. Most Preferred Method for Online Payment by Citizens and Businesses

Most Prefered Method for Online Payment by Citizens and Businesses

Businesses, 2%
Businesses, 8%
Businesses, 11%
Businesses, 43%
Citizens, 4%
Citizens, 8%
Citizens, 35%
Citizens, 25%
Citizens, 28%
Businesses, 36%

Legend:
- EFT
- Traditional Check
- Credit Card
- 3rd Party Credit Card
- State Charge
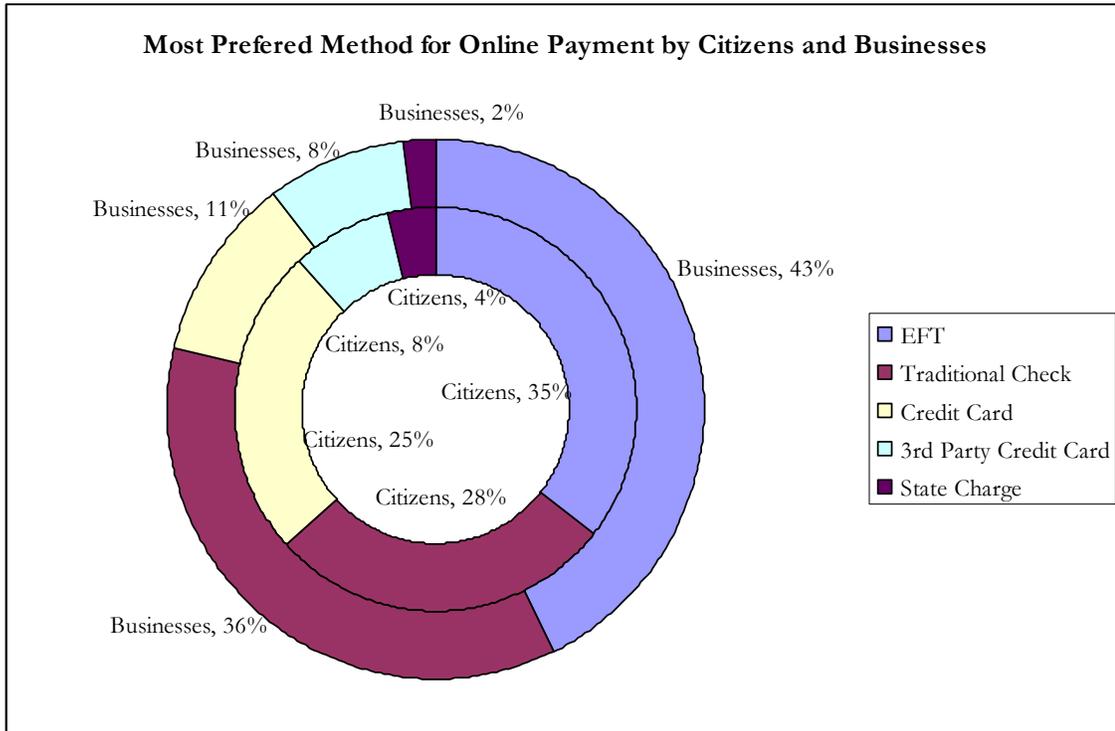
Meeting the Demand for E-Government: An Enterprise Strategy

Meeting the current and future demand of e-government information and services presents significant challenges for state government. A survey of best practices suggests an enterprise approach to meeting those challenges. *An enterprise approach treats state government as an enterprise in its provision and production of electronic information and services for all user groups including citizens, businesses, other governments, government employees, and other entities.* This approach has demonstrated tangible benefits.[5] First, cost savings come from

---

[5] The state of Washington and other leading digital states have adopted the enterprise approach to e-government. This approach is evident in its digital government plan (see State of Washington, 2002). The results have been positive, with advanced electronic services delivered to citizens and businesses, as recognized by the Center for Digital Government with various awards and high rankings.

enterprise purchasing and inventory management. A recent initiative by Iowa Department of Administrative Services has generated savings of more than 1 million dollars (Government Technology, August, 2005). Second, consolidation of enterprise resources such as e-mail, directory services, and data centers is cost effective in comparison with individual departments running their own systems. More importantly, it provides an enterprise view for information and service production and provision as well as business intelligence. Lastly, significant savings accrue from one-time development of common e-government modules (such as e-payments, authentication, and basic forms) that can be used throughout the entire enterprise to increase the return on investment.

An Iowa eGovernment Enterprise (IEE) strategy has multiple components (Figure 5). The first and most important is governance. Electronic government is much more about people and processes than just technology (Center for Technology in Government 2005). The market approach underlying the IEE strategy requires the governance body and state agencies to respond to user demands for online services. *The second component is a mechanism to implement online services demanded by the stakeholders of state government.* Only when user needs and challenges facing citizens and businesses are fully understood, are governments in the position to provide relevant online services. To meet those demands for online services, state government needs to find financial resources for their development and implementation. This includes review and adoption of funding mechanisms. The development of online transactions should be done in the context of multiple and integrated channels of information and service delivery. Once services are online, conscious efforts to publicize to and maintain communication with the user communities are also a critical component of the enterprise strategy. Below is a more detailed description of individual components of an enterprise strategy for Iowa.

E-Government Governance

A governance board is critical in making decisions on the state-wide strategic use of information technology resources. *The governance board must have the policy and fiscal flexibility to be able to plan e-government development strategically, develop common IT architecture to build a statewide enterprise framework, and choose specific projects based on the strategic plan.* The interests of the state government as a whole, individual state agencies, and user communities need to be represented. Representatives from the governor's office, the state's chief information officer (CIO) and state legislators can represent state-wide interests. State agencies must be partners in the strategic e-government planning process. The governor and legislators can select citizen and business group representatives to articulate user needs. The board is best attached to the Department of Management (DOM) since both have responsibility for a statewide management perspective for delivery of state services to citizens and businesses.

Making decisions on the strategic direction of e-government in Iowa is a key responsibility of the e-government governance board. It needs to determine the extent to which information technology will complement traditional methods of service delivery. Another key function of the governance board is to develop standards for a common service-oriented architecture (SOA) and common IT policies. For example, the board would be responsible for development of an enterprise security policy to promote information assurance and gain the trust of citizens and businesses. Another important area of common standard is privacy policy; the board would be responsible for setting enterprise policy on the protection of personal and propriety information.

The most important task of the governance board is creating standards for a common service-oriented architecture; this is essential to developing a user-friendly state web portal that provides one-stop service delivery to the user, be it a business or citizen. The SOA component must ensure that behind the state portal, information and fees flow to the appropriate agencies. For example, a firm may require multiple permits related to its facility, including elevator inspections, fire marshal inspections, hazardous waste facility inspections, and so on. Currently, the firm must complete multiple forms, write multiple checks to multiple agencies to pay for inspections and permits, and repeat most of the essential information about the firm and its facility each time it completes a permit application. Under the Iowa *e*Government Enterprise approach, the firm would be able to use a single web portal, complete a single form that pertains to each of the building inspection components, and use a single electronic disbursement to pay for all the associated fees. Behind the web portal, the SOA allows the IEE to manage the transaction so that the information flows to the appropriate agencies and revenue from the fees is shared appropriately among the agencies and the IEE.

Figure 5. Statewide Iowa *e*Government Enterprise Model

- 15 -
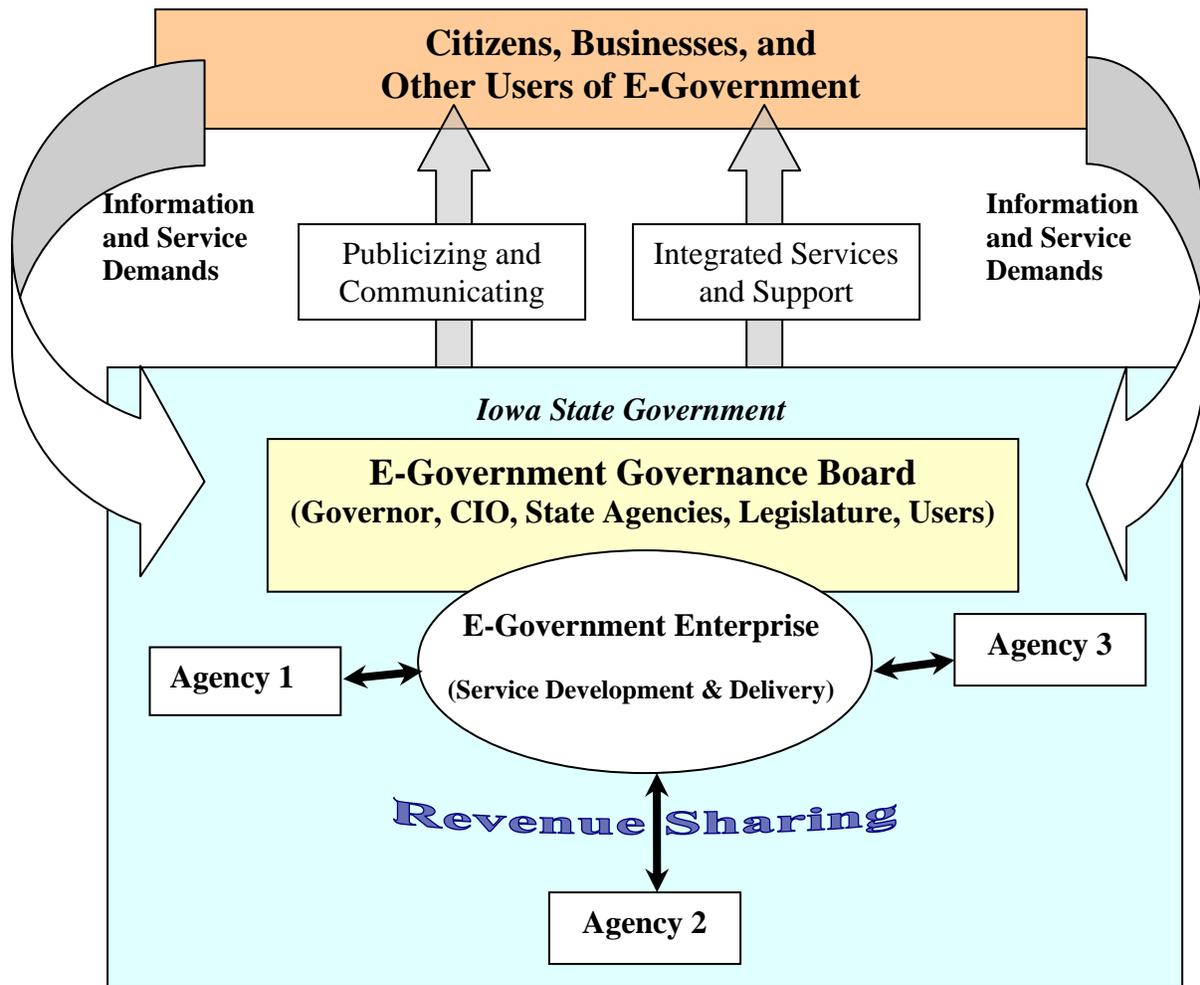
An e-government council attached to the governance board could act as the coordination body for e-government activities. This council would be responsible for developing specific rules and procedure for the implementation of the SOA and other common standards and policies. This council would have members who understand the operational side of information technology resource management and can assist the CIO managing the Iowa *e*Government Enterprise with purchases of information technology hardware and software.

The Iowa eGovernment Enterprise itself should be attached to the Department of Management. With the state CIO as its manager, the primary responsibility of the IEE should be development of individual applications to deliver online services to citizens and businesses. Given its statewide perspective and scope of work, the IEE should have the flexibility to gather market intelligence, develop applications with demonstrated market demand (including willingness to pay), and manage user fee revenues in such a way that agencies receive funding for delivering the actual service and the IEE receives funding to recover costs for online service delivery and continued maintenance of the online channel of service delivery. We anticipate that the actual fees and revenue sharing formulas will be negotiated as each online service channel is developed and implemented. DOM would be responsible for producing an annual report and an annual tactical plan that outlines expected service developments and IEE management priorities.

Understanding Users of E-Government Information and Services

A basic task of directing and managing e-government is to understand the needs of users where businesses and citizens are the two primary groups, as indicated in figure 5. *The intelligence on user groups' need for electronic government information and services can be modeled as a knowledge management system. It requires acquiring information from the user communities.* The Iowa e-government citizen and business surveys represent the effort to acquire basic information about user communities, both current users and future potential users. The other method would be working closely with professional associations or interest groups that can represent the needs of their members. Moreover, state government can provide a forum or mechanism online for user communities, citizens and businesses alike, to offer comments and intelligence on evaluation of e-government information and services.

This knowledge management system needs to be able to promote information sharing among state government agencies about e-government service needs. In the process of implementing programs and policies, individual agencies have accumulated extensive knowledge about service needs of their clients. The sharing of electronic service needs across agencies helps promote an enterprise view of resource utilization. Moreover, the system needs to have codifying protocols and analytical capability. The intelligence gathered on service needs--external or internal to the state government--needs to be codified in a way that facilitates easy retrieval and interpretation. The governance board would be more effective if this kind of intelligence on information and service needs is available.

The knowledge about users of e-government information and services should be updated on a regular basis. For instance, the e-government survey of Iowa businesses and citizens can be done every two or three years. Although not directly surveying its users, the state of North Carolina has been surveying its local governments every other year to understand the use of information technology. The state of Iowa can pick a selected set of issues (e.g., privacy and demand for wireless services) to examine every two or three years while tracking basic information such as the internet penetration rate.

Financing

The strong survey evidence that businesses and citizens are willing to pay fees to adopt the option of online service delivery by state agencies suggests that developing an Iowa *e*Government Enterprise could be a successful approach to financing the development of online transactions. There are two aspects of the financing approach. First, a market driven approach should be managed at an enterprise wide level; that is, there should be one IEE agency that manages e-government service provisions for all state agencies. The statewide enterprise approach promotes a strategic plan for development of services targeted to meet user demands. Second, the IEE should be financed with a business-like enterprise fund for purposes of accounting and budgeting; that is, the financing for the IEE *primarily* would depend upon e-government revenues—not general fund appropriations from the legislature.

The enterprise approach to financing e-government development has several advantages over a system that depends on legislative appropriations specific to an agency budget request. First, development of e-government services would be independent of the budget cycle, permitting a flexible responsiveness to emerging user demands for services. Second, a revenue based approach requires information on user demands to convince the IEE to invest in the development of a service, rather than the budgetary skills of an agency head who must manage the political environment of the state legislature during the budget process. Third, a statewide enterprise approach provides the IEE with the flexibility to invest in one service with a short-term cost recovery period and high return on investment (ROI) and another service with a longer cost recovery term and different ROI; that is, the IEE can subsidize development of one service with revenues from another service that has already repaid the investment costs.

Finally, the enterprise approach provides pricing flexibility so that the overall cost structure of the IEE (including personnel, payment surcharges, etc.) can be financed by the overall stream of revenues of the enterprise; that is, the financing of each service is independent of the vagaries of an agency's particular appropriations structure. For example, in Iowa, agencies are required by law to deposit all monies collected for the various license or filing fees into the general fund; they are not allowed to first deduct payment of credit card charges from the monies collected. The effect is to force agencies to ask the legislature to "fund" the payments for credit card charges (increasing their general fund budgets) or to levy a surcharge on the credit card and EFT payments. Since the legislature is not inclined to increase agency budgets, the most feasible option is a surcharge (a substantial barrier to online adoption according to both the citizen and business surveys). The restrictions are more onerous given that state agencies must maintain dual systems (manual and electronic) until such time as there is such a predominance of electronic access that manual systems can be discontinued. The politics of the general fund budget are consequently an impediment to further development of the transactions phase of e-government evolution using traditional appropriations.

The key to the market approach is developing a price for services that encompasses costs across all product lines (including payment surcharges) and then applying a market price specific to each service. As presented in figure 6, a transaction pricing pyramid, the IEE would develop services based on market demand and share revenues from the user charges with the agencies providing the service (for staffing, etc.). The specific price for an online service will be determined largely by the users' willingness to pay, both as determined by initial market surveys and by experimenting with user charge levels.

We can summarize the general principles underlying the pricing pyramid as the following:

The more that benefits accrue to a specific firm, the higher the value to the firm, and the more willing the firm should be to pay a higher charge for the service. Conversely, the higher the social benefits, the greater the justification for the infusion of general fund investments to underwrite at least some portion of the IT infrastructure required to deliver the services.

Figure 6. Transaction Pricing Pyramid for Online Services

Business Services
Citizen Services

Optional Services

Transaction Fee: Upper bound negotiated with enduser

Customized searches
Business-related data report

Customized searches and data reports

Apply or renew Licenses or certificates

Apply or renew licenses or certificates

Convenience Services

Bidding and commercial registration

Parks & recreation reservations

Employer-related data searches

Employee-related data searches

Transaction Fee: Fee set for each service

Apply or renew permits

Apply or renew permits

File claims or reports

File claims or reports

Paying Taxes Online

No Fee*

Public assistance registration

Paying Taxes Online

Basic Services

Information Websites

Information Websites

Downloadable Reports and Documents

No Fee. Requires general fund support.

Downloadable Reports and Documents

Notes: * See political constraints.

Political Considerations: Developing and financing e-government cannot occur without heeding political considerations. For example, paying taxes online presents a special case from the other e-transaction services. We define taxes here as the broad corporate and individual income taxes

paid by firms and citizens, and sales taxes collected by firms as agents of the state. All must pay taxes; there is no option. Paying taxes has broad social benefits (externalities) and minimal consumptive benefits to the firm or citizen as a taxpayer. Given resistance to paying taxes generally, it is unlikely that legislators will support a surcharge levied on firms paying their taxes online. In addition, Crawford, Johnson & Northcott (1999) found strong resistance from firms to the suggestion that e-payment of taxes should involve a surcharge as well. Thus a surcharge on paying taxes online is unlikely, even when a state or local government adopts an e-government enterprise approach. Consequently, the enterprise approach does not preclude infusions of general fund appropriations to the extent that capital financing (such as for e-payment of taxes) will have broad social benefits and will increase overall efficiency of state government. Registration for public assistance has similar political properties and such an application would likely need to be financed from the general fund.

In addition, Taylor (2003, 41) correctly argues that there is "no pure play" for deciding whether to fund e-government improvements with general fund or user charges; solutions require some combination. In choosing the mix, governments must pay attention to who benefits from the online services. To the extent there are social benefits worthy of public investment, it is appropriate to use capital investments from the general fund for ICT infrastructure (Robbins and Miller 2004). There are inherent social benefits to the more efficient government operations expected with an online modality approach, and initial and periodic infusions of general fund capital will be warranted as a catalyst to the development of online services by state agencies. Developing e-filing of taxes is a prominent example. Still, the market approach has much merit; the financing of online developments and maintenance can be funded largely with transactions service charges less than or equal to the savings firms will experience in online costs versus the traditional paper option.

Information and Communication Technology (ICT) *Infrastructure Development:* An IEE approach to further e-government development in Iowa has an additional long-term benefit. The higher willingness-to-pay (WTP) weight given to business services compared to citizen services suggests a long-term strategy for the development of ICT infrastructure by the IEE. *By carefully developing and following a strategic plan for the development of online services demanded by the business community, the IEE can reinvest revenues from business services to build the ICT infrastructure necessary for providing citizens with online transaction services. Building the infrastructure with reinvested business revenues will ultimately lower the marginal cost of adding online services for citizens and reduce the need for general fund financing.* An important consequence is that service fees for citizens can be set low enough to match the WTP weights suggested by the citizens demand curve (figure 3). This two-phase development strategy could facilitate the development of high value types of services for citizens, such as a "Schools Out" notification system, which might be a very popular citizen service, but for which there also could be high resistance to pay for the service. In effect, the state can use the IEE to develop and implement a two-phase strategy that meets the differing needs of businesses and citizens, and adapts the pricing structure to meet differing WTP preferences.

Integrated Service Channels and Support

Although it may be increasingly small, there will still be a group of citizens or businesses that will not connect to the internet. The ultimate challenge is to provide integrated services more efficiently with the use of information and communication technology. As more people conduct

transactions with government online, state government can free resources to improve service quality. There are certainly more government services provided via traditional channels than electronic ones, and concerns for the persistence of a digital divide among citizens will require continued provision of traditional service channels. The traditional paper channels are unlikely to be eliminated in the near future.

The results of the e-government surveys of businesses and citizens suggest specific areas for service improvement. A common complaint of citizens and businesses is difficulty in finding the information they are looking for. State portals need to improve the search engine on their site as well as navigation structure to improve navigation efficiency. To adopt best practices, the State of Iowa's official portal should also provide a list of the most popular services and a quick drop down box of services organized by the user communities. Development of a one-stop web portal for online transactions with multiple state agencies, supported with a service-oriented architecture, will enhance the e-transaction experience and remove a significant barrier to online service adoption.

The support for integrated services is to provide incentives for citizens and businesses to participate online and remove barriers to doing so at the same time. For online services for businesses, state government needs to focus on the provision of phone support and improve the speed of transactions to streamline application of various permits and licenses. For citizens, state agencies need to address the perceived problem with privacy and security. Moreover, state agencies need to allocate resources to provide up-to-date information and to make services available 24/7.

Publicizing and Communicating

Publicizing and communicating with e-government service user communities is an integral component of an enterprise e-government strategy. Businesses and citizens, based on the results of Iowa e-government surveys, prefer different channels of learning about news about e-government services. Businesses prefer to get news about e-government services via e-mail notices and government publications. To reach the business communities, state agencies can utilize one of these two channels that over 80 percent of businesses prefer. Trade newsletters and TV/radio are less effective channels; only 67 percent and 58 percent, respectively, of businesses indicated these as one of their preferred channels. Newspaper advertisement is deemed as even less effective with the support of only 55 percent of businesses.

In contrast, the most preferred method of publicizing e-government information and services with citizens is TV/radio (91 percent). The experience of the city of Des Moines with its online mosquito spread reporting and monitoring speaks to the effectiveness of working with media such as TV/Radio. A sharp contrast is also seen between citizens and businesses in the use of newspaper advertisement. Citizens responded rather well to this media (81 percent). E-mail notice and government notices are less popular ways of publicizing online information and services among citizens.

The marked difference between the popularity of communication channels suggests a user-group specific strategy in publicizing e-government information and services. For citizens, working with media such as TV, radio, and newspaper is a more effective strategy. In contrast, the best way to reach businesses would be through e-mail notices and government publications. The difference is probably due to the nature of transactions with government and the concern about privacy. Businesses are less concerned about privacy. As a result, they are more willing to share their e-mail addresses. Moreover, businesses prefer faster speed, getting an e-mail is a

speedy way of staying informed. Unlike businesses that receive notice on compliance, citizens do not receive government notice on a regular basis (although they could enroll in this option if it were offered by the IEE). They need to rely on mass media to stay informed about any recent development in e-government information and services.

Communication between government and user groups is critical. The state of Iowa has implemented a strong information security policy to safeguard information collected by government. However, the citizen survey suggests that there is a gap between reality and perception. State government may need to work through the preferred channels of communication to manage the expectation of online security and privacy and provide an informative description of the safeguards in state agencies.

Conclusions and Recommendations

Iowa e-government has been making significant progress in moving to a more mature stage of electronic government. However, like most other state governments, there are many areas for further growth in online services and more effective ways of serving citizens and businesses via electronic services. More specifically, a more advanced Iowa electronic government needs to address issues of internet access, utilization and demand for online services, and financing.

For internet access, Iowa state government needs to develop different strategies for businesses and citizens to address the lack of access (digital divide). State government needs to invest in providing low-cost or even free access to the internet to overcome cost barriers for citizens, and provide convenient services to attract businesses to transact with government online.

Iowa state government needs to address different online service needs of citizens and businesses as an enterprise. Citizens are behind businesses in the adoption of online transactions with state government. The relatively low adoption rates for businesses and citizens indicate opportunities for growth. If these future demands are realized, the state of Iowa will have 85 percent of businesses and 75 percent of citizens transacting with government online.

The strong future demand requires Iowa state government to adopt a financing strategy to fund the development and implementation of online services. The preferred approach is a market approach that relies on a self-financing model, the Iowa *e*Government Enterprise. The pricing scheme for the IEE should adhere to public finance principles and flexibly provide a wide range of information and services. The results of the Iowa business and citizen surveys provide valuable information on willingness to pay. The support for user fees specifically for online services demanded by users supports the feasibility of a self-financing model.

To accelerate the advance of e-government, Iowa state government can adopt an enterprise strategy that continuously gauges the needs of citizens, businesses, and all other e-government users as well as understands their preferences on e-government financing and payment methods. The preferences of users should be reflected in the governance structure for enterprise-wide e-government services and allocation of resources. Revenues primarily should come from user fees which are shared with various state government agencies. General fund appropriations will be required for services that have broad social benefits, such as e-filing taxes. The IEE will need to pay attention to the provision of integrated services and support and publicizing and communicating new and improved services to the user community.

In the near future, Iowa state agencies can benefit from working with local governments to achieve agency and end user efficiencies by vertical integration of online information and

services. The IEE also can assist local governments in building their e-government capacity, particularly in the area of e-participation to promote civic engagement. Lastly, Iowa state government can move into area of knowledge management and business process reengineering to vigorously address the challenges posed by the loss of experience and knowledge resulting from the baby boomers reaching retirement age.

Iowa state government will be able to move aggressively by taking advantage of emerging trends of electronic government. This report, and the two reports that preceded it, provides critical information to help the state's evolution to a more sophisticated and effective system of service delivery. The framework suggested in this report is an invitation for state policy makers and user groups to engage in the exciting prospects for Iowa's next stage of e-government development.

References

Carroll, J. M., & Rosson, M. B. (1996). "Developing the Blacksburg electronic village," *Communication of the ACM*, 39(12), 69-74.

Crawford Johnson & Northcott, Inc. 1999. *Attitudes toward the Iowa Department of Revenue and Finance and the Services they Provide*, Survey Consulting Report, July.

Center for Technology in Government. (2005). *About CTG*. www.ctg.albany.edu/about/ [accessed June 10, 2005].

Chen, Yu-Che and Kurt Thurmaier. 2005a. *Iowa E-Government Business Survey: Anticipating Demand and Understanding Financing Strategies*, report prepared for IOWAccess Advisory Board, Iowa State University, June 12, 2005.

Chen, Yu-Che and Kurt Thurmaier. 2005b. *Iowa E-Government Citizen Survey: Anticipating Demand and Understanding Financing Strategies*, report prepared for IOWAccess Advisory Board, Iowa State University, August 12, 2005.

Fox, Susannah. 2005. *Digital Divisions*. Pew Internet & American Life Project, Washington, D.C.

General Accounting Office (GAO) of the United States. (2001). *Characteristics and Choices of Internet Users*. www.gao.gov/new.items/d01345.pdf, [accessed September 24, 2005].

Diana Burley Gant, Jon P. Gant, and Craig L. Johnson. (2002). *State Web Portals: Delivering and Financing E-Service*. Arlington, Virginia: PricewaterhouseCoopers Endowment for the Business of Government, January 2002

Glover, Mike. 2004. "Officials announce expanded electronic filing of payroll withholding taxes," *Des Moines Register*, December 7: B5.

Ho, Alfred Tat-Kei. 2002. "Reinventing Local Governments and the E-Government Initiative." *Public Administration Review* 62(4):434-44.

Holden, Stephen, Donald Norris, and Patricia Fletcher. 2003. "Electronic Government at the Local Level: Progress to Date and Future Issues," *Public Performance and Management Review* 26, no. 4: 325-44.

Horrigan, John. 2004. *How Americans Get in Touch With Government: Internet Users Benefits from the Efficiency of E-Government, but Multiple Channels Are Still Needed for Citizens to Reach Agencies and Solve Problems*. Pew Internet & American Life Project.

Horrigan, John. 2005. "*Broadband Adoption at Home in the United States: Growing but Slowly,*" paper presented to the 33rd Annual Telecommunication Policy Research Conference, September 24, 2005.

International City/County Management Association. (2001). *Electronic Government Survey 2000*. Washington, D.C.: International City/County Management Association.

International City/County Management Association. (2002). *Electronic Government Survey 2002*. Washington, D.C.: International City/County Management Association.

International City/County Management Association. (2004). *Electronic Government Survey 2004*. Washington, D.C.: International City/County Management Association.

Johnson, Craig L. 2002. "Financing and Pricing E-Service," in Diana Burley Gant, Jon P. Gant, and Craig L. Johnson, *State Web Portals: Delivering and Financing E-Service*. Arlington, Virginia: PricewaterhouseCoopers Endowment for the Business of Government, January 2002, pp. 35-55.

Larsen, Elena and Lee Rainie. 2002. *The Rise of the E-Citizen: How People Use Government Agencies' Web Site*. Washington, D.C., Pew Charitable Trust.

Layne, Karen and Jungwoo Lee. 2001. "Developing Fully Functional E-Government: A Four Stage Model," *Government Information Quarterly* 18(2):122-36.

Marchionini, Gary; Samet, Hanan, and Brandt, Larry. "Digital Government," *Communications of the ACM*. 2003 Jan; 46(1):25-27.

Mossberger, Karen, Caroline Tolbert, and Mary Stansbury. 2003. *Virtual Inequality: Beyond the Digital Divide*. Washington D.C.: Georgetown University Press.

Moon, M. Jae. 2002. "The Evolution of E-Government among Municipalities: Rhetoric or Reality." *Public Administration Review* 62(4):424-33.

Momentum Research Group of Cunningham Communication. (2000). *Benchmarking the eGovernment Revolution: Year 2000 Report on Citizen and Business Demand*. Washington, D.C.: Momentum Research Group of Cunningham Communication.

Norris, Donald. 2003. "Leading-Edge Information Technologies and American Local Governments," in *Public Information Technology: Policy and Management Issues*. Ed. Garson, David. Hershey, PA: Idea Group Publishing.

Norris, Donald and M. Jae Moon. 2005. "Advancing E-Government at the Grassroots: Tortoise or Hare?" *Public Administration Review* 65(1):64-74.

Perlman, Ellen. 2004. "Dealing in Data," *Governing* 17(12) September: 22-6.

Pew Internet & American Life Project, February-March 2005 *Tracking Survey*, www.internet.org/trends. accessed 14 November 2005.

Rainie, Lee. (2004, April 13). *Latest Internet Tracking Data*. Pew Internet Project Data Memo. Washington, D.C.: Pew Internet and American Life Project. Accessed Nov. 28, 2005 www.pewinternet.org/pdfs/PIP_April2004_Data_Memo.pdf

Rogers, E., Collins-Jarvis, L., & Schmitz, J. (1994). :The PEN project in Santa Monica: Interactive communication, equality, and political Action," *Journal of the American Society for Information Science*, 45(6), 401-410.

Ross, Jeanne. (March 2003). "Creating a Strategic IT Architecture Competency: Learning in Stages," *MIS Quarterly Executive* 2 (1): 31-43.

Schedler, Kuno and Maria Christina Scharf. (2001). *Exploring the Interrelations between Electronic Government and the New Public Management: A Managerial Framework for Electronic Government*. I3E Conference Zurich.

State of Washington. (February 2002). *Washington State Digital Government Plan*. Seattle, WA: State of Washington.

Thomas, John Clayton and Gregory Streib. 2003. "The New Face of Government: Citizen-Initiated Contact in the Era of E-Government," *Journal of Public Administration Research and Theory* 13(1):83-102.

United Nations -- DPEPA & ASPA. (2002). *Benchmarking E-Government: A global perspective*. New York, United Nations: American Society for Public Administration.