e-Government and Financial Transactions: Potential Versus Reality

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Abstract: Some of the most challenging e-government applications involve allowing citizens and other customers such as businesses to conduct financially related transactions electronically with governments on a 24-hour, 7-day a week basis. There has been little empirical research on the utilization rates of on-line financial applications. This paper reviews existing data concerning usage rates and presents new data from governments at the state and local levels concerning the usage rates of these online systems. Generally, usage rates are low, demonstrating that there is a gap between the potential and reality of this form of e-government. Statistical tests showed that convenience fees have a negative effect on usage rates. There were also statistically significant differences among applications. Population size was not significantly related to usage rates. Our qualitative data suggest that governments can affect usage rates by providing incentives to employ online transactions and/or penalties for making payment by manual methods. Governments may also improve their usage rates by making their websites and applications accessible and easy-to-use as well as by extensively marketing these applications. Finally, the intrinsic advantages of the applications themselves compared to traditional payment methods affect usage rates.

Keywords: e-Government, usage rates, e-Payment, convenience fees, marketing (of e-Government and e-Payment services)

1. Introduction

In this paper, we study the use of e-government (Holden, Norris, & Fletcher, 2005, p. 64) to provide financially related transaction services to citizens 24 hours, seven days per week such as paying of bills and filing of taxes. There are at least two major positive expectations associated with these types of transactions: (1) It is expected that they will make it easier and quicker for citizens and others to conduct transactions with government by providing a 24/7 method of access; (2) It is expected that by moving these transactions from mail, phone or in-person contacts to electronic exchanges that government may save money such as by less need for personnel in "front office" duties involving the general public as well as other savings including avoidance of costs associated with physical mailings and dealing with bad checks. In addition, many governments suspect that citizens will eventually expect and demand online services because they have become used to this mode of conducting businesses such as with Amazon.com or E-bay. This viewpoint is supported by a recent Federal Reserve (2004) study of payment trends for the period of 2000-2003 showed rapid changes towards electronic payments. In 2000, most non-cash payments were by check but by 2003, most were by "electronic instruments" and the number of checks paid actually declined during these years (Federal Reserve, 2004, p. 10).

2. Literature review

Data show the potential for growth in the use of electronic financial transactions by governments. For example, a 2004 survey by the Pew Center (Horrigan 2004) found that 30 percent of all contacts with government concerned transactions of some sort. A Pew study (Horrigan 2004) asked how many people would prefer to perform personal transactions to the Internet and between 20 and 26 percent each said they prefer to do transactions for auto licenses, personal projects, recreational licenses, and professional licenses using electronic means. As one might expect, the study showed that citizens with broadband access were more likely to want to use the internet for transactions..

Coursey (2005) reports that an average of 44 percent of citizens requested online financial transactions according to citizen surveys. However, Norris & Moon (2005) based on the 2002 survey by the International City/County Management Association (ICMA) found that only about 5 to 7 percent of governments currently allow for online processing of financial transactions. But change should be occurring soon. According to Moulder (2005), more than 50 percent of local governments (including 50 percent of those with populations from 5000 to 9000) plan to offer online payment of utility bills, fees and fines. However, Norris & Moon (2005) cite data to show that there is a wide gap between

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stated intentions and actual behaviour with respect to the implementation of financial transactions. Norris & Moon (2005, p. 70) point out that, based on stated intentions, the percent of governments adopting financial transactions should have jumped by 32 per cent between 2000 and 2002 but the actual increase was only 6.5 percent.

There are significant obstacles to offering online services. Norris & Moon (2005) found that lack of IT staff and financial resources were the top two barriers to e-government in 2002. Norris & Moon's data also show that the percent of governments citing the issues of security and convenience fees grew faster than other barriers between 2000 and 2002—this finding could reflect their interest in developing online transaction systems. Coursey (2005) points out that the funding of these systems often requires convenience fees that are resisted by political leadership and these fees also may violate local ordinances. However, there are now third party vendors who will provide e-commerce sites for governments. Arrangements vary but one approach that is cost free to government is to allow the vendor to charge convenience fees to recoup their costs and assist in making a profit on these ventures. In some cases such as in the Illinois Epay Program (http://www.illinoisepay.com/epay/index.jsp), the state may arrange a contract and make online payment systems available to a wide variety of governmental organizations including many municipalities and county governments that have few IT resources of their own and, in some cases, even lack their own website. In the state of Washington, several governments have cooperated on developing a successful system (MyBuildingPermit.com) for doing simple (i.e., they don't require plan review) permits online and some of these local governments are relatively small in population. This system has been highly successful. For example, during 2004, their overall percentage usage rate for all of the cities taken together in 2004 was about 29 percent of all subject permits issued and the rate has been increasing in 2005 (Michaud, 2005). Perlman (2001) discusses how the use of third party vendors has allowed counties without large IT resources such as Cobb County (Georgia) to implement an online ticket-paying system. Cobb County obtained a 17 percent usage rate and helped to shorten lines at the courthouse. These cases show that small and moderately-sized cities can experience success through use of vendors and cooperative efforts of pooling resources.

One of the most important aspects of planning for online transaction systems is the extent and speed with which the intended customers of these systems use online functions. This usage rate is sometimes referred to as a "penetration" or "take-up" rate. This rate is important to vendors and the nature of the deal that they are willing to strike with governments—the higher the rate expected, the more favourable the deal they would be willing to make. If the government conducts its own online transaction system, then the usage rate will be important because government will want to recoup its investment of personnel, hardware, and software with benefits such as less time required to conduct traditional mail or in person transactions, though some governments told us that the major goal of such programs is to reduce costs for customers as an official associated with the MyPermit.com (Michaud, 2005) observes:

Standard ROI methods do not work with on-line applications. Too many of the benefits are "soft"—either they are on the side of your customer or they are in the improved image of the city. In our case, the cost savings are almost all on the customer side.

Still, planning for governmental e-commerce requires assumptions about these usage rates. For example, a plan for e-government for the State of Massachusetts (2001) assumed that the "take-up rate" for individual citizens would begin at 10 percent and increase 5% per year so that by the fifth year of implementation, it would reach 35 percent. The same plan assumed that business usage rate would begin at 15 percent and would increase rapidly to 50 percent by the fifth year of implementation.

Are these assumptions realistic? What are the usage rates obtained by governments for their online financial transactions? Although only a small percentage of local governments offer such transactions according to the most recent ICMA survey cited above, the absolute numbers are large enough now for us to take advantage of the experience of these early implementers and provide a data base for governments planning e-commerce activities to draw upon. These data will also help initiate research into the factors that affect usage rates of governmental online transaction systems.

Despite its importance, there have been few studies of actual e-commerce usage rates. One exception is Rudolphy & Cullison's (2002) study of the State of Arizona's Motor Vehicle Department (MVD) adoption of an online registration system. The original plan was for a "self-funding model" in which IBM would construct and implement the system at no cost to the State. IBM's plan was to recoup their costs and make a profit from a convenience fee that would be charged to

customers using the online system (Rudolphy & Cullison, 2002). The system began in 1997 and worked smoothly in technological terms but the usage rate was low, only about 2 percent in the first year, due largely to the $6.95 convenience fee according to Rudolphy & Cullison (2002). The state passed new legislation in 1998 to allow IBM to recoup money from the registration fee itself and also to be reimbursed for the credit card fee and this policy change led IBM to rescind the convenience fee (Rudolphy & Cullison). The result was an increase in usage rate to about 20 percent by 2002. Rudolphy & Cullison (2002) report that an internal study found that online transactions cost about 65 percent less than traditional "over-the-counter" service.

Strover's (2002) Texas survey and found the highest percentage of citizens willing to pay high fees (over 10 dollars) for renewing driver's license (10.1%) and filing and paying taxes (7.5%) which makes sense because these are two of the most essential services for citizens. It is instructive to compare survey results with actual reports of online usage from governments. The State of Texas Online Authority (2002, 2000) found a wide range in the degree of usage depending on the particular target group involved. The highest usage rates obtained were for the following transactions: (1) Department of Public Safety Driver records (71.9%); (2) Savings & Loan license renewals (44%); (3) Department of Public Safety concealed handgun license (27%); (4) Real Estate Commission License renewal (23%); and (5) Department of Public Safety Driver's License Renewal (12.7%). The lowest rates of usage were for local government transactions that the Texas Online Authority supported including: City of Mesquite Ticket pay (.2%), City of Dallas Water Bill pay (.2%); City of Houston Ticket pay (.6%); Department of Transportation Vehicle Renewal (1.0%); and Travis County Property tax (1.2%).

The Texas OnLine Authority (2002, p. 18) concluded that the extent of marketing done for the online transaction system helped to explain why some target groups had high rates. For example, the departments with the highest usage rates (Department of Public Safety and Department of Savings and Loan) marketed the new applications on TV, radio, through press conferences, and other media. A survey (Texas OnLine Authority, 2002) studied end users of the systems and found that the most common way that end users found out about the system was from renewal notices but other significant sources were websites, search engines, and libraries.

3. Study purposes and methods

This is an exploratory study of an important but largely neglected topic of usage rates. Our goals are to synthesize existing knowledge, present new information on rates, and develop a preliminary framework to explain variation in usage rates. During the course of the study, we also found it important to analyze other forms of electronic financial transactions that governments employ such as automated debit or credit payment systems. Drawing on qualitative data gathered in the study, we also will also identify certain strategies to improve usage rates as well as some preliminary insights on some of the impacts of these systems.

Since Moulder (2005) found that only about 10 percent of governments have systems now, we deliberately sought out organizations that already have implemented online payment systems. In particular, we contacted local governments that were rated highly by West (2004) and another rating of e-government excellence, the Campbell Public Affairs Institute of the Syracuse University's Governmental Performance Project ratings of counties. In addition, we contacted certain state agencies that were reputed to have high usage rates in order to gather additional information. We also employed major governmental listservs (those of Governmental Management Information Science, the Innovation Groups, and CityWebmaster listservs) to solicit data. We asked each government to provide us with the following information: (1) data on the number and percent of transactions that are conducted electronically through their governmental website with credit cards; (2) data on the number and percent of transactions that were conducted by other electronic transaction methods such as "ACH" or direct debit payments. We also requested information about whether they used convenience fees. We obtained responses from 45 governments for 58 different applications. This is an exploratory study and, given the methods we used to obtain data from organizations, we can not claim that these data are representative of other governments. We do know that our governments contain certain organizations have been offering online transaction services for a relatively long period of time as well as others that are very new to online transactions. Despite the fact that we guaranteed anonymity to governments reporting usage data, it is still likely that governments that view their online systems as being successful are more likely to share their data so this and other unknown response biases may affect our findings. Our reporting of these measures, despite the non-random sample, helps to build some benchmark usage data and prepare

the basis for more refined analyses in the future. Moreover, we have a good representation of local governments in terms of size—the governments in our list range from less than five thousand to more than one million in population. In addition to seeking data on their usage rates, the authors also solicited qualitative comments both through e-mail and phone conversations with the respondents to obtain their insights concerning usage rates.

4. Forms of "Electronic" Payments and state-level data

When we began this research, we were primarily focused on one specific form of electronic transaction: transactions by individual citizens with governments through websites with credit cards since this has been the focus of research by most e-government researchers such as West (2005). As we explored further, we realized that web-based credit card payments were only one of several different electronic transaction methods offered by governments and these other forms often dominate in terms of numbers. For example, projects such as New York City's NYCSERV and Indiana's ePay programs, named winners of a contest for online systems by the NECCC (National Electronic Commerce Coordinating Council 2004), employ a variety of forms of transactions including web-based credit card payments, Interactive Voice Response (IVR), Kiosk, ACH-credit, ACH-debit, and other forms of electronic payments from customers. For state agencies, there are several approaches to filing state taxes (Federation of Tax Administrators 2004) that are electronic. There are ELF, Telefile, On-Line, and Direct I-file returns that are at least partially electronic in nature: (1) ELF: returns are submitted by practitioners; (2) Telefile: citizens use touchtone phone to submit their forms; (3) Direct I-File in which citizens submit their forms directly to the state through a state website; (4) Online Returns in which citizens submit their forms via personal computers and software through "electronic return originators;" (5) Bar-Coded paper returns in which the paper returns are captured and converted into electronic form. Of course, many would not consider the bar-coded approach to be "electronic." Moreover, new forms of electronic conversion and payments are continually evolving. For example, one of the municipalities we contacted employs "Distributed Payment Capture" in which payments left in an outdoors payment box are scanned and converted to enable an electronic ACH deposit. In short, we have now reached the stage where most payments will quickly be converted into electronic format even if it is initially made via manual methods but there remain differences among these methods in the extent to which they have eliminated the need for manual processing and human intervention on the part of the government.

The different forms of transaction methods have their advantages and disadvantages. Direct debit or the "ACH" method has the advantage of usually not involving any fees for the government or the citizen. This method, however, may not be practical if the bill is due in a short period of time and the person is not already signed up for this form of payment, although one of the governments in our sample did offer a "one time ACH" payment option. Thus direct debiting forms of payment make best sense for recurring types of charges like utility bills while occasional payments that often have short-time frames for payment (e.g., for traffic violations) mesh better with online credit card payments. From the governmental point of view, the credit card approach has an advantage of immediately obtaining the funds and problems of payment become a matter for the individual and his/her credit card company to work out. By way of contrast, an electronic debit approach will not obtain any money if there is nothing left in that person's account and thus presents a difficulty similar to bad checks.

There are wide ranges in the degree to which states employ these particular forms of electronic submissions. The majority of all states' electronic income tax filing appears to occur through electronic arrangements with "practitioners" (the "ELF" electronic submission form). For example, in 2004 (Federation of Tax Administrators, 2004), about 81 and 71 percent of the electronic taxes filed to Iowa and Illinois occurred through ELF. Iowa overall had the highest rate of electronic submission, about 60 percent (including telefile) but less than 3 percent of Iowa returns were filed by the I-filing method through direct electronic submission by citizens from a website. By way of contrast, Illinois had less than 40 percent filed electronically but had more than 9 percent filed through the I-filing method. If one includes bar-coded returns as electronic, then Massachusetts had the highest overall electronic filing rate with more than 80 percent. (Federation of Tax Administrator, 2004). The percentage of taxes filed electronically by states varies greatly from 19% (Rhode Island) to 60% (Iowa) (see Table 1 below). The relatively high rates of state taxes being filed by electronic methods is explained by at least two factors: (1) Residents who file electronically expect to quickly receive a refund so they are actually expecting a benefit rather than paying a bill; (2) A large proportion of these payments are made by tax processing "practitioners" for whom electronic submission makes economic sense and the fact that states

can require or more easily target efforts to increase electronic submission on a narrow set of businesses. Another factor affecting usage rates is a state mandate. Duncan & Burruss (2005) point out that certain states mandate electronic payments for practitioners and these mandates have had a significant effect on usage rates

Table 1: Shows the electronic payment rate

Type of Organization	Bills-Application	Time period	Overall Electronic Rate	Types of Electronic Payments Included
States	State tax filings	2004	19-60%	Telefile, I-file, Online, Web, & IVR
State of Arizona	Vehicle Registrations	July-December 2004	32.18%	Web & IVR
State University	Tuition Payments	2004	3.54%	Web

Also impressive is the State of Arizona's 32.18% rate of electronic submission (IVR and Web combined) for their automobile registration (see Table 1). Moreover, there has been a steady rate of increase in Arizona's percent of registrations done via the Internet or Interactive Voice Response System from 1.2 percent in FY1998 to nearly 28 percent for FY2004 for an average increase of nearly 4 percent per year. Arizona's success began with the repeal of the convenience fee thus the percent Internet/IVR jumped from 1.3 to 7.35% in the 1998-1999 period but the upward trend has continued steadily since then indicating that there is an underlying secular trend to greater use of online transactions. In Table 1, we combine Internet and IVR—disaggregating these two categories shows that the percent done by the Internet rose steadily from about 12 percent in 2002 to 25.5 percent in 2005 (year to date) while the percent done by IVR has actually declined from 7.1% to 6.6% during the same time period. (Note: We are indebted to James Cullison, Arizona Department of Transportation for providing this updated analysis of the Arizona data). By way of contrast, the percent of tuition payments at one state university done through the Internet was 3.54%. (Note: we keep this university temporarily anonymous to preserve the anonymity of the authors).

Several of the state and local governments provided us data concerning usage rates for several years and the data show a consistent secular trend to higher rates through time, though the improvement generally is gradual. For example, data provided to us recently by the State of Texas OnLine Authority allow us to compare FY2005 data for selected Texas applications (see Table 2 below) and there are (with one exception) systematic improvements in usage rates, often sizeable, between the 2002 and the projected 2005 usage figures. The Texas results and the high rate of success with tax practitioners illustrate one principle of online transaction systems: success is easier when the target group is relatively small in number so that marketing efforts can be concentrated. Likewise, success is likely to be greater when the target group can perform a large number of transactions that are important to the success of their jobs or businesses as opposed to the occasional transaction that characterizes many of the online transaction systems aimed at general citizenry

5. Local government results

For local governments, Table 3 below shows the percent of web payments with credit cards range from zero percent for two local governments to a high of 45 percent for simple building permits but the latter figure is an exception. Many of the governments provided us with several months and, in a few cases, years of data. In these cases, we calculated averages for the most recent year or fiscal year or for the several months of data provided. In Table 3, we report averages and ranges for those categories of applications that had several responses: parking violations, utilities, property taxes, and water-related payments. The percent usage for parking tickets was highest with an average of more than 10 percent compared to 3 percent for utility, two percent for water, and only about 1 percent for property taxes. We conducted simple t-tests and the differences in usage rates between parking and water-related were significant ($p < .001$, 2 tail) but those between parking and utility were not quite significant ($p = .051$, 2 tail). Most utility and water-related web payment usage rates are in the low single digit range. We received few reports for business taxes but the few we did obtain were generally low. So, generally, the penetration rate for web payments of most local government applications appears to be low. The percentages of payments by electronic debit (also often referred to as "ACH" or "bank draft" by our respondents) were generally more substantial than the percent of web payments. In 18 out of 23 cases where we received percent usage figures for both web and direct debit (ACH) payment methods, the direct debit percent surpassed the web payment, often by a substantial degrees—a

paired samples t-test found the difference . significant at p<.001.

Table 2: State of Texas OnLine Authority: Selected 2002 & Projected 2005 Adoption Rates Compared

Agency	FY 2002*	Projected FY2005**	# Transactions (2005)
Nurses License Board	50%	135.82%	8,321
Texas Dept. Licensing & Regulation Air	4%	12.27%	196
Licensed Chemical Dependency Counselor Renewal	4.10%	23.82%	41
Railroad Commission License Renewal	4.40%	42.39%	401
Department of Insurance Agents License Renewal	9.33%	22.73%	2,034
Real Estate Commission License Renewal	23.20%	59.81%	2,108
Department of Public Safety Drive License Renewal	12.70%	38.33%	23,300
Department of Public Safety Concealed Handgun License	27.30%	8.56%	1,894
Department of Public Safety Driver Records	71.90%	93.96%	759,646
Department of Transportation Vehicle Registration Renewal	1.00%	2.79%	33,850
Texas Engineering Extension Course Registration	0.70%	3.53%	335
Comptroller of Public Accounts Sales Tax	2.60%	6.27%	12,913

*Based on State of Texas OnLine Authority (2002).

**Based on Interim FY 2005 report provided March 24, 2005 by Kevin Tanner, Senior Project Manager, Texas OnLine Authority.

***These are projected figures based on early 2005 results and thus the figures are estimates and can be in excess of 100%.

We explored the hypothesis that governments that do not impose a convenience fee would have higher usage rates by testing for differences in usage rates for local governments with similar applications (water-related & utility) and the usage rates were higher (.047 vs. .012) with the no-fee governments (p<.05). The impact of convenience fees is also suggested by the fact that in 3 out of the 4 cases (in which we know about the status of convenience fees) where web payment percentages exceeded the direct debit (ACH) percentages, the governments had no convenience fee. As noted above, one of the reasons for the relative popularity of the direct debit method is that it generally has no convenience fee attached to its use.

We also explored the hypothesis that the size of the government as indicated by its population would have a positive impact on the percent of online transactions. Population size has been found to be important by Ho & Ni (2004) to the expansion of e-government features. Although the correlations were in the expected direction, there were no statistically significant correlations between size and usage rates overall or within the utility and water-related categories. Of course, due to the non-random nature of our sample and its limited size, these tests need to be replicated on larger, random samples before drawing any firm conclusions. However, the lack of a strong relationship between size and usage rates could reflect the fact that the increasing availability of third party vendors reduces the importance of size as a factor affecting usage rates

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Table 3: Usage rates for local Government

Government	Population Range	Application	Time	%Web	Conv. Fee?	Other Electronic
G27	Over 1,000,000	Business taxes	2004	0.01%	Yes	
G42	250,000-499,999	Business taxes	2004	0.60%	Yes	
G13	2500-4999	Licenses	2005	1.00%	Yes	
G36	Over 1,000,000	Municipal Courts	2004	6.95%	Yes	
G3	100,000-249,999	Parking Violations	2005	17.00%	Yes	
G14	100,000-249,999	Parking Violations	2004	1.25%	Yes	Other: 7.49%
G21	500,000-1,000,000	Parking Violations	2005	4.00%		
G24	500,000-1,000,000	Parking Violations	FY2005	13.70%		
G27	Over	Parking Violations	2004	11.53%	Yes	IVR 2.95%;

Government	Population Range 1,000,000	Application	Time	%Web	Conv. Fee?	Other Electronic Kiosk .26%
G42	250,000-499,999	Parking Violations	2004	18.30%	Yes	
G44	250,000-499,999	Parking Violations	2004	10.89%	Yes	
Average for Parking Violations: 10.95%; Range: 1.25% to 18.30%						
G2	100,000-249,999	Parks &Recreation	2004-2005	6.30%	No	
G42	250,000-499,999	Police Reports	2004	18.10%	Yes	
G22	100,000-249,999	Property tax	FY2005	2.04%	Yes	
G23	500,000-1,000,000	Property tax	2004	0.41%	No	
G24	500,000-1,000,000	Property tax	FY2005	0.01%		
G27	Over 1,000,000	Property tax	2004	2.08%	Yes	
Average for Property taxes: 1.13%; Range .01% to 2.08%						
G27	Over 1,000,000	Red light violations	2004	3.26%	Yes	
G21	500,000-1,000,000	Sewer bill	2005	3.00%		ACH: 2%
G2	100,000-249,999	Simple building permit	Mar-05	45%	No	
G18	Over 1 Million	Ticket payments	2005	2.8%		
G22	100,000-249,999	Ticket payments	FY2005	2.17%	Yes	
G1	25,000-49,999	Utility payments	2005	2.14%	Yes	ACH 8.11%
G4	Under 2500	Utility payments	2005	0.00%	Yes	
G5	100,000-249,999	Utility payments	2005	1.00%	Yes	Direct debit 9%
G6	50,000-99,999	Utility payments	2004-2005	15.85%	No	Bank draft 8.05%
G7	50,000-99,999	Utility payments	2005	1.64%		
G10	25,000-49,999	Utility payments	2004	1.45%	No	Direct debit: 15.34%
G15	2500-4999	Utility payments	2004	0.24%	Yes	
G20	200,000-249,999	Utility payments	Jan-05	2.73%	Yes	IVR: 9.15%
G26	100,000-249,999	Utility payments	2004	4.96%	No	Direct debit 13.40%
G30	5000-9,999	Utility payments	2005	0.50%	Yes	Direct debit: 9.5%
G31	100,000-249,999	Utility payments	2005	11.50%	No	ACH 9.1%; Electronic lock box 14%
G32	100,000-249,999	Utility payments	2005	1.06%	No	ACH 1.19%;Direct Debit 2.14%
G33	10,000-24,999	Utility payments	2005	0.17%		Direct debit 2.14%
G35	100,000-249,999	Utility payments	2004	4.14%	No	
G37	100,000-249,999	Utility payments	2004	2.88%	No	
G38	500,000-1,000,000	Utility payments	2004	0.92%	No	
G42	250,000-499,999	Utility payments	2004	1.80%	Yes	
Utility-Related Payments. Average 3.18%; Range 0 to 15.85%						
G17	250,000-499,999	Vehicle registrations	2004	3.56%	No	
G40	2500-4999	Wastewater bills	2005	0.00%	Yes	
G41	50,000-99,999	Water & Wastewater	2005	4.17%	No	Automatic bank draft: 16.5%

Government	Population Range	Application	Time	%Web	Conv. Fee?	Other Electronic
G8	Over 1,000,000	Water bill	FY2005	5.36%	Yes	IVR 1.2%
G9	500,000-1,000,000	Water bill	2004-2005	0.55%	Yes	IVR 1.2%
G16	50,000-99,999	Water bill	2003	0.01%	Yes	
G19	50,000-99,999	Water bill	2005	5%	Yes	Direct Debit: 25%
G22	100,000-249,999	Water bill	FY2005	4.20%	Yes	
G25	100,000-249,999	Water bill	2004-2005	1.28%	No	IVR 1.73%; ACH-recurring 12%; ACH-one time 1.01%
G28	10,000-24,999	Water bill	2005	0.39%	Yes	ACH 2.56%
G29	25,000-49,999	Water bill	2005	0.39%	Yes	ACH 2.56%
G34	5000-9999	Water bill	2005	0.82%	Yes	ACH 4.65%
G39	50,000-99,999	Water bill	2003	0.01%	Yes	
G43	250,000-499,999	Water bill	2005	.60%	Yes	Automated payment: 15.3%
G45	5000-9,999	Water bill	2005	1.01%	Yes	Direct debit 5.11%
G11	2500-4999	Water-sewer	2005	0.68%	Yes	ACH: 4.69%
G12	50,000-99,999	Water, sewer, & recycling	2005	5.63%	No	ACH 3.62%;DPC: 2.95%
G44	250,000-499,999	Water-Stormwater	2005	2.43%	No	ACH 9.57%

Water-Related Applications. Average: 1.98%; Range 0 to 5.63%

ACH, Bank draft, & direct debit all refer to essentially same idea of electronic transfer arrangements with bank or other financial institutions that results in electronic transfer of funds.
IVR: Interactive Voice Response System that also results in electronic payments.
DPC: Distributed Payment Capture that involves scanning of check to result in an ACH transaction.

The City of Tampa (Florida) provides a test for the impact of convenience fees. (Note: we are indebted to Steve Cantler, Tampa's Information Technology Project Services Leader, for these data). They dropped convenience fees in March of 2005 (see Table 4) and both the percentage of the count of online payments and the percent of the amount paid online increased the months following the change despite the fact that the government did little or no promotion. The percentage usage rates in Table 4 represent an average for all of Tampa's applications but their individual application rates vary greatly—from more than 18 percent for parking tickets to less than 1 percent for business taxes, demonstrating that the nature of the particular application affects usage rates. The Tampa data also illustrate that online percentages are generally fairly stable even though the absolute amounts may be affected by seasonal factors. Table 4 also illustrates the fact that there are two different figures that can be used to calculate usage rates: percentages of counts and percentage of amounts—the count percent is almost double the amount figure in this case. These two different percentages can differ significantly if the size of the typical online payment differs from the typical traditional payment—note that the figures reported in Table 3 employ the count figure. For example, one local government noted that their numbers of "wire transactions" were small but often involved large amounts being transferred from banks.

One of the attractions of web payments is the ability to earn "miles" or other rewards from credit card companies. This would be especially attractive for a large payment such as annual property taxes but most if not all of the property taxes online systems have fairly heavy convenience fees so that the percent paying online is small. Still some do pay by this method even though it does not appear to make economic sense. Indeed, an official in one government reported that in some cases, online credit cards were used for payments that resulted in hundreds or thousands of dollars in fees and the benefits from credit card companies did not appear to justify the costs. Upon inspection, in some of these cases, it turned out it was a third party (e.g., representative of a homeowner association) paying the fee and thus the payment of the penalty made sense from that individual's perspective.

Table 4: City of Tampa Effect of Eliminating Convenience Fees Beginning March 2005

Month-Year	Online Transaction Account	Online Revenue Collected	Percent of Transactions Online	Percent of Revenue Collected Online
Jan-04	4,388	280,886	3.55%	1.70%
Feb-04	4,396	268,067	3.66%	1.59%

Mar-04	4,574	278,481	3.28%	1.50%
Apr-04	4,048	231,278	3.32%	1.52%
May-04	4,034	256,940	3.32%	1.60%
Jun-04	4,208	272,940	3.30%	1.58%
Jul-04	4,209	294,904	3.40%	1.67%
Aug-04	4,280	296,358	2.98%	1.44%
Sep-04	3,578	234,976	2.90%	1.28%
Oct-04	4,510	303,981	3.46%	1.63%
Nov-04	4,378	315,701	3.30%	1.89%
Dec-04	4,441	296,684	3.62%	1.73%
Jan-05	4,375	307,392	3.72%	1.84%
Feb-05	4,381	311,956	3.72%	1.87%
Mar-05	5,894	361,359	4.49%	1.97%
Apr-05	5,784	367,897	4.66%	2.35%
May-05	6,685	437,002	4.90%	2.52%

Source: Steve Cantler, Information Technology Project Services Leader, City of Tampa, Florida

6. Discussion

Web payments can save governments money on postage and are also a quicker and easier method than traditional methods (postal mail or in person payments). The speed of the website credit card payment can make a difference when people are late. For example, one local government has a policy that parking tickets double in cost if not paid within 10 business days. According to an official with this local government, people often don't pay immediately and then panic as they realize the date is approaching so they use the web online system to pay the parking tickets despite its convenience fee and this is one of the reasons why their usage rate for parking tickets is higher (close to 20 percent) compared with less than 2 percent for utility bills. In short, people may resort to online payment to ensure that they make the deadline to avoid penalty fees and be willing to pay the convenience fee if they are less than the penalty.

Online payments with credit cards may also be useful to those who are short on cash and this fact is associated with other important benefits. According to one of the municipal officials, many of the users of online utility payments are late payers whose service is about ready to be cutoff. It used to be that people could write a check and use "float" due to the fact that it took several days for the check to clear. However, the Check Truncation Act (often referred to as "Check 21") has sped up the time that it takes to clear checks and thus cut back on the "float." Consequently, online payment with credit cards is one way to pay when cash funds are not available in their checking accounts. From the point of view of the government, the processing of checks can be costly in terms of time and personnel as well as the fact that a certain percentage of the checks are bad. Thus credit card payment can alleviate the problem of the bad check—the problem of payment then becomes between the credit card company and the customer, not between the customer and the local government. Likewise, the cutting off of utility services is a very serious step (e.g., losing heat during cold weather) so the use of credit cards can help to avoid this dilemma for both customer and government. Our communications with several local governments revealed that they very much dislike initiating these service cutoffs so that if online services reduce the necessity to cutoff services, the online systems could be viewed as successful even if the overall rate of usage is low. One local government reported a drop in "collection shutoffs" of water declined for the city from about 2500 to 1700 during a 3-month period—more than a 30 percent drop. In short, to summarize, the smallness of the percentage figures for web use can mask some important positive impacts.

Web usage rates are likely affected by many factors over which governments have no control such as the socioeconomic status of their populations and the area's degree of "connectedness" to Internet. Areas with wealthy populations with high education levels and prevalent broadband usage are likely to obtain relatively higher rates of usage and these are factors over which governments have little or no control. There are some factors that governments can control. One is the nature of the website—how visible and easy to access and use is the online payment system? The authors searched through more than 200 websites for their online payment applications during the course of this study. In many cases, online services are highlighted on the home page (or portal) so that the online transaction system is both prominent and accessible in one or two clicks of a mouse. In many cases, we had extreme difficulty in finding the online payment system and only were able to locate it by sending a query to the webmaster or some other official of the government. Some of

the variation in usage rates is likely to be due to these aspects of the governmental website.

We were not able to actually conduct transactions to test the user friendliness and effectiveness of the applications. The award-winning NYCServ ePayment Project's (NECC, 2004, p.13) concluded that it is important to have a live help desk that citizens can call and that many hacking attempts were made so that "robust security" is a necessity. However, an official of the NYCServ (Desiderio, 2005) stated that the biggest fraud issues concerned pay by phone—not by Internet. The development of an online transaction system is complex and the NYCServ (2004, p. 14) project concluded that there is no substitute for a field test because acceptance testing could not accurately "simulate actual portal usage." They noted that a focus group would have been useful because it would have turned up insights such as the importance of supporting AOL and Apple that were not included in the original design requirements developed by internal managers. Another agency found similar issues needed to be dealt with: (1) Customer support issues such as lost or forgotten information, credit card validation problems, missing or inaccurate customer information, & user error in navigating the application; (2) Operational issues such as fraudulent credit card use, need to train customer support representatives, and dealing with changes that the system forces to the closing of business operations. If this agency had to start over, some of the steps they would do differently include a more detailed online help system. In short, although we were not able to investigate the actual characteristics of the applications, it is clear that the accessibility and quality of the system will affect usage rates.

A second major factor is marketing. One of the officials running a state-supported online system said that he noticed big differences in usage rates depending on the extent to which the local government marketed their system. We asked governments to provide us information on the nature their marketing and some of high usage rates indicated that they had put substantial effort into it as the following comments indicate. Here are some comments. The high usage rate for MyBuildingPermit.com communities reflects their commitment to marketing the applications:

(Local Government Business Systems Manager) We hired a marketing company to help us come up with a logo and to give us advice. Each of the jurisdictions had posters and business cards and every jurisdiction's Permit Techs told clients about it. We had press releases. During the design stage we had focus groups of contractors who tested the system and gave us feedback. We have contractors that pull a lot of these types of permits so we knew if we targeted some of the big ones we would pick off a large percentage of the applications. We went to the Master Builders Association. We all have public computers in our Permit Centers so we can show clients how to use it. We all have links on our websites to this website….

The nature of the customer pool affects success rate. MyBuilding.Com was able to be quickly successful because they were able to target a few large contractors and thus achieve substantial success by converting them to users. Other communities relied on a variety of marketing strategies:

(Local Government Manager) "We used whatever marketing tools we had at hand. We included a few sentences in our residential newsletter, sent a separate letter to all utility customers and promoted it on our website.

(Local Government Manager): "The marketing strategy was straightforward. The first billing cycle that eBilling was available…the message section of the bill had an announcement with information inviting people to go to our website and view and/or pay their bill. In addition, a buck slip bill stuffer on bright yellow paper was placed in the envelope with more detailed information. (The City does not use bill stuffers very often and limited them to one subject per cycle so there is more effect). In addition, we made the system the "featured" story with a hot link on the home page of the website. We repeated the message on the bill with the next two cycles but did not use a buck slip. In addition, residents who called and paid their bill historically via phone were given the information and invited to look at the system….

In both of these above cases, the governments were relatively successful and their success appeared to be associated with a reasonably extensive marketing campaign. So marketing can make a difference. Still, as we show in Table 4, increases in usage rates can be achieved without additional marketing simply by eliminating convenience fees. According to Cullison (2005), Arizona's auto-registration program did not employ much advertising beyond sticking a flyer in renewal notices but that their application sold itself through word-of-mouth advertising.

In Figure 1 below, we have outlined a model of the factors that, based on our analysis, appear to influence usage rates. Our model is undoubtedly a simplified version of reality, positing that the usage rates are constrained by certain variables that are beyond the control of the government

including the nature of the area served, the pool of customers/citizens and their particular characteristics and financial situations, and the nature of the applications themselves. Within these constraints, organizations can influence usage rates through their convenience rate policies, and the quality of their website and applications. The nature and perceived advantages of the application itself can have effects on customers' propensity to use the systems independent of these factors. For example, according to Megan Michaud (2005), Business Systems Manager for the City of Bellevue (Washington), the MyBuilding.com "system sells" itself because it allows contractors to sit in their office and "pull permits across jurisdictions." We saw in the state level data that fairly high usage rates can be obtained when the targeted group expects a significant benefit such as an income tax refund or if the targeted users are business people whose job will be significantly facilitated by the online system. Our model draws on the Technology Acceptance Model (TAM) that posits that perceived ease of use and utility affect end user's usage of technology (Davis, 1989). Wang (2002) employed a revised TAM model that included perceived privacy of information and the citizen's sense of self-efficacy and found these variables were significant in explaining usage rates of electronic filing systems in Taiwan. Of course, we did not directly study end users of the systems in this research--our model is based upon the qualitative observations of some of the managers of the government systems.

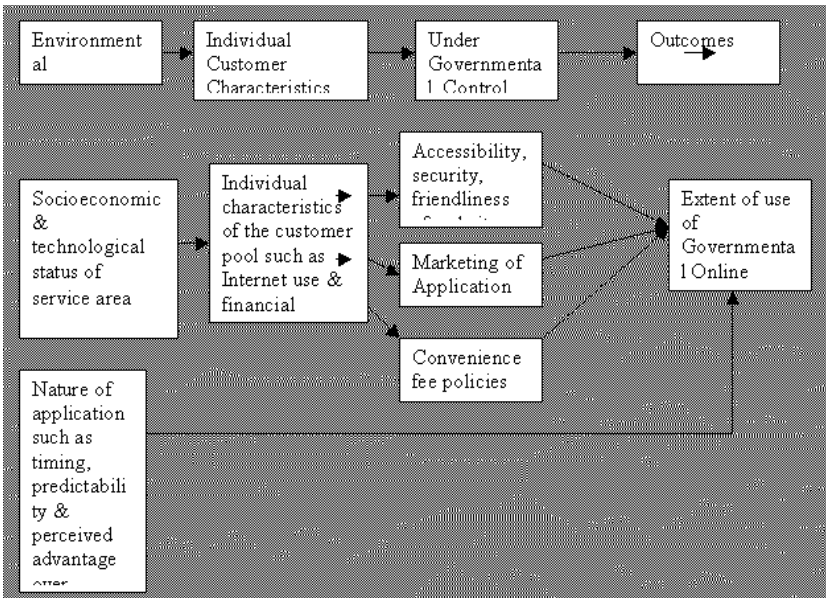

Figure 1: Model of factors influencing use of Governmental online financial

The establishment of online payment systems can be complex for a variety of factors including negotiations with credit card companies. Governments can adopt certain tactics to lower rates for their customers. For example, the NECCC (2004) study reports that the State of Indiana issued an RFP to obtain the best credit card rate. Reportedly, some of the credit card companies have policies that restrict, for example, the use of sliding fees and require that all credit cards offered by online systems charge the same fee. These policies can force government to make choices as to which credit cards they will accept.

All governments providing online systems currently maintain traditional payment systems too so it is important to increase the usage of electronic payment options because the marginal cost of them is less once the system is in place. The trend among the advanced governments is to provide several different options for payment including web payment, interactive voice response, direct debit, and others. An alternative approach to encourage greater electronic payment usage is to charge a fee for traditional methods of payment. This is what Conyers Georgia (Perlman, 2001) did—they charged three dollars for an accident report picked up at City Hall while providing it for free over the Internet. However, such an approach is likely to be controversial since previous work shows that usage rates are correlated with age and ethnicity (Strover & Straubhaar, 2000). Indeed, one local government official explicitly argued against the exclusion of convenience fees for online payments:

We read with interest the experience of other municipalities and "villages" with high median incomes who absorb the costs of "e-payment"

programs…. …this approach doesn't make business sense. "E-government" may be sexy, but it comes at a cost. We made the decision not to subsidize those customers who (and we have heard this quite often) wish to accumulate frequent flyer miles by using their credit card to pay their utility bills.

Our results along with the few other studies done of usage rates provide some tentative conclusions that need testing with a scientific sample. First of all, the percent of payments done through websites with credit cards is generally small for most local governments. Thus governments planning to implement online systems should begin with expectations of low usage rates for applications aimed at general citizenry. High usage rates appear to occur in special situations such as when customers expect benefits (e.g., tax refunds) as opposed to paying a bill, their numbers are small so marketing can be targeted, or the group of intended users are businesses or professionals whose jobs will be significantly easier due to the online system. Still, we found a steady if gradual increase so that usage rates should be substantially higher in the future. In short, online financial transactions continue to offer a great deal of promise for the future but success is not quick or easy but requires a sustained effort.

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