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The University of North Carolina at Pembroke
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**Online vs. In Line: An Assessment of E-Government Initiatives
in North Carolina's County Government Web Sites**

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Master of Public Administration

and hereby certify that in our opinion it is worthy of acceptance in partial fulfillment of
the requirements for this master's degree.

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DEDICATION

In Loving Memory of
Lawrence Jeffery and Pearl Jones Strickland
Roberta Jacobs Locklear

In Honor of
My Lumbee people who broke the chains of oppression and discrimination so that I
might have this opportunity

BIOGRAPHY

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ABSTRACT

ONLINE VS. IN LINE: AN ASSESSMENT OF E-GOVERNMENT INITIATIVES IN
NORTH CAROLINA'S COUNTY GOVERNMENT WEB SITES

by

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Whether standing in line at the county government office or online from the comfortable surroundings of home, the Internet has transformed how government provides services to its constituents. Began in 1969 as ARPANET, the Internet, through e-government initiatives, has transformed government, how it transacts business and its relationship with citizens. Such e-government initiatives include online transactions (financial, registration for events), requests for documents and information, and additional means of contact with government leaders.

To investigate the transformation of government and e-government initiatives in North Carolina's county governments, the International City/County Management Association's (ICMA) *Electronic Government 2004* survey was replicated in North Carolina's 100 county governments. A comparison of the survey results indicates a significant statistical difference between e-government initiatives in North Carolina

county governments and national local governments that rejects the null hypothesis. North Carolina county government Web sites are more likely to be more advanced than those of national local governments. However, the differences may be attributed to the one year's difference between the 2004 and 2005 surveys and changes in IT such as reduction in IT costs, hiring of employees with IT/web expertise and advances in technology.

INTRODUCTION

“Imagine a future in which citizens can log onto one Internet site,” 24 hours a day, 7 days a week, 365 days a year (Basu, 2000), to “easily find the government services they are looking for, and use that site to conduct an online transaction; a future in which businesses fill out one Internet form for all their local, state, and federal environmental regulatory compliance requirements; a future in which government officials make all purchases and payments electronically, saving millions of dollars. The technology for all these applications and others is here today....” (Progressive Policy Institute, 2000).

Born in 1969 as ARPANET (Advanced Research Projects Agency Network), the Internet began as a “partnership between the military, business, and academia to improve communications in support of government sponsored research efforts” (Wikipedia, 2005) and has since “transformed our economy,” society and government (A Guide to E-government and E-commerce, 2000).

As a result, a “new concept began to emerge in American political and governmental parlance, electronic government” also known as e-government or simply e-gov” (Relyea, 2001). E-government is “the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees” (Basu, 2000). E-citizen “demands forced the transformation of government from providing services in line to transacting the same service online from the comforts of their homes” (ibid).

Access to the Internet, as a result, has made communication between citizens and officials much more efficient. From “providing a convenient spot for posting library hours to offering citizens the ability to “chat” informally with their elected officials,” the

Internet “provides the public with convenient access to local government and community based-information” (Bowser, 1998; Bringing Local Government Home, 2000). “There are now virtual offices where residents can conduct their business with speed and security. By eliminating paperwork and mailing costs, e-government also affords some cost savings to local budgets” (Bringing Local Government Home, 2000). The “Internet is becoming one of the most critical items in the local government toolbox” (Bowser, 1998).

President George W. Bush’s President declared, “The federal government can secure greater services at lower cost through electronic government, and can meet high public demand for e-government services. This administration’s goal is to champion citizen-centered electronic government that will result in a major improvement in the federal government’s value to the citizen.” The Clinton-era National Performance Review also pointed to IT [information technology] as a means to “reengineer governmental services” and to “serv[e] the public on its terms” (Moynihan, 2004).

Bill Hansell, executive director of the International City/County Management Association (ICMA), stated, “It has been said we’re living in a dot com world. We think it's going to be a dot governance world” (A Guide to E-Government and E-Commerce, 2000).

In the spring of 2004, ICMA conducted the *Electronic Government 2004* survey to assess e-government activity in U.S. city and county governments. According to the results, ICMA discovered that, among many other things, 99.4% of local governments have Web sites, “nearly 70% of local governments report improved communication with

the public as a result of their E-government initiatives, and 56% cited improved customer service.”

What has been the impact of e-government on North Carolina’s county governments? Replicating the survey in said county governments through the North Carolina County Government Survey (2005), what similarities and differences, if any, exist between the results of ICMA’s *Electronic Government 2004* survey and the 2005 survey? How do North Carolina county government e-government initiatives compare to those of national local governments? Are North Carolina county governments doing better or worse at e-government than national local governments? What are the benefits and challenges to e-government in North Carolina and what has been the impact of the Internet on citizen to government relationships at the county level of government in North Carolina?

HISTORY OF THE INTERNET AND THE WORLD WIDE WEB

The precursor to the Internet had an auspicious beginning in 1969 as ARPANET (Advanced Research Projects Agency Network). The Advanced Research Projects Agency (ARPA) of the U.S. Department of Defense established ARPANET, at that time “the planet’s largest computer network,” “to prevent the U.S. military’s computer system from being destroyed in the event of a nuclear war” (Bowser, 1998). ARPANET “developed as a partnership between the military, business, and academia to improve communications in support of government sponsored research efforts” and “served as a testbed for new networking technologies, linking many universities and research centers” (Aldrich, Bertot & McClure, 2002; Webopedia, n.d.; Wikipedia, 2005). ARPANET

evolved through various iterations until achieving the present-day status of the Internet in the early 1990s.

As evidenced by ARPANET, the federal government took the lead in what is now known as information and communication technologies (ICT). “Early experiments with CD-ROM technology enabled federal agencies, such as the Bureau of the Census, to deliver massive datasets in formats readily usable on personal computers. The Bureau of the Census, the Department of Commerce, the Library of Congress, and other federal agencies also began to post large datasets and documents to electronic bulletin boards that provided dial-up and telnet access to government information, migrating to Gopher access in the early 1990s then to graphics-based World Wide Web access beginning in the mid-1990s” (Aldrich, Bertot & McClure, 2002).

The advent of the graphics-based Web in 1994 “brought the potential for e-government access and services to every desk top in America, indeed in the world” (Aldrich, Bertot & McClure, 2002). The e-government “revolution was underway” (Pew Internet & American Life Project, 2004).

As the Internet revolution began to gain steam in the 1990s, “e-government started to attract the attention of government officials. The federal government began taking deliberate steps to encourage federal agencies to accelerate their adoption of electronics to enhance agency services and internal performance” (Aldrich, Bertot & McClure, 2002). However, “electronic interactions and applications utilized by government and citizens lagged behind similar developments in the commercial sector. By the late 1990s, government agencies began to see the potential of networked information technologies to improve government operations. Yet, the e-government

applications that existed were oriented mainly towards information provision – for example, ‘brochure’ Web pages featured information from publications that were already available offline in print” (Pew Internet & American Life Project, 2004).

The Web, “with capabilities of electronic mail, interactive [W]eb sites and video-conferencing,” made it “a perfect fit for state and local governments.” State governments “began to take advantage of the Web by developing home pages. The “positive reaction to those state web pages prompted city and county governments to test the Internet waters” (Bowser, 1998).

Pew Internet and American Life Project argues, “A decade later, the Internet has reached into – and, in some cases reshaped – just about every important realm of modern life. It has changed the way we inform ourselves, amuse ourselves, care for ourselves, educate ourselves, work, shop bank, pray, stay in touch” and conduct government (2005).

THE E-CITIZEN

The e-government revolution has given birth to the e-citizen. The online population in the United States constitutes 63% of the adults in the country, or about 128 million people age 18 or older. 81% of the nation’s teenagers (those 12 to 17) go online (Pew Internet & American Life Project, 2005).

Pew Internet and American Life Project (2005) reports, “On a typical day at the end of 2004, some 70 million American adults logged onto the Internet to use email, get news, access government information, check out health and medical information, participate in auctions, book travel reservations, research their genealogy, gamble, seek out romantic partners and engage in countless other activities.” “For the most part, the

online world mirrors the offline world. People bring to the internet the activities, interests and behaviors that preoccupied them before the Web existed.”

The Web “has become the ‘new normal’ in the American way of life; those who don’t go online constitute an evershrinking minority. Many of them can scarcely imagine what the world was like way back when people weren’t always connected, ‘always on’” (Pew Internet & American Life Project, 2005).

E-citizens “like the Internet because it can make them more productive and more connected. Theirs is an unsentimental outlook. They are very fond of email, and when they go to the [I]nternet to shop or get information they gravitate to the Web-based versions of traditional retail institutions and news organizations. By 2004, fully 89% of those who went online for political news were getting it from the Web sites of traditional news organizations” (Pew Internet & American Life Project, 2005).

“The longer the Internet is around, the more people expect of it. Increasingly, it is seen as a utility rather than a novelty. In 2002,... large majorities of Internet users and nonusers said they expected to find news, medical information, government information and commercial products and services online — to say nothing of friends, family and colleagues. It’s no wonder that people report that their use of the Internet improves their lives in multiple ways” (Pew Internet & American Life Project, 2005).

TRANSFORMATION OF GOVERNMENT

“Digital technologies, particularly the advent of the Internet and the World Wide Web, are fundamentally transforming our economy,” society and government.

“Reinventing government involves the widespread application of information and

communication technology to the delivery of government services—in short, fostering digital government” (Progressive Policy Institute, 2000). "The Internet has changed the way we think about exchange of information and the way we transact business," says Les Branning of GovStoreUSA.com, an online provider of computer, communications and networking equipment (A Guide to E-Government and E-Commerce, 2000).

According to a recent study by the Washington, D.C.-based Council for Excellence in Government, “nearly three-quarters of respondents said that the Internet will have a positive effect on government operations over the next decade. Facing their constituents' demands for more access to services, a greater need for security and the necessity to become more efficient, local governments are responding. Cities and counties are replacing their old ‘legacy systems’ with the next generation of information technology (IT).” “The new systems allow municipal departments to communicate with each other internally and interact with external customers more efficiently” (O’Connell, 2003). “Virtually every aspect of local government depends on communication between citizens and officials, and the Internet has made that process much more efficient” (Bowser, 1998). “The Internet is becoming one of the most critical items in the local government toolbox” (ibid).

The introduction of the graphics-based World Wide Web in 1994 and government initiatives “has brought the potential for e-government access and services to every desk top in America, indeed in the world” (Aldrich, Bertot & McClure, 2002).

Definition of E-Government

Definitions of “digital government,” “e-government,” or just plain “e-gov” range from “the use of information technology to free movement of information to overcome the physical bounds of traditional paper and physical based systems’ to ‘the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees’” (Basu, 2000; Norris, 2001).

The “common theme behind these definitions is that e-government involves the automation or computerization of existing paper-based procedures that will prompt new styles of leadership, new ways of debating and deciding strategies, new ways of transacting business, new ways of listening to citizens and communities, and new ways of organizing and delivering information.” Eventually, “e-government aims to enhance access to and delivery of government services to benefit citizens. More important, it aims to help strengthen government’s drive toward effective governance and increased transparency to better manage a country’s social and economic resources for development” (Basu, 2000).

Evolution of E-Government

Beginning with ARPANET in 1969, through experiments with CD-ROM technology and evolution of the Internet to the graphics-based Web in the early 1990s, the federal government set the tone for the adoption of ICTs.

However, Misra (2000) argues, in 1997, “local government Web sites were as rare as rain in the desert. But residents demanded to be served electronically -- at the time and place of their choosing. They insisted on access to information and services online, not in

line. They wanted the improved speed and availability that only the Internet could supply.”

Many federal, state and local governments, Miranda (2000) says, rushed “to catch the” e-government “wave.” In 2005, all federal agencies, all state governments (including most, if not all, departments within the states), and over 80 [%] of all general-purpose local governments have Web sites. Through these sites, they offer information and provide services 24/7 to citizens, other governments, businesses, and nonprofit organizations” (Moon & Norris, 2005).

According to Basu (2004), e-government has matured along a four stage development path, which starts with broadcasting, then interaction, followed by transaction, and finally integration.

“In broadcasting mode, the government’s presence would be made with static [W]eb pages and one-way communication. The format of the early government websites is similar to that of a brochure or leaflet.

In interaction mode, [Web sites] would be able to exchange information or services with citizens, where citizens can enquire, and obtain resources from database backed websites located behind a portal. The interaction between government and the public is stimulated with various applications. People can ask questions via e-mail, use search engines, and download forms and documents. The fact is complete intake of (simple) applications can be done online 24 hours per day. Normally this would only have been possible at a counter during opening hours. Internally (G2G), government organizations use LANs, intranets and e-mail to communicate and exchange data.

At the transaction stage, the public would be able to carry out (financial) transactions with the government. This would require higher levels of processing capability, as well as payment gateways and security implementation.

In this situation, complete transactions could be done without going to an office. Examples of online services are filing income tax, filing property tax, extending/renewal of licenses, visa and passports and online voting.

Finally, e-governments would reach integration stage where departments collaborate in significant ways to avoid duplication of efforts, and a one-stop contact point is created, which is capable of handling procedures of all involved departments. In this phase when all information systems are integrated and the public can get government-to-citizen and government-to-business services at one (virtual) counter. One single point of contact for all services would be the ultimate goal. In this phase cost savings, efficiency and customer satisfaction are reaching highest possible levels.”

Moon & Norris (2005) claim, “relatively few governments in the United States at any level and of any size have developed truly sophisticated e-government offerings. Most e-government in the United States today is principally informational--that is, it involves the one-way transmission of information from government to citizens, usually by way of static information pages (‘brochureware’), downloadable forms, and e-mail. Few governments offer much in the way of two-way transactional e-government (making purchases, payments, and reservations, or recording complaints) or provide either horizontal (within a governmental unit) or vertical (among levels and layers of government) e-government integration. Fewer still have established true portals through which visitors can navigate to needed services and information transparently regardless of source or location.”

LEGISLATION

The federal government has taken the lead in e-government. Federal e-government legislation, along with advances in technology, has contributed to the evolution of e-government. Signed in 1980, the focus of the Paperwork Reduction Act (PRA) is “to limit the information the Federal government collects from the public in any form. Not to be confused with the PRA, the focus of 1998’s Government Paperwork Elimination Act (GPEA) is to promote the doing of business electronically, with the public and otherwise. Under the GPEA persons required to submit information to the government, or maintain information, must be given the option to do so electronically when practicable. That includes providing for electronic signatures and the appropriate security for the information involved” (National Oceanic & Atmospheric Administration, 2003).

On June 30, 2000, President Clinton signed into law the Electronic Signatures In Global and National Commerce Act (E-SIGN Act). The E-SIGN Act “established certain procedures and significant rules that clarify the legal status of electronic signatures, electronic contracts and electronic records in the context of writing and signing requirements imposed by federal and state law. The E-SIGN Act requires an electronic contract to be in a form that is capable of being retained and accurately reproduced in order for it to be valid and legally enforceable” (Baker & McKenzie, 2000).

In December 2002, President Bush signed the E-Government Act of 2002 making it “easier to get more government information and services online. The new law’s intent is to bring government fully into the electronic age, ‘giving taxpayers the same round-the-clock access to government that they have come to expect from the private sector,’

according to Sen. Joe Lieberman of Connecticut, co-author of the legislation. ‘The idea behind this law is for the federal government to take full advantage of the Internet and other information technologies to improve its efficiency and to secure its electronic information,’” Lieberman said (Hasson, 2002).

In addition to e-government legislation, President George W. Bush’s 2004 President's Management Agenda declares, “The federal government can secure greater services at lower cost through electronic government, and can meet high public demand for e-government services. This administration’s goal is to champion citizen-centered electronic government that will result in a major improvement in the federal government’s value to the citizen.” The Clinton-era National Performance Review also pointed to IT as a means to “reengineer governmental services” and to “serv[e] the public on its terms” (Moynihan, 2004).

E-GOVERNMENT INITIATIVES

“Ideally, e-government is a 24-hour per day, seven-day per week operation in which anyone with access to a PC can dial into a...government Web site and conduct business” (Norris, 2001). E-government initiatives “allow residents to perform many tasks online that previously would have required them to make multiple phone calls or dart across town to the appropriate city or county office” (Bringing Local Government Home, 2000). E-government involves both one-way and two-way communication from the government. An example of one-way communication might be the simple provision of information on a Web site” (Norris, 2001), such as public records, legislation, business hours and office locations, job announcements, and traffic updates (Bowser, 1998).

Others include geographic information systems (GIS), public safety advisories, color-coded homeland security alerts and information about local weather disasters. E-citizens may also look up the names and addresses of convicted sex offenders and credentials of doctors and nurses (Alvord, 2004).

Two-way communication includes such things as e-mail access to governmental officials. Currently, “e-mail is the most widely available on-line tool helping local agencies communicate with their publics. Furthermore, it eases communication between agencies and jurisdictions by allowing convenient message exchange. E-mail has the additional advantage, over other Internet tools, of being able to alert people when new information and services become available. Although more sophisticated on-line options are available, people with early computers, slower phone lines or older software can still benefit from e-mail alone” (Bowser, 1998).

Other forms of two-way communication include chat rooms on governmental Web sites (for example, to discuss current issues), and the ability to request records and services and to register complaints. E-government “increasingly involves on-line, real-time transactions as well” (Norris, 2001). In addition, the “permitting process can be automated so that contractors and citizens alike can complete all forms needed for development activity and also receive approval on-line.” Other e-government transactions include “financial transactions like paying tickets, utility bills, taxes, and license and permit fees; voter registration; license and permit applications; registering for a variety of programs; and purchasing of virtually any goods that a local government might sell from commemorative T-shirts at the Arts Festival to fertilizer from the waste-water treatment plant” (ibid).

“However, e-governance is more than just a government Web site on the Internet” (Basu, 2000). “Digital government encompasses both e-government and e-commerce initiatives” (Miranda, 2000). “Purchasers at all levels of government are taking advantage of e-commerce opportunities. Most state and federal agencies as well as many cities and counties are posting bidding opportunities and requests for proposals on their Web sites” (A Guide to E-Government and E-Commerce, 2000). Governments are also “tapping into the efficiency of e-commerce. Without managing a library of supplier manuals, playing phone tag with vendors or so much as leaving their offices, government buyers can compare thousands of products and their specifications from dozens of suppliers. Depending on applicable requirements, buyers can even get enough quotes at the Web site for competitive bidding purposes with just a few clicks of the mouse” (ibid).

“The ability to do that will dramatically reduce -- some would say by as much as 70 to 80% -- the cost of a purchasing transaction,” says Hansell of ICMA (A Guide to E-Government and E-Commerce, 2000).

BENEFITS OF E-GOVERNMENT

When the first government Web sites started in the mid-1990s, Paul Taylor, chief strategy officer at the Center for Digital Government, a research institute that helps state and local government use information technology, says, “it was about doing something cool that might get you some press and some bragging rights. Now, it’s about doing the real work of government -- and doing it smarter and cheaper” (Alvord, 2004).

Among the benefits of e-government are savings in money and time for the government, consumers, and businesses. “If banks can cut their transaction costs by 90%

through online banking, similar savings for government are likely” (Progressive Policy Institute, 2000). “Vehicle registrations or driver’s license renewals done in person, for example, cost some states \$3.40 each in personnel and paperwork. The online cost: \$1.75. Michigan and Virginia have moved 100% of some license applications online. You can still go in person to apply for the license, but the people helping you will use the same Web site you could have accessed,” Taylor says. Washington state’s health department “has put 1,200 forms online, saved three-quarters of a million dollars and gotten social workers out from under mountains of paper,” he says (Alvord, 2004). The “cost-saving opportunities in online purchasing and e-commerce stem from better pricing that can come with more competitive bidding, aggregating the buying power of small jurisdictions and streamlining an expensive process” (A Guide to E-Government and E-Commerce, 2000).

Other benefits include “better delivery of government services to citizens, improved interactions with business and industry, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions. Traditionally, the interaction between a citizen or business and a government agency took place in a government office. With emerging information and communication technologies, it is possible to locate service centers closer to the clients. Such centers may consist of an unattended kiosk in the government agency, a service kiosk located close to the client, or the use of a personal computer in the home or office” (Basu, 2000).

In this era of homeland security, “upgraded IT systems also allow various emergency responder groups to communicate quickly and retrieve important information

in times of crisis. The Council for Excellence in Government poll stated that half of all Americans believe that governments should be able to search databases for information that would help to track and capture terrorists” (O’Connell, 2003).

The “strategic objective of e-governance is to support and simplify governance for all parties; government, citizens and businesses. The use of ICTs can connect all three parties and support processes and activities. In other words, in e-governance electronic means support and stimulate good governance. Therefore, the objectives of e-governance are similar to the objectives of good governance. Good governance can be seen as an exercise of economic, political, and administrative authority to better manage affairs of a country at all levels” (Basu, 2000).

E-government fosters “citizen empowerment through access to information” (Basu, 2000). “Done right,” according to the Progressive Policy Institute (2000), e-government “promises to transform Industrial Age big government into Knowledge Age smart government. Old economy government was organized around agencies and bureaucracies that operated like ‘stove pipes’ with little information flowing between them, and with operations developed to meet the requirements of agencies, not the needs of citizens. New Economy government will be organized around the functions and the needs of citizens; with information and communication technologies a key enabler of this reinvented government.” Moreover, “users of government services will benefit by greater 24x7x365 access to higher quality services” (Progressive Policy Institute, 2000).

“The most exciting thing about e-commerce and e-government is that we’re just beginning to discover their benefits,” says Tom Straub, CEO of GovStoreUSA. “Endless

opportunities for improvements in efficiency and the delivery of service are on the horizon” (A Guide to E-Government and E-Commerce, 2000).

CHALLENGES TO E-GOVERNMENT

The “possibilities of e-government are stimulating. However, with the promise of e-government there are also the challenges” (Basu, 2000). Perhaps the most prohibitive challenge to e-government is “lack of funding and flexibility to implement digital government projects and flexible technology management” (Progressive Policy Institute, 2000). “Government is being asked to manage paper and face-to-face government while at the same time creating a new digital government, but often without additional resources to do the job. While it is true that digital government saves money, there are short term costs for technology and project management” (ibid).

However, as ICTs and the Internet have evolved, cost prohibitiveness has become less of a challenge to e-government. “In terms of cost, a simple, no frills [W]eb page can run as little as \$2,000 to develop and \$100 a month to maintain, according to Robert Drescher, a systems analyst in Los Angeles....A sophisticated web page, with online forms, access to extensive material and links to other agencies and information, can run \$100,000 or more” (Bowser, 1998).

The “current generation of e-government evolution requires flexible technology management as never before. Indeed, the latest round of applications requires new approaches to stimulate creative thinking regarding existing stores of data, approaches that will locate valuable and useful data and link it functionally across departments. This goal is one that requires the continued integration of best practices in ICT management

into local governments. Naturally, localities with large ICT staffs and professionally trained management will continue to lead” (Kaylor, 2005). “The utility of the Internet is limited only by the creativity of the governing body” (Bowser, 1998).

A 2000 news release by the White House states, “Access to computers and the Internet and the ability to effectively use this technology are becoming increasingly important for full participation in America's economic, political, and social life” (Miranda, 2000). “There is no question e-government makes things easier” (Bringing Local Government Home, 2000).

“Of course, that applies only to” citizens “with Internet access. And that does not include everyone” (Bringing Local Government Home, 2000). “About one third of American adults do not – which means that phone calls, in-person visits, or letter-writing are the available options to contact government for a large share of the population” (Pew Internet & American Life Project, 2004).

The “‘digital divide,’ another challenge to e-government, is a classic case of the ‘haves’ vs. the ‘have-nots.’ Lower-income families who cannot afford a home PC, or people who do not work in offices with computer equipment may be shut out of the evolution without some assistance from their local governments” (Bringing Local Government Home, 2000).

The “‘haves’ and ‘have-nots’ also applies to government. The digital divide between advanced local governments and the rest continues to grow apace. The smaller, more rural communities are being left farther and farther behind. On one hand, this is a distressing trend” (Kaylor, 2005).

There are “nonetheless, perhaps, advantages to lagging. Several best practices are emerging that smaller jurisdictions can benefit from. For example, many city governments put enormous resources into Web-enabling their services and functions at the onset of the e-government revolution only to find that they need to reinvest in content management systems in order to keep information up-to-date. Smaller governments just now turning to Web-enabled applications are implementing content management systems at the outset. More crucially, perhaps in the long run there are advantages to lagging today” (Kaylor, 2005).

“People with disabilities make up an important sub-population of Americans.” They “exhibit other differences compared with the rest of the population.” According to Pew Internet & American Life Project (2004), “fewer are Internet users – 40% of those with disabilities use the Internet. Among those who are Internet users, 16% say their disability makes it harder to use the Internet, a challenge to e-government. Among non-Internet users, 22% say that their disability would make it difficult or impossible to use the Internet.”

“Due to the low Internet penetration rate among this segment of the population, cyber means of contacting the government is not preferred by people with disabilities. Among [g]overnment [p]atrons with disabilities, 44% say they prefer the telephone to contact government, 21% prefer visiting in person, and 16% prefer to write a letter. Just 9% say they prefer visiting a Web site and 6% prefer email” (Pew Internet & American Life Project, 2004).

Section 508 of the Federal Rehabilitation Act of 1973 (amended by the Workforce Investment Act of 1998) “requires federal agencies to purchase electronic and

information technology that is accessible to employees with disabilities, and to the extent that those agencies provide information technology to the public, it too shall be accessible by persons with disabilities” (PBS Adult Learning Service, 2002).

A recent Government Accountability Office (GAO) report “identifies other challenges such as: sustaining committed executive leadership, building effective e-government business cases, protecting personal privacy, implementing appropriate security controls, maintaining electronic records, maintaining a robust technical infrastructure, addressing ICT human capital concerns, and ensuring uniform service to the public” (Aldrich, Bertot & McClure, 2002).

“In the future, as technology costs drop, familiarity with it increases and challenges to e-government dissipate, governments will more fully exploit the Internet's capabilities” (Bowser, 1998).

THE INTERNETS AFFECT ON THE RELATIONSHIP BETWEEN CITIZENS AND THE GOVERNMENT

“The relationship between government and citizens” has evolved “from its traditional hierarchical and arms-length one to a more reciprocal one where citizens are genuine stakeholders in their government” (Progressive Policy Institute, 2000).

According to Pew Internet & American Life Project’s 2004 report, *How Americans Get in Touch with Government*, “fully 77% of Internet users, or 97 million Americans, have at some time gone online to search for information from government agencies or to communicate with them. 36% of Internet users say the [I]nternet has improved their dealings with government;” “this helps people move through their dealings with government more efficiently” (Citizen Use of E-Governance on the Rise, 2004).

The Internet “enhances the relationship of citizens to their government.” “E-government applications are growing in popularity with online Americans. For instance, 38 million have sent email to government officials to try to influence policy decisions and another 29 million have researched or applied for government benefits on government Web sites. Many report that the convenience and usefulness of these sites have improved their perceptions of how government functions. In addition, 52 million have researched policy issues and 36 million have used government Web sites for health and safety information” (Pew Internet & American Life Project, 2005).

Pew Internet & American Life Project also found that “the Internet creates new online town squares and civic storms. The widely varying information sources that are available online, combined with the new opportunities that the internet creates for civic participation, have begun to reshape politics and community life. Nowhere was that more evident than in the rapid rise of blogs during the 2004 campaign. Political bloggers serve up a boiling caldron of facts, rumors, commentaries, conspiracy theories, ideological screeds and media criticisms. Yet blogs are not the only online destination for ecitizens. On Web sites, in discussion groups and on listservs -- automatic mailing lists for distributing email to groups of internet users -- citizen activists are using the tools of online technology to organize, to mobilize and to raise recordsetting sums of money” (2005).

The Internet “establishes an ‘open door’ atmosphere for public officials and their constituents. It also creates a window of opportunity for governments to communicate more openly with each other...” (Bowser, 1998). For example, Bloomington, IN recently “began broadcasting video coverage of all local public meetings on its Web

site...reaching residents who might otherwise never attend a meeting” (Bringing Local Government Home, 2000).

The relationship also involves “expanded information flows between governments and citizens. Many citizens say the Internet helps in conducting their business with government. Americans with Internet access are much more likely to contact the government than non-Internet users, showing that Internet users have strongly embraced a new communications medium to contact government. The conveniently available information offered [on] government Web sites makes it easier for Americans to conduct their business with government by whatever means they choose. The ease of email makes it possible for citizens to fire off a missive to express a view about policy or highlight a problem with neighborhood garbage pickup” (Pew Internet & American Life Project, 2004).

Others findings by the Pew Internet & American Life Project (2004) include: “e-government is an increasingly popular tool for Internet users, and its utility is primarily in getting information from and sending messages to government. Americans like to have multiple channels available when addressing a need they have with government. And, some problems lend themselves to ‘real time’ interaction with the government -- meaning the telephone and in-person visits are preferred -- while other problems have greater suitability for the Web or email.”

To investigate the continuing transformation of government, the benefits and challenges to e-government, and the Internet’s impact on citizen to government relationships at the county level of government in North Carolina, the International City/County Management Association’s (ICMA) *Electronic Government 2004* survey is

replicated in North Carolina's county governments. Based on an analysis of survey results, comparisons will be made between the adoption of e-government by U.S. local governments and North Carolina county governments.

METHODOLOGY

According to ICMA (2004), the *Electronic Government 2004* survey was "mailed in the spring of 2004 to the chief administrative officers in municipalities with populations of 2,500 and over and to the chief administrative officers of counties with the council-administrator or council-elected executive form of government. Those local governments that did not respond to the first mailing received a second mailing in the summer of 2004. Of the 7,944 municipalities and counties that received surveys, 3,410 responded (42.9%)."

On August 8, 2005, permission was received via email from Evelina Moulder, Director of Survey Research & Information Management at ICMA, to use the *Electronic Government 2004* survey instrument (see Appendix B: Email from ICMA Granting Permission to use *Electronic Government 2004* Survey Instrument).

After changing all references in the survey instrument from local government to county government, an interactive version of the North Carolina County Government Survey was placed online at <http://www.uncp.edu/home/lawrence/survey/>.

The Web address was then emailed to the county manager/administrator, chief IT officer and/or staff in North Carolina's 100 county governments (see Appendix C: Email/Fax to North Carolina County Governments). Respondents were asked to complete the survey online between September 5 and October 1, 2005. Those county governments

that did not respond to the initial email were faxed and phoned the Web address. In some cases an additional fax and email were sent. Of the 100 county governments that received the Web address, 74 responded (74%). The respondents were reasonably representative of North Carolina's county governments.

An error in the North Carolina County Government online survey prevented the collection of responses to question 5a, item d: online completion and submission of permit applications, and question 15: which department manages the GIS function? In the aggregate results, each question has been coded with E=Error.

To examine aggregate results of both surveys, the t-value is derived from a t-test. The t-test "assesses whether the means of two groups are statistically different from each other" (Trochim, 289). The t-test "can be used both for the difference between two sample means for the difference between two sample proportions" (Brundey & Meier, 206). The "t-value will be positive if the first mean is larger than the second value and negative if smaller" (Trochim, 289). The t-value is calculated using $t = \frac{\bar{X}_{04} - \bar{X}_{05}}{SE_{overall}}$

where \bar{X} =mean and se =standard error. This is converted to $t = \frac{P_{04} - P_{05}}{SE_{overall}}$ where

P =percentage.

Once the t-value has been computed, a table of significance is used to "test whether the ratio is large enough to say that the difference between the groups is not likely to have been a chance finding" (Trochim, 290). The risk level, called the alpha level (α), is set at .05. Results are considered significant at .05 α . T-values greater than .05 accept the null hypothesis (no difference between the 2004 and 2005 survey results) while results less than .05 reject the null hypothesis and accepts either H_1 (North Carolina

county governments doing better at e-government than national local governments) or H₂ (North Carolina county governments doing worse than national local governments).

Based on an analysis of aggregate results from each survey (see Appendix A: Aggregate Results of *Electronic Government 2004* Survey and North Carolina County Government Survey (2005), as well as t-test results, comparisons will be made between the adoption of e-government by U.S. local governments and county governments in North Carolina to accept or reject the null hypothesis or to accept H₁ or H₂.

RESULTS AND DISCUSSION

Results

The comparison of the aggregate results of ICMA's *Electronic Government 2004* survey (also referred to as 2004 respondents and national local governments) and the 2005 North Carolina County Government Survey (2005 respondents and North Carolina county governments) revealed:

Internet Connectivity. While similar numbers of national local governments (99.4%) and North Carolina county governments (98.6%) report having Internet connectivity, the method and speed of connectivity differs. 64.3% of North Carolina county governments and 42.3% of national local governments have high bandwidth Internet connectivity. While DSL and cable use are lower in North Carolina county governments, high bandwidth use is higher, indicating a trend to faster Internet connectivity. 92.3% of 2004 respondents and 84.3% of 2005 respondents have DSL, cable or high bandwidth connectivity. However, 14.3% of 2005 respondents have Internet connectivity which includes a mixture of DSL, cable and/or high bandwidth. None of the

North Carolina county governments, compared to 7.1% of national local governments, reported having dial-up Internet connectivity, indicating a trend away from dial-up to faster Internet connectivity.

Table 1. Method of Internet Connectivity

2004	2005		<i>t</i>
7.1	0	a. Dial-up	24.50***
27.8	12.9	b. DSL	16.84***
22.2	7.1	c. Cable	18.41***
42.3	64.3	d. High bandwidth	-22.30***
0.6	14.3	e. Other	-20.96***

Note. Asterisks next to the t-value indicate the alpha (α) level or level of significance. *= $>.05$, **= $.05 - .01$ while ***= $< .01$.

Governments with Web Sites. A higher percentage of North Carolina county governments (94.4%) than national local governments (91.1%) report having government Web sites. However, only 33.3% of the 5.6% of North Carolina county governments without Web sites plan to create a Web site in the next year. Reasons given for not creating a Web site include “time, personnel, resources and funding.”

IT Departments. Survey results indicate a trend toward the IT department being responsible for day-to-day management of the Web site. Up from 30.7% in the 2004 survey, 60.3% of North Carolina county governments indicate the IT department is now responsible for the Web site. The county manager’s responsibility has declined from 20.4% in 2004 to 7.4% (2005).

Table 2. Responsibility for Management of Government Web Site

2004	2005		<i>t</i>
20.4	7.4	a. County Manager/CAO	15.94***
30.7	60.3	b. IT department	-30.36***

5.0	2.9	c. Finance department	3.38***
4.8	7.4	d. PIO/Communications office	-3.77***
1.0	0	e. Library	3.17***
0.7	0	f. Business development office	2.42***
9.6	2.9	g. Clerk	8.31***
6.3	8.8	h. Web management team representatives from different departments	-3.45***
4.3	0	i. Consultants	9.55***
3.2	4.4	j. Planning/economic development dept.	-1.94**
2.4	0	k. Volunteers	6.13***
0.7	7.4	l. Other	-11.4***

As the IT department’s responsibility for the Web site has increased, 78.1% of North Carolina county governments have a separate IT department that is responsible for all IT needs, including e-government. This is up from 40.6% in 2004.

61.1% of national local governments and 64.9% of North Carolina county governments reported having 1-5 full-time employees in the IT department. In addition, over three-quarters of both respondents reported between 1-10 full-time employees. Most IT staff remain small in number. Survey results suggest that IT departments in North Carolina county governments are more likely to be smaller than national local governments. Less than 24% of both respondents have over 11 full-time employees.

Table 3. Full-time Employees in IT Department

2004	2005		<i>t</i>
61.1	64.9	a. 1-5	-3.87***
15.8	12.3	b. 6-10	4.20***
9.7	10.5	c. 11-20	-1.03*
8.3	7.0	d. 21-50	1.78**
5.2	3.5	e. More than 50	2.67***

IT Operating Budgets for Current Fiscal Year. Operating budgets for IT for the current fiscal year are smaller in North Carolina county governments than in national local governments. The average operating budget for North Carolina’s county

governments is \$994,872 compared to \$1,313,427 for national local governments. While North Carolina county government IT operating budgets are smaller, they share a similar size staff with national local governments.

Citizen Survey. A relatively small number of respondents to both surveys reported conducting a citizen survey to determine what online services residents and businesses want. Only 10% of national local government and 12.2% of North Carolina county governments conducted a survey. North Carolina county governments reported requests for only four online services. Of those four, the two most requested services are online financial transactions (77.8%) and council meeting minutes (44.4%). The two most requested services for national local governments are online financial transactions (44.4%) and online registration for community events (40.1%).

Table 4. Requested Online Services Identified by Citizen Survey

2004	2005		<i>t</i>
35.7	22.2	a. Online service requests (e.g., requesting pothole repair)	14.27***
44.4	77.8	b. Online financial transactions (e.g., online payment of taxes)	-34.97***
40.1	11.1	c. Online registration for community events (e.g., park/rec activities, adult education)	32.34***
19.6	0	d. Online complaints (e.g., reporting graffiti, missed trash pickup)	31.11***
37.6	44.4	e. Council meeting minutes	-6.86***
10.9	0	f. Budget document	19.53***
5.6	0	g. Police reports	11.68***
10.9	0	h. Newsletters e-mailed to residents	19.53***
37.9	0	i. Employment info./applications	54.41***
37.3	0	j. Permits/licenses	53.64***
15.2	0	k. Other	25.37***
5.0	0	l. Other	10.71***

Level of Web Site Sophistication and Online Services. Of the twenty potential services offered on government Web sites, 80% or 16 of 20 increased in percentage offered between 2004 and 2005. Among North Carolina county governments, the top three services are GIS mapping/data (93.7%), council agendas/minutes (92.8%) and employment information/applications (90.8%). Others include council agenda/minutes (75.6%), codes/ordinances (65.6%) and online communication with individual elected and appointed officials (65.6%).

North Carolina county governments offered higher percentages in 14 of 19 (73.7%) services than the national local governments. North Carolina county governments reported offering percentages over 70% in seven service areas while national local governments reported only one.

A similar number of national local and North Carolina county government residents and businesses use online services. However, a much larger percentage of North Carolina county respondents than national local government respondents use GIS mapping/data, 35.2% (2005) and 18.2% (2004), council agendas/minutes (33.5%, 22.1%), employment information/applications (27.8%, 20.6%) and codes/ordinances (27.8%, 21.0%).

Table 5. Services Offered Online (Yes)

Service	Is currently offered		
	2004	2005	<i>t</i>
a. Online payment of taxes	8.6	80.0	-86.56***
b. Online payment of utility bills	9.2	25.9	-19.58***
c. Online payment of fines/fees	7.3	3.6	5.54***
d. Online completion and submission of permit applications	10.2	E	---
e. Online completion and submission of	6.3	3.4	4.45***

business license applications/renewals			
f. Online requests for county government records	27.1	56.3	-30.11***
g. Online delivery of county governments records to the requestor.	18.1	47.9	-31.68***
h. Online requests for services, such as pothole repair	29.5	27.3	2.32**
i. Online registration for use of recreational facilities/activities, such as classes and picnic areas	16.4	30.6	-15.58***
j. Online voter registration	2.4	14.3	-16.78***
k. Online property registration, such as animal, bicycle registration	2.8	2.9	-0.17*
l. Forms that can be downloaded for manual completion (e.g., voter registration, building permits, etc.)	58.3	87.5	-32.17***
m. Online communication with individual elected and appointed officials	65.6	77.4	-12.48***
n. GIS mapping/data	27.2	93.7	-80.18***
o. Employment information/applications	59.6	90.8	-35.33***
p. Council agendas/minutes	75.6	92.8	-20.74***
q. Codes/ordinances	65.6	88.1	-25.17***
r. Electronic newsletter sent to residents/businesses	27.7	21.4	6.80***
s. Streaming video	9.3	17.1	-9.55***
t. Other	19.7	33.3	-14.59***

Note. E=Error with online survey prevented collection of response.

Table 6. Plan to Offer Services Online

Service	We plan to offer the service		
	2004	2005	<i>t</i>
a. Online payment of taxes	31.1	93.3	-73.67***
b. Online payment of utility bills	50.3	46.9	3.40***
c. Online payment of fines/fees	51.8	62.1	-10.38***
d. Online completion and submission of permit applications	72.4	E	---
e. Online completion and submission of business license applications/renewals	61.9	51.6	10.38***

f. Online requests for county government records	54.2	70.6	-16.79***
g. Online delivery of county governments records to the requestor.	41.8	72.3	-31.45***
h. Online requests for services, such as pothole repair	62.1	48.0	14.21***
i. Online registration for use of recreational facilities/activities, such as classes and picnic areas	59.3	70.8	-11.82***
j. Online voter registration	15.3	47.4	-34.63***
k. Online property registration, such as animal, bicycle registration	31.8	41.7	-10.11***
l. Forms that can be downloaded for manual completion (e.g., voter registration, building permits, etc.)	71.6	100	-42.29***
m. Online communication with individual elected and appointed officials	44.1	20	25.45***
n. GIS mapping/data	58.6	100	-58.99***
o. Employment information/applications	57.1	71.4	-14.70***
p. Council agendas/minutes	70.1	50.0	20.54***
q. Codes/ordinances	74.4	100	-38.75***
r. Electronic newsletter sent to residents/businesses	49.5	41.2	8.33***
s. Streaming video	28.2	26.3	2.01**
t. Other	17.0	0	27.74***

Of respondents reporting not currently offering the service, 16 of 19 (84.2%) of the 2005 services have higher percentages than 2004 respondents.

The level of Web site sophistication for North Carolina county governments, based on survey responses, has reached Basu's transaction stage of development, although national local governments and North Carolina county governments have higher percentages for broadcast items. The national local government survey revealed national sites are at the interaction stage. The North Carolina County Government survey revealed North Carolina's county governments are at the transaction stage of development because of accepting online payments, delivering documents to requestor and two-way

communication. 2005 survey results indicate a trend toward higher levels of Web site sophistication.

Traditional paper option still available. A paper option or payment by mail or in person for the majority of these previously mentioned services is very high among governments. 96.6% of North Carolina county governments indicate this option compared with 94.8% of national local governments.

Barriers to E-Government. National local governments and North Carolina county governments share the top two barriers to e-government. Lack of financial resources, the top barrier, is reported by 63.6% of national local governments and 66.2% of North Carolina county governments. Lack of technology/web staff, while the second barrier, is less of a barrier to North Carolina county governments (50.0%) than national local governments (62.8%). Other top barriers shared include difficulty justifying return on investment and issues regarding security.

Additional barriers for national local governments were less of a barrier to North Carolina county governments. Lack of technology/web expertise declined from 43.1% (2004) to 20.3% (2005). Web site not accepting payment by credit card declined from 30.3% (2004) to 25.7% (2005). Lack of resident/business interest/demand declined from 27.0% to 18.9% and lack of information about e-government applications decreased from 17.3% to 10.8%. One years difference between surveys, increase in staff expertise, changes in technology and decreases in costs may have contributed to the decline.

Other barriers found at higher rates in North Carolina county governments include the need to upgrade technology, which increased from 24.3% (2004) to 48.9% (2005). As hardware and software ages, the need to upgrade technology has the potential to become

more of a barrier to e-government. Issues relating to convenience fees for online transactions also increased from 28.8% (2004) to 35.1% (2005). Surprisingly, lack of support from elected officials increased from 12.5% (2004) to 23.0% (2005).

Table 7. Barriers to E-Government

2004	2005		<i>t</i>
62.8	50.0	a. Lack of technology/web staff	12.91***
43.1	20.3	b. Lack of technology/web expertise	24.07***
17.3	10.8	c. Lack of information about e-gov't applications	7.83***
12.5	23.0	d. Lack of support from elected officials	-12.11***
28.8	35.1	e. Issues relating to convenience fees for online transactions	-6.53***
14.4	21.6	f. Lack of collaboration among departments	-8.24***
34.5	37.8	g. Difficulty justifying return on investment	-3.37***
17.5	23.0	h. Staff resistance to change	-6.15***
26.4	28.4	i. Issues regarding privacy	-2.12**
35.8	36.5	j. Issues regarding security	-0.71*
63.6	66.2	k. Lack of financial resources	-2.66**
24.3	48.9	l. Need to upgrade technology (PCs, networks, etc.)	-25.53***
5.9	9.5	m. Resident resistance to change	-4.95***
27.0	18.9	n. Lack of resident/business interest/demand	8.86***
30.3	25.7	o. Web site does not accept payment by credit card	4.86***
7.4	14.9	p. Bandwidth issues	-9.54***
4.0	1.4	q. Other	4.64***

E-governments impact on government. E-government has changed government's relationship with citizens. E-government has improved customer service, according to 55.5% of national local governments and 64.9% of North Carolina local governments. E-government has also improved local government communication with the public, reported by 67.8% of national local governments and 59.5% of North Carolina local governments. 39.9% of national local governments reported increased citizen contact

with elected and appointed officials, compared to 28.4% of North Carolina county governments.

E-government has also had an impact on staff. The role of staff has changed according to 32.9% of national local governments and 44.6% of North Carolina county governments. Higher according to 2005 respondents, e-government has reduced time demands on staff, 25.6% (2004) and 41.9% (2005). A smaller number of 2005 respondents report e-government increasing demands on staff, 33.8% (2004) and 21.6% (2005).

Business processes have also been affected by e-government. Approximately 23% of national local governments report a re-engineering of business processes; while a larger number of North Carolina local governments (29.8%) report business processes are more efficient as a result of e-government. Data suggests e-government has made national local governments and North Carolina county governments more efficient.

One-fifth of North Carolina’s county governments report a reduction in administrative costs. 20.3% of North Carolina county governments report such findings, compared with 11.0% of national local governments.

Table 8. How E-government has changed Government

2004	2005		<i>t</i>
2.4	1.4	a. Has reduced the number of staff	1.92**
32.9	44.6	b. Has changed the role of staff	-11.90***
25.6	41.9	c. Has reduced time demands on staff	-16.90***
33.8	21.6	d. Has increased demands on staff	12.97***
1.2	1.4	e. Has increased non-tax-based revenues from fees, advertising	-0.42*
39.9	28.4	f. Has increased citizen contact with elected and appointed officials	11.86***
22.8	23.0	g. Business processes are being re-engineered	-0.22*

23.1	29.8	h. Business processes are more efficient	-7.15***
11.0	20.3	i. Has reduced administrative costs	-11.00***
67.8	59.5	j. Has improved local gov't communication with the public	8.48***
55.5	64.9	k. Has improved customer service	-9.52***
4.0	0	l. Other	9.04***

Development of E-government Services. Over 60% of national local governments and North Carolina county governments are developing e-government initiatives in-house by government staff. However, more governments are turning solely to vendors to develop e-government services. 33.8% of North Carolina county governments report services are outsourced to application service providers, compared to 17.7% of national local governments. In addition, 30.9% of North Carolina county governments, compared to 24.7% of national local governments, indicate programs are purchased from IT vendors and integrated into their databases. As a result, data suggests North Carolina county governments are more likely than national local governments to outsource e-government services.

Table 9. How E-Government Services are Developed

2004	2005		<i>t</i>
62.5	64.7	a. Developed in-house by county government staff	-2.24**
45.9	39.7	b. Developed by consultants and county government staff	6.24***
17.7	33.8	c. Outsourced to Application Service Providers	-17.41***
24.7	30.9	d. Programs are purchased from IT vendors and integrated into our databases.	-6.56***
2.4	0	e. Other	6.13***

In-house Management of IT Services. There is more of a trend in North Carolina county governments than national local governments to provide various IT functions in-

house. 38.5% of national local governments provide in-house Web site hosting compared to 53.5% of North Carolina county governments. This is a dramatic increase over national local governments. Other functions such as Web site design, Web site operation and management, and integration of Web site with county government databases, according to North Carolina county government respondents, are provided entirely in-house. Because North Carolina county government IT operating budgets are smaller than national local governments, county governments in North Carolina may be able to save money by managing these services in-house.

Table 10. How Government Provide Various IT Functions

	In-house by county government staff			Currently outsources		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Web site hosting	38.5	53.5	-15.11***	63.2	46.5	16.86***
b. Web site design	55.9	100	-62.59***	49.5	0	70.01***
c. Web site operations and management	77.1	100	-35.33***	27.7	0	41.41***
d. Integration of Web site with county government databases	68.0	100	-46.85***	37.6	0	54.02***

Web Content Management System (CMS) that enables non-technical staff to manage and maintain the Web site. While the number of national local governments using Web site content management systems is only 29.6% in 2004, less than half of North Carolina county governments (41.2%) reported using a CMS. Of North Carolina county governments not using a CMS, only 40% plan to introduce a CMS.

Web Site Policies and Procedures. Over half of North Carolina county governments have policies on Web site privacy (54.4%) and Web site security (66.6%), as compared to national local governments (46.2% and 56.2%). As concerns with user

security and privacy increase, so have policies and procedures. North Carolina county governments also have more policies and procedures for issues such as links to businesses that request a link and Web site options for visually impaired users. Surprisingly, only 20.1% of North Carolina county governments and 13.3% of national local governments report having policies for Web site options for visually impaired users, considering Section 508 of the Federal Rehabilitation Act of 1973 “requires federal agencies to purchase electronic and information technology that is accessible to employees with disabilities, and...be accessible by persons with disabilities” (PBS Adult Learning Service, 2002). Last, Web site language translation capability policies are higher in North Carolina (19.0%) than with national local governments (7.2%). The Spanish-speaking population has dramatically increased in North Carolina over the past few years. Web site language translation capabilities reflect advances in technology and changes in the North Carolina’s demographics.

Table 11. Policies and Procedures

	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Web site privacy	46.2	54.4	-8.21***	53.8	45.6	8.21***
b. Web site options for visually impaired users	13.3	20.1	-7.90***	86.7	79.9	7.90***
c. Web site security	56.2	66.6	-10.57***	43.8	33.4	10.57***
d. Web site language translation capability	7.2	19.0	-14.63***	92.8	81.0	14.63***
e. Paid advertising on the web site	10.0	13.2	-4.00***	90.0	86.8	4.00***
f. Links to businesses that request a link	33.7	20.9	13.65***	66.3	79.1	-13.65***

Online Procurement. Online procurement is higher in North Carolina county governments than national local governments. Review of equipment and office supplies, while high in national local governments, is higher in North Carolina county governments. Over half of national local governments purchase equipment and office supplies online, compared with three-quarters of North Carolina county governments.

Online review of property and/or liability insurance in national local governments (18.4%) is half that of North Carolina county government (36.1%). Online purchase of property by national local governments (4.4%) is lower when compared to in North Carolina county governments (6.9%).

Such results indicate a desire to complete property and insurance reviews and purchases by means other than the Internet; most likely face-to-face or by phone.

Table 12.1. Review Product Offerings Online

Service	Review product offerings online					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Property and/or liability insurance	18.4	36.1	-19.00***	81.6	63.9	19.00***
b. Equipment	72.4	95.5	-23.41***	27.6	4.5	23.41***
c. Office supplies	74.2	92.2	-21.43***	25.8	7.8	21.43***

Table 12.2. Make Purchases Online

Service	Make purchases online					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Property and/or liability insurance	4.4	6.9	-3.69***	95.6	93.1	3.69***
b. Equipment	52.0	78.3	-27.54***	48.0	21.7	27.54***
c. Office supplies	62.4	77.3	-15.68***	37.6	22.8	15.68***

Geographic Information Systems (GIS). While already high among national local governments (73.3%), utilization of GIS programs that create maps and display data

spatially to help analysis of information is higher among North Carolina county governments (94.4%). Of those governments that provide GIS programs, a larger number of North Carolina county governments (79.4%), compared to 61.7% of national local governments, rely more on GIS technology to assist in emergency preparedness as a result of recent terrorism-related threats in the United States.

In addition, more North Carolina county governments (85.7%) than national local governments (33.3%) provide GIS data online to residents/businesses. Of governments providing GIS data online, 19.8% of national local governments and 17.0% of North Carolina county governments charge a fee to residents/businesses for GIS data. North Carolina county governments are more likely to provide GIS data online and not charge a fee for using the data.

Intranet. Half of national local governments (50.3%) and North Carolina county governments (50.7%) have an Intranet. Of those with Intranets, 94.6% of North Carolina county governments and 87.0% of national local governments are managed in-house, while 5.4% of North Carolina county governments and 13% of national local governments are managed by services providers. Again, in North Carolina, the trend is to manage IT services in-house.

North Carolina county governments reported higher usage of Intranets to provide services to staff. Each usage is higher in North Carolina county government than national local governments. The two most popular uses shared by national local governments and North Carolina county governments are providing news and information (81.1%, 97.1%) and publishing documents and manuals online to reduce printing costs (62.0%, 88.6%). Other top uses shared include: GIS, posting of job openings for internal recruitments,

providing employee benefit forms and enabling inter-/intra-agency data and information sharing.

Table 13.1. How Use Intranet (Currently Use)

	Currently use					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Provide news and information	81.1	97.1	-21.39***	18.9	2.9	21.39***
b. Publish documents and manuals online to reduce printing costs	62.0	88.6	-29.68***	38.0	11.4	29.68***
c. Post job openings for internal recruitments	50.5	74.3	-24.59***	49.5	25.7	24.59***
d. Provide employee benefit forms	46.1	71.4	-25.95***	53.9	28.6	25.95***
e. Provide online report generation	34.7	48.5	13.97***	65.3	51.5	13.97***
f. Provide online procurement tools	26.6	32.4	-6.03***	73.4	67.6	6.03***
g. Enable project teams to collaborate	33.4	37.5	-4.19***	66.6	62.5	4.19***
h. Enable inter-/intra-agency data and information sharing	50.2	58.8	-8.63***	49.8	41.2	8.63***
i. For financial reporting	37.9	45.5	-7.67***	62.1	54.5	7.67***
j. Expand telecommuting staff access to information and data	37.3	50.0	-12.81***	62.7	50.0	12.81***
k. Provide online training	29.4	50.0	-21.07***	70.6	50.0	21.07***
l. GIS	45.0	79.4	-36.22***	55.0	20.6	36.22***
m. Timesheets	27.3	39.4	-12.52***	72.7	60.6	12.52***
n. Online help desk	30.7	55.6	-25.44***	69.3	44.4	25.44***
o. Other	28.1	100	-107.24***	71.9	0	107.24***

Of the governments that do not currently use an Intranet, a larger percentage of North Carolina county governments indicated they plan to use one in the future. Of the 15 uses of the Intranet in the survey, 66% or 10 of 15 showed an increase in planned use in the future.

Table 13.2. How Use Intranet (Plan to Use)

	If you do not currently use an intranet, do you plan to use one in the future?					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Provide news and information	65.0	100	-50.68***	35.0	0	50.68***
b. Publish documents and manuals online to reduce printing costs	64.7	100	-51.06***	35.3	0	51.06***
c. Post job openings for internal recruitments	57.1	50.0	7.12***	42.9	50.0	7.12***
d. Provide employee benefit forms	65.0	0	94.12***	35.0	100	94.12***
e. Provide online report generation	53.7	62.5	-8.88***	46.3	37.5	8.88***
f. Provide online procurement tools	48.3	66.7	-18.67***	51.7	33.3	18.67***
g. Enable project teams to collaborate	54.7	66.7	-12.19***	45.3	33.3	12.19***
h. Enable inter-/intra-agency data and information sharing	58.4	83.3	-26.76***	41.6	16.7	26.76***
i. For financial reporting	51.6	37.5	14.22***	48.4	62.5	-14.22***
j. Expand	43.1	42.9	0.20*	56.9	57.1	0.20*

telecommuting staff access to information and data						
k. Provide online training	55.5	87.5	-35.17***	44.5	12.5	35.17***
l. GIS	57.6	66.7	-9.26***	42.4	33.3	9.26***
m. Timesheets	57.0	66.7	-9.87***	43.0	33.3	9.87***
n. Online help desk	53.2	33.3	20.20***	46.8	66.7	-20.20***
o. Other	26.5	0	39.89***	73.5	0	-39.89***

Intranets allow governments to save money and better communicate and share information with employees while providing a means for improving job performance. While Intranets provide documents and information, they are not highly sophisticated. Based on Basu’s four stage development path for e-government, Intranets fit the characteristics of the third stage, interaction, which includes communication and exchange of data.

E-government Budget Process. 88.8% of North Carolina county governments report there is no separate budget item for e-government, compared to 81.7% of national local governments. 4.6% of national local governments, compared to 1.4% of North Carolina local governments report there is a separate budget item for e-government, and each department develops and submits its own e-government budget. In addition, 13.7% of national local governments, compared to 9.5% of North Carolina county governments, report there is a separate budget item for e-government, and the Information Technology (or equivalent) department develops and submits the e-government budget for the county government. Survey results indicate a trend toward no separate budget item.

Table 14. E-Government Budget Process

2004	2005		<i>t</i>
81.7	88.8	a. There is no separate budget item	-8.47***

		for e-government.	
4.6	1.4	b. There is a separate budget item for e-government, and each department develops and submits its own e-government budget.	5.60***
13.7	9.5	c. There is a separate budget item for e-government, and the Information Technology (or equivalent) department develops and submits the e-government budget for the county government.	5.26***

E-government Budget for Coming Fiscal Year. Of governments with a separate budget item for e-government, one-fourth of North Carolina county governments plan to budget under \$5,000 for e-government for the coming fiscal year, compared to 13.6% of national local governments. North Carolina county governments (58.3% total) are more likely to have a budget under \$5,000 (25%) and over \$100,000 (33.3%) compared to national local governments (13.6%, 19.2% -- 32.8%). However, national local governments (49.7%) are more apt to range between \$5,000 and \$49,999 compared to North Carolina county governments (25%). Similar numbers of national local governments (17.5%) and North Carolina county governments (16.7%) plan to budget between \$50,000 and \$99,000.

Table 15. How Much Plan to Budget for E-Government for the Coming Fiscal Year

2004	2005		<i>t</i>
13.6	25.0	a. Under \$5,000	-12.94***
15.7	0	b. \$5,000-\$9,999	26.03***
19.2	16.7	c. \$10,000-\$24,999	2.85***
14.8	8.3	d. \$25,000-\$49,999	8.18***
17.5	16.7	e. \$50,000-\$99,999	0.92*
19.2	33.3	f. \$100,000 or over	-15.16***

Cost Estimates for E-government. A similar number of national local governments and North Carolina county governments, 55%, reported obtaining cost

estimates primarily from IT solution vendors. National local governments are more likely to obtain cost information from other cities/counties who have implemented similar e-government services (22.3%) and internal estimates (48%) than North Carolina local governments (18.9% and 44.6%).

Table 16. Where Obtain Cost Estimates for E-Government

2004	2005		<i>t</i>
55.6	55.4	a. Our cost information was obtained primarily from IT solution vendors	0.20*
22.3	18.9	b. Our cost information was obtained primarily from other cities/counties who have implemented similar e-government services.	3.78***
48.0	44.6	c. We estimated most of the costs for e-government	3.41***
3.2	4.1	d. Other	-1.47**

Funding for E-government. The main source of funding for e-government is general revenues. While more national local governments (92.6%) fund e-government with general revenues than North Carolina county governments (83.8%), 24.3% of North Carolina local governments receive funds from federal or state grants, compared with 7.5% of national local governments. More state and federal grants programs may have been available for North Carolina county governments during the year between the 2004 and 2005 surveys.

In addition, North Carolina county governments are more apt to use transaction fees from services provided (16.7%) than national local governments (5.2%).

Almost no funding comes from Web site advertising.

No responses were received from North Carolina county governments for four funding sources.

Table 17. How Current E-Government Efforts Funded

2004	2005		<i>t</i>
7.5	24.3	a. Federal or state grants	-20.19***
5.2	16.7	b. Transaction fees from services provided	-14.91***
92.6	83.8	c. General revenues	11.09***
4.0	0	d. Risk-sharing (a private sector firm provides the application and receives a percent of the revenue)	9.04***
2.2	0	e. Municipal bond financing	5.74***
3.3	2.7	f. Cable fees	1.03*
9.8	0	g. Utility funds/revenues	17.97***
7.0	2.7	h. Enterprise fund	6.66***
0.1	0	i. Web site advertising	0.56*
4.0	1.4	j. Other	4.64***

Statistical Analysis of the Data

Of t-values, 89.2%, or 267 of 299, are between .05 and .01 α while 5.4%, or 16 or 299, are less than .01. Therefore, 94.6% of the t-values reject the null hypothesis and indicate a statistically significant difference between the 2004 and 2005 survey. Negative t-values generally indicate that North Carolina is doing better at e-government (H_1) than local governments. 5.4%, or 16 or 299 of t-values are greater than .05 α and accept the null hypothesis. Therefore, a statistical analysis of the data accepts H_1 that North Carolina county governments are doing better at e-government than national local governments.

Summary of Findings

Summary results of a comparison of the aggregate results of the *Electronic Government 2004* survey and North Carolina County Government Survey are:

- North Carolina county governments are more likely to have Web sites than national local governments.
- In North Carolina county governments, IT departments are more likely to manage government Web sites.

- IT departments in North Carolina county governments and national local governments are similar in size although North Carolina county governments are more likely to have smaller IT operating budgets.
- North Carolina county government Web sites have higher percentages at offering services and are more sophisticated than national local government Web sites.
- North Carolina county governments are more likely to have paper options available.
- The top two barriers to e-government initiatives shared by North Carolina county governments and national local governments are funding and lack of technology/web staff.
- E-governments impact on North Carolina county and national local governments has:
 - changed government's relationship with citizens,
 - changed the role of staff,
 - forced a re-engineering of business processes, and,
 - reduced costs.
- Similar numbers of North Carolina county governments and national local governments develop e-government initiatives in-house. However, North Carolina county governments are more likely to turn to vendors to develop e-government initiatives.
- North Carolina county governments more likely to provide in-house management of IT services.
- More North Carolina county governments than national local governments are more likely to use a Web Content Management System (CMS).
- North Carolina county governments are more likely to have policies and procedures for Web site security and Web site privacy.
- North Carolina county governments have higher levels of online procurement (online review and purchase of services).
- North Carolina county governments are more likely to utilize GIS and provide data at no charge to residents/businesses.
- North Carolina county government Intranets provide more services and have attained Basu's third stage of e-government development, interaction.
- National local governments are more likely to have separate IT budgets than North Carolina county governments.
- National local county governments budgets are more likely to be between \$5,000 and \$49,999 while North Carolina local governments are more likely to be under \$5,000 and \$100,000 or over.
- Current e-government initiatives are mostly funded from general revenues. However, North Carolina county governments more likely to seek federal or state grants to fund e-government initiatives.

In e-government, North Carolina county government Web sites are more likely to be more advanced than national local governments. However, the differences may be attributed to the one years difference between the 2004 and 2005 surveys and

changes/advances in IT such as – reduction in IT costs, hiring of employees with IT/web expertise and advances in technology.

The results of this analysis may be best used as a planning tool for elected government leaders, city/county managers and IT directors/staff. In addition, said individuals may use the survey results to compare their e-government efforts to national local and North Carolina county government e-government initiatives. The results may be used to set IT policy and determine and project trends in e-government initiatives at the local level of government.

CONCLUSION

Began in 1969 as ARPANET, a “partnership between the military, business, and academia to improve communications in support of government sponsored research efforts” (Wikipedia, 2005), the Internet has since “transformed our economy,” society and government (A Guide to E-government and E-commerce, 2000).

With the advent of the graphics-based World Wide Web in the early 1990s came the e-citizen. As the Web “has become the ‘new normal’ in the American way of life” (Pew Internet & American Life Project, 2005), e-citizen “demands” have “forced the transformation of government from providing services in line to transacting the same service online from the comforts of their homes” (Basu, 2000). As a result, “[t]he Internet has changed the way we think about exchange of information and the way we transact business” (A Guide to E-Government and E-Commerce, 2000).

“The relationship between government and citizens” has evolved “from its traditional hierarchical and arms-length one to a more reciprocal one where citizens are

genuine stakeholders in their government” (Progressive Policy Institute, 2000). Through e-government initiatives such as online financial transactions, requests for documents and information, and additional means of contact with government leaders, the Internet “enhances the relationship of citizens to their government” (Pew Internet & American Life Project, 2005).

To investigate the transformation of government and the Internet’s impact on citizen to government relationships at the county level of government in North Carolina, the International City/County Management Association’s (ICMA) *Electronic Government 2004* survey was replicated in North Carolina’s county governments.

A comparison of survey results indicates a significant statistical difference between e-government initiatives in North Carolina county governments and national local governments. North Carolina county governments are more likely to have a Web site than national local governments. While IT departments are similar in size, North Carolina county governments are more likely to have smaller IT budgets. In addition, North Carolina county government Web sites are more likely to offer more services and be more sophisticated than national local government Web sites.

North Carolina county governments are also more likely to have higher levels of online procurement, policies and procedures on Web site security and privacy, utilize GIS and provide data at no charge, and have more sophisticated Intranets.

North Carolina county governments and national local governments share similar e-government experiences. Current e-government initiatives are mostly funded from general revenues. Each government shares the two major barriers to e-government initiatives, funding and lack of technology/web staff. E-government has impacted both

governments in similar ways. E-government has changed the relationship with citizens, changed the role of staff, re-engineered business processes and reduced costs. E-government initiatives are also more likely to be developed in-house.

A comparative analysis of e-government initiatives in North Carolina county governments and national local governments raises a few questions that may be better answered with additional research. How much did the one year difference between surveys contribute to or skew the survey results? What would be the results of the same North Carolina county government survey if it was conducted in 2006? What is the relationship between e-government initiatives and the socio-economic status of North Carolina county governments? How do e-government initiatives in county governments in other states compare to North Carolina?

“The most exciting thing about e-commerce and e-government is that we’re just beginning to discover their benefits,” says Tom Straub, CEO of GovStoreUSA. “Endless opportunities for improvements in efficiency and the delivery of service are on the horizon” (A Guide to E-Government and E-Commerce, 2000). “As technology costs drop, familiarity with it increases and challenges to e-government dissipate, governments will more fully exploit the Internet's capabilities” (Bowser, 1998).

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APPENDIX A

Aggregate Results of *Electronic Government 2004* Survey and North Carolina County Government Survey (2005)

Below is the North Carolina County Government survey text with the aggregate results of the *Electronic Government 2004* survey and the North Carolina County Government Survey (2005) shown next to each answer. Each number represents the percentage reporting for that question. T-value (*t*) and alpha levels (α) are included. Asterisks next to the t-value indicate the alpha (α) level or level of significance. *=>.05, **=.05 - .01 while ***= < .01.

For the *Electronic Government 2004* survey results, n=3,410 while n=74 for the North Carolina County Government Survey.

Two notable symbols are E=Error with Online North Carolina County Government Survey prevented collection of responses to question 5a, item d, and question 15, and NA=No Answer.

CUSTOMER SERVICES AND MANAGEMENT

For the purposes of this survey, the county government Web site is the official web site. This does not include Web sites produced by the Chamber of Commerce.

1. Does your county government have Internet connectivity?

2004	2005		<i>t</i>
99.4	98.6	Yes	1.81**
0.6	1.4	No	-1.81**

1A. If you have Internet connectivity, please identify the method. (*Check only one.*)

2004	2005		<i>t</i>
7.1	0	a. Dial-up	24.50***
27.8	12.9	b. DSL	16.84***
22.2	7.1	c. Cable	18.41***
42.3	64.3	d. High bandwidth	-22.30***
0.6	14.3	e. Other	-20.96***

2. Does your county government have a Web site?

2004	2005		<i>t</i>
91.1	94.4	Yes	-4.60***

8.9	5.6	No	4.60***
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2A. If "Yes," what is the address of your Web site? See Appendix D: Web Site Addresses of North Carolina County Governments Reporting Having Web Sites.

2B. If "No," do you plan to create a Web site in the next year?

2004	2005		<i>t</i>
49.6	33.3	Yes	16.54***
50.4	66.7	No	-16.54***

2C. If your county government does not plan to create a Web site in the next year, please explain why.

- Time, personnel, resources and funding
- Web site currently under redesign

2D. If your county government has a Web site, which department has overall responsibility for the day-to-day management of your county government's Web site? (*Check only one.*)

2004	2005		<i>t</i>
20.4	7.4	a. County Manager/CAO	15.94***
30.7	60.3	b. IT department	-30.36***
5.0	2.9	c. Finance department	3.38***
4.8	7.4	d. PIO/Communications office	-3.77***
1.0	0	e. Library	3.17***
0.7	0	f. Business development office	2.42***
9.6	2.9	g. Clerk	8.31***
6.3	8.8	h. Web management team representatives from different departments	-3.45***
4.3	0	i. Consultants	9.55***
3.2	4.4	j. Planning/economic development dept.	-1.94**
2.4	0	k. Volunteers	6.13***
0.7	7.4	l. Other	-11.4***

For purposes of this survey, e-government is the use of the Internet to deliver services and information.

3. Does your county government have a separate information technology department that is responsible for all information technology needs, including e-government?

2004	2005		<i>t</i>
40.6	78.1	Yes	-39.43***
59.4	21.9	No	39.43***

3A. If “Yes,” how many full-time employees are in that department?

2004	2005		<i>t</i>
61.1	64.9	a. 1-5	-3.87***
15.8	12.3	b. 6-10	4.20***
9.7	10.5	c. 11-20	-1.03*
8.3	7.0	d. 21-50	1.78**
5.2	3.5	e. More than 50	2.67***

4. What is your total *operating* budget for information technology for the *current fiscal year*?

2004	2005
\$1,312,427	\$994,872

5. Has your county government conducted a citizen survey to determine what online services residents and businesses want?

2004	2005		<i>t</i>
10.0	12.2	Yes	-2.78***
90.0	87.8	No	2.78***

5A. If “yes,” which are the top three most requested online services identified by survey respondents? (*Check only three. If more than three are checked, none of the answers will be used.*)

2004	2005		<i>t</i>
35.7	22.2	a. Online service requests (e.g., requesting pothole repair)	14.27***
44.4	77.8	b. Online financial transactions (e.g., online payment of taxes)	-34.97***
40.1	11.1	c. Online registration for community events (e.g., park/rec activities, adult education)	32.34***
19.6	0	d. Online complaints (e.g., reporting graffiti, missed trash pickup)	31.11***
37.6	44.4	e. Council meeting minutes	-6.86***
10.9	0	f. Budget document	19.53***
5.6	0	g. Police reports	11.68***
10.9	0	h. Newsletters e-mailed to residents	19.53***
37.9	0	i. Employment info./applications	54.41***

37.3	0	j. Permits/licenses	53.64***
15.2	0	k. Other	25.37***
5.0	0	l. Other	10.71***

6. Please provide the following information about e-government on your county government Web site. *(Place a check in the box under the relevant columns.)*

Service	Is currently offered			% of residents/ businesses using (Average)		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Online payment of taxes	8.6	80.0	-86.56***	6.6%	6.9%	-0.42*
b. Online payment of utility bills	9.2	25.9	-19.58***	8.6%	10.3%	-2.22**
c. Online payment of fines/fees	7.3	3.6	5.54***	10.6%	NA	---
d. Online completion and submission of permit applications	10.2	E	---	13.4%	E	---
e. Online completion and submission of business license applications/renewals	6.3	3.4	4.45***	14.6%	10.0%	5.69***
f. Online requests for county government records	27.1	56.3	-30.11***	10.8%	8.5%	3.00***
g. Online delivery of county governments records to the requestor.	18.1	47.9	-31.68***	14.3%	11.8%	3.05***
h. Online requests for services, such as pothole repair	29.5	27.3	2.32**	9.3%	5.3%	5.58***
i. Online registration for use of recreational facilities/activities, such as classes and picnic areas	16.4	30.6	-15.58***	18.1%	NA	---
j. Online voter registration	2.4	14.3	-16.78***	18.4%	NA	---
k. Online property registration, such as animal, bicycle registration	2.8	2.9	-0.17*	8.7%	NA	---
l. Forms that can be downloaded for manual completion (e.g., voter registration, building	58.3	87.5	-32.17***	14.2%	13.4%	0.96*

permits, etc.)						
m. Online communication with individual elected and appointed officials	65.6	77.4	-12.48***	17.2%	18.9%	-1.94**
n. GIS mapping/data	27.2	93.7	-80.18***	18.2%	35.2%	-18.30***
o. Employment information/applications	59.6	90.8	-35.33***	20.6%	27.8%	-7.80***
p. Council agendas/minutes	75.6	92.8	-20.74***	22.1%	33.5%	-12.11***
q. Codes/ordinances	65.6	88.1	-25.17***	21.0%	27.8%	-7.35***
r. Electronic newsletter sent to residents/businesses	27.7	21.4	6.80***	16.9%	NA	---
s. Streaming video	9.3	17.1	-9.55***	10.2%	NA	---
t. Other	19.7	33.3	-14.59***	12.4%	NA	---

Service	Is NOT currently offered			We plan to offer the service			We do not plan to offer the service		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Online payment of taxes	91.4	20	86.56***	31.1	93.3	-73.67***	68.9	6.7	73.67***
b. Online payment of utility bills	90.8	74.1	19.58***	50.3	46.9	3.40***	49.7	53.1	-3.40***
c. Online payment of fines/fees	92.7	96.4	-5.54***	51.8	62.1	-10.38***	48.2	37.9	10.38**
d. Online completion and submission of permit applications	89.8	E	---	72.4	E	---	27.6	E	---
e. Online completion and submission of business license	93.7	96.6	-4.45***	61.9	51.6	10.38***	38.1	48.4	16.79***

applications/renewals									
f. Online requests for county government records	72.9	43.7	30.11***	54.2	70.6	-16.79***	45.8	29.4	16.79***
g. Online delivery of county governments records to the requestor.	81.9	52.1	31.68***	41.8	72.3	-31.45***	58.2	27.7	31.45***
h. Online requests for services, such as pothole repair	70.5	72.1	-2.32**	62.1	48.0	14.21***	37.9	52.0	-14.21***
i. Online registration for use of recreational facilities/activities, such as classes and picnic areas	83.6	69.4	15.58***	59.3	70.8	-11.82***	40.7	29.2	11.82***
j. Online voter registration	97.6	85.7	16.78***	15.3	47.4	-34.63***	84.7	52.6	34.63***
k. Online property registration, such as animal, bicycle registration	97.2	97.1	0.17*	31.8	41.7	-10.11***	68.2	58.3	10.11***
l. Forms that can be downloaded for manual completion (e.g., voter registration, building permits, etc.)	41.7	12.5	32.17***	71.6	100	-42.29***	28.4	0	42.29***
m. Online communication with individual elected and appointed officials	34.4	22.6	12.48***	44.1	20	25.45***	55.9	80	-25.45***
n. GIS mapping/data	72.8	6.3	80.18***	58.6	100	-58.99***	41.4	0	58.99***
o. Employment	40.4	9.1	35.33***	57.1	71.4	-14.70***	42.9	28.6	14.70***

information/applications									
p. Council agendas/minutes	24.4	7.2	20.74***	70.1	50.0	20.54***	29.9	50.0	-20.54***
q. Codes/ordinances	34.4	11.9	25.17***	74.4	100	-38.75***	25.6	0	38.75***
r. Electronic newsletter sent to residents/businesses	72.3	78.6	-6.80***	49.5	41.2	8.33***	50.5	58.8	-8.33***
s. Streaming video	90.7	82.8	9.55***	28.2	26.3	2.01**	71.8	73.7	-2.01**
t. Other	80.3	66.7	14.59***	17.0	0	27.74***	83.0	100	-27.74***

7. If your county government offers any of the web-based online services listed above, is there also a paper option and payment by mail or in person for the majority of these services?

2004	2005		<i>t</i>
94.8	96.6	Yes	-2.83***
5.2	3.4	No	2.83***

8. Which if any of the following barriers to e-government initiatives has your county government encountered? (*Check all applicable.*)

2004	2005		<i>t</i>
62.8	50.0	a. Lack of technology/web staff	12.91***
43.1	20.3	b. Lack of technology/web expertise	24.07***
17.3	10.8	c. Lack of information about e-gov't applications	7.83***
12.5	23.0	d. Lack of support from elected officials	-12.11***
28.8	35.1	e. Issues relating to convenience fees for online transactions	-6.53***
14.4	21.6	f. Lack of collaboration among departments	-8.24***
34.5	37.8	g. Difficulty justifying return on investment	-3.37***
17.5	23.0	h. Staff resistance to change	-6.15***
26.4	28.4	i. Issues regarding privacy	-2.12**
35.8	36.5	j. Issues regarding security	-0.71*
63.6	66.2	k. Lack of financial resources	-2.66**
24.3	48.9	l. Need to upgrade technology (PCs, networks, etc.)	-25.53***
5.9	9.5	m. Resident resistance to change	-4.95***
27.0	18.9	n. Lack of resident/business interest/demand	8.86***
30.3	25.7	o. Web site does not accept payment by credit card	4.86***
7.4	14.9	p. Bandwidth issues	-9.54***
4.0	1.4	q. Other	4.64***

9. How has e-government changed your county government? (*Check all applicable.*)

2004	2005		<i>t</i>
2.4	1.4	a. Has reduced the number of staff	1.92**
32.9	44.6	b. Has changed the role of staff	-11.90***
25.6	41.9	c. Has reduced time demands on staff	-16.90***
33.8	21.6	d. Has increased demands on staff	12.97***
1.2	1.4	e. Has increased non-tax-based revenues from fees, advertising	-0.42*
39.9	28.4	f. Has increased citizen contact with elected and appointed officials	11.86***
22.8	23.0	g. Business processes are being re-engineered	-0.22*
23.1	29.8	h. Business processes are more efficient	-7.15***
11.0	20.3	i. Has reduced administrative costs	-11.00***

67.8	59.5	j. Has improved local gov't communication with the public	8.48***
55.5	64.9	k. Has improved customer service	-9.52***
4.0	0	l. Other	9.04***

10. If you currently provide e-government services, how are they developed? (*Check all applicable.*)

2004	2005		<i>t</i>
62.5	64.7	a. Developed in-house by county government staff	-2.24**
45.9	39.7	b. Developed by consultants and county government staff	6.24***
17.7	33.8	c. Outsourced to Application Service Providers	-17.41***
24.7	30.9	d. Programs are purchased from IT vendors and integrated into our databases.	-6.56***
2.4	0	e. Other	6.13***

11. How does your county government provide the following? (*Check all applicable.*)

	In-house by county government staff			Currently outsources		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Web site hosting	38.5	53.5	-15.11***	63.2	46.5	16.86***
b. Web site design	55.9	100	-62.59***	49.5	0	70.01***
c. Web site operations and management	77.1	100	-35.33***	27.7	0	41.41***
d. Integration of Web site with county government databases	68.0	100	-46.85***	37.6	0	54.02***

11A. Do you use a Web Content Management System?

2004	2005		<i>t</i>
29.6	41.2	Yes	-11.91***
70.4	58.8	No	11.91***

11B. If “no,” do you plan to introduce a Content Management System that enables non-technical staff to manage and maintain your Web site?

2004	2005		<i>t</i>
35.6	40.0	Yes	-4.47***
64.4	60.0	No	4.47***

12. Does your county government have a policy or procedure on any of the following?
(Check all applicable.)

	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Web site privacy	46.2	54.4	-8.21***	53.8	45.6	8.21***
b. Web site options for visually impaired users	13.3	20.1	-7.90***	86.7	79.9	7.90***
c. Web site security	56.2	66.6	-10.57***	43.8	33.4	10.57***
d. Web site language translation capability	7.2	19.0	-14.63***	92.8	81.0	14.63***
e. Paid advertising on the web site	10.0	13.2	-4.00***	90.0	86.8	4.00***
f. Links to businesses that request a link	33.7	20.9	13.65***	66.3	79.1	-13.65***

ONLINE PROCUREMENT

13. Please indicate by checking the boxes below which procurement activities you complete online.

Service	Review product offerings online					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Property and/or liability insurance	18.4	36.1	-19.00***	81.6	63.9	19.00***
b. Equipment	72.4	95.5	-23.41***	27.6	4.5	23.41***
c. Office supplies	74.2	92.2	-21.43***	25.8	7.8	21.43***

Service	Make purchases online					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Property and/or liability insurance	4.4	6.9	-3.69***	95.6	93.1	3.69***
b. Equipment	52.0	78.3	-27.54***	48.0	21.7	27.54***
c. Office supplies	62.4	77.3	-15.68***	37.6	22.8	15.68***

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

14. Does your jurisdiction utilize GIS programs that create maps and display data spatially to help you to analyze information?

2004	2005		<i>t</i>
73.3	94.4	Yes	-25.73***
26.7	5.6	No	25.73***

14A. If “yes,” will you rely more on GIS technology to assist in emergency preparedness as a result of recent terrorism-related threats in the U.S.?

2004	2005		<i>t</i>
61.7	79.4	Yes	-18.76***
6.8	4.4	No	3.55***
31.5	16.2	Not Sure	16.76***

14B. Does your county government provide GIS data online to residents/businesses?

2004	2005		<i>t</i>
33.3	85.7	Yes	-57.82***
66.7	14.3	No	57.82***

14C. If “Yes,” does your county government charge a fee to residents/businesses for GIS data?

2004	2005		<i>t</i>
19.8	17.0	Yes	3.18***
80.2	83.0	No	-3.18***

15. Which department manages the GIS function? *(Please check the department that has primary responsibility.)*

2004	2005	
23.7	E	a. Information technology
23.0	E	b. Engineering
28.5	E	c. Planning
24.9	E	d. Other

INTRANET

16. Does your county government have an Intranet (a Web server accessible only to county government employees, sometimes called a “portal”)?

2004	2005		<i>t</i>
50.3	50.7	Yes	-0.40*
49.7	49.3	No	0.40*

16A. If “yes,” how is the Intranet managed?

2004	2005		<i>t</i>
87.0	94.6	in house	-10.13***
13.0	5.4	by a service provider	10.13***

16B. If “yes,” how do you use/plan to use the intranet? *(Please check all below.)*

	Currently use					
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Provide news and information	81.1	97.1	-21.39***	18.9	2.9	21.39***
b. Publish documents and manuals online to reduce printing costs	62.0	88.6	-29.68***	38.0	11.4	29.68***
c. Post job openings for internal recruitments	50.5	74.3	-24.59***	49.5	25.7	24.59***
d. Provide employee benefit forms	46.1	71.4	-25.95***	53.9	28.6	25.95***
e. Provide online report generation	34.7	48.5	13.97***	65.3	51.5	13.97***
f. Provide online procurement tools	26.6	32.4	-6.03***	73.4	67.6	6.03***
g. Enable project teams to collaborate	33.4	37.5	-4.19***	66.6	62.5	4.19***
h. Enable inter-/intra-agency data and information sharing	50.2	58.8	-8.63***	49.8	41.2	8.63***
i. For financial reporting	37.9	45.5	-7.67***	62.1	54.5	7.67***
j. Expand telecommuting staff access to information and data	37.3	50.0	-12.81***	62.7	50.0	12.81***
k. Provide online	29.4	50.0	-21.07***	70.6	50.0	21.07***

training						
l. GIS	45.0	79.4	-36.22***	55.0	20.6	36.22***
m. Timesheets	27.3	39.4	-12.52***	72.7	60.6	12.52***
n. Online help desk	30.7	55.6	-25.44***	69.3	44.4	25.44***
o. Other	28.1	100	-107.24***	71.9	0	107.24***

If you do not currently use an intranet, do you plan to use one in the future?						
	Yes			No		
	2004	2005	<i>t</i>	2004	2005	<i>t</i>
a. Provide news and information	65.0	100	-50.68***	35.0	0	50.68***
b. Publish documents and manuals online to reduce printing costs	64.7	100	-51.06***	35.3	0	51.06***
c. Post job openings for internal recruitments	57.1	50.0	7.12***	42.9	50.0	7.12***
d. Provide employee benefit forms	65.0	0	94.12***	35.0	100	94.12***
e. Provide online report generation	53.7	62.5	-8.88***	46.3	37.5	8.88***
f. Provide online procurement tools	48.3	66.7	-18.67***	51.7	33.3	18.67***
g. Enable project teams to collaborate	54.7	66.7	-12.19***	45.3	33.3	12.19***
h. Enable inter-/intra-agency data and information sharing	58.4	83.3	-26.76***	41.6	16.7	26.76***
i. For financial reporting	51.6	37.5	14.22***	48.4	62.5	-14.22***
j. Expand telecommuting staff access to information and data	43.1	42.9	0.20*	56.9	57.1	0.20*

k. Provide online training	55.5	87.5	-35.17***	44.5	12.5	35.17***
l. GIS	57.6	66.7	-9.26***	42.4	33.3	9.26***
m. Timesheets	57.0	66.7	-9.87***	43.0	33.3	9.87***
n. Online help desk	53.2	33.3	20.20***	46.8	66.7	-20.20***
o. Other	26.5	0	39.89***	73.5	0	-39.89***

FINANCING

17. Please check the box beside the option below that best describes the e-government budget process in your county government.

2004	2005		<i>t</i>
81.7	88.8	a. There is no separate budget item for e-government.	-8.47***
4.6	1.4	b. There is a separate budget item for e-government, and each department develops and submits its own e-government budget.	5.60***
13.7	9.5	c. There is a separate budget item for e-government, and the Information Technology (or equivalent) department develops and submits the e-government budget for the county government.	5.26***

18. If you have a separate budget item for e-government, how much do you plan to budget for e-government for the coming fiscal year?

2004	2005		<i>t</i>
13.6	25.0	a. Under \$5,000	-12.94***
15.7	0	b. \$5,000-\$9,999	26.03***
19.2	16.7	c. \$10,000-\$24,999	2.85***
14.8	8.3	d. \$25,000-\$49,999	8.18***
17.5	16.7	e. \$50,000-\$99,999	0.92*
19.2	33.3	f. \$100,000 or over	-15.16***

19. Regardless of whether your county government budgets separately for e-government, as you plan for e-government, where do you obtain your cost estimates? (*Check all applicable.*)

2004	2005		<i>t</i>
55.6	55.4	a. Our cost information was obtained primarily from IT solution vendors	0.20*

22.3	18.9	b. Our cost information was obtained primarily from other cities/counties who have implemented similar e-government services.	3.78***
48.0	44.6	c. We estimated most of the costs for e-government	3.41***
3.2	4.1	d. Other	-1.47**

20. How are your current e-government efforts funded? (*Check all applicable.*)

2004	2005		<i>t</i>
7.5	24.3	a. Federal or state grants	-20.19***
5.2	16.7	b. Transaction fees from services provided	-14.91***
92.6	83.8	c. General revenues	11.09***
4.0	0	d. Risk-sharing (a private sector firm provides the application and receives a percent of the revenue)	9.04***
2.2	0	e. Municipal bond financing	5.74***
3.3	2.7	f. Cable fees	1.03*
9.8	0	g. Utility funds/revenues	17.97***
7.0	2.7	h. Enterprise fund	6.66***
0.1	0	i. Web site advertising	0.56*
4.0	1.4	j. Other	4.64***

APPENDIX B

Email from ICMA Granting Permission to use *Electronic Government 2004* Survey Instrument

Date Sent: Monday, August 08, 2005 7:52 AM
From: "Evelina Moulder" EMOULDER@ICMA.org
To: Lawrence T. Locklear
Subject: RE: ICMA Survey

Hello,

It's fine to use the survey instrument. Good luck!

Evelina
Evelina Moulder
Director of Survey Research & Information Management
ICMA
emoulder@icma.org
icma.org
202-962-3534

Visit the survey research section of ICMA's web site at
<http://icma.org/main/bc.asp?bcid=130&hsid=1&ssid1=44&ssid2=80&ssid3=216>

-----Original Message-----

From: Lawrence T. Locklear [ltl001@uncp.edu] Sent: Monday, August 08, 2005 12:00 AM
To: Evelina Moulder; pubs; Sebia Clark
Subject: ICMA Survey

I am a graduate student in the Public Administration Program at The University of North Carolina at Pembroke. I am beginning work on my thesis. As part of the thesis, I plan to conduct a survey of the 100 county managers in North Carolina on e-government initiatives (web sites) in their county.

I would like to use ICMA's Electronic Government 2004 survey instrument (http://bookstore.icma.org/freedocs/e_government_2004.pdf).

I am writing seeking your permission to use the survey. I will cite ICMA in my thesis.

Thanks!

Lawrence T. Locklear
Graduate Student
Master of Public Administration (MPA) Program
The University of North Carolina at Pembroke
Email: ltl001@uncp.edu

APPENDIX C

Email/Fax to North Carolina County Governments

Dear County Manager/Administrator (or designee),

My name is Lawrence T. Locklear and I am a graduate student in the Public Administration Program at The University of North Carolina at Pembroke.

I am conducting an online survey to assess activity by North Carolina's county governments in the area of Electronic Government (e-government). The results of this survey will be used to write my thesis and complete requirements for the Master of Public Administration.

The survey takes approximately 15 minutes to complete. You or your designee should complete the survey. Please complete the survey between September 5 and October 1, 2005.

THE SUCCESS OF MY THESIS HINGES ON YOUR COMPLETION OF THE SURVEY.

The survey can be found online at <http://www.uncp.edu/home/lawrence/survey/>

If you wish to receive a copy of the results, please answer "yes" to the appropriate question in the Demographics section of the survey.

For more information, contact me at ltl001@uncp.edu.

Thank you for your participation.

Lawrence T. Locklear
Graduate Student
Master of Public Administration (MPA) Program
The University of North Carolina at Pembroke
Email: ltl001@uncp.edu
MPA Program Web Site: <http://www.uncp.edu/mpa/>

APPENDIX D

Web Site Addresses of North Carolina County Governments Reporting Having Web Sites

County	Web Site Address
Alamance	http://www.alamance-nc.com
Alexander	http://www.alexandercountync.gov
Anson	http://www.co.anson.nc.us
Ashe	http://www.ashecountygov.com
Bertie	http://www.co.bertie.nc.us
Buncombe	http://www.buncombecounty.org
Burke	http://www.co.burke.nc.us
Cabarrus	http://www.cabarruscounty.us
Camden	http://www.camdencountync.gov
Carteret	http://www.carteretcountygov.org
Caswell	http://www.caswellcountync.gov
Catawba	http://www.catawbacountync.gov
Cherokee	http://www.cherokeecounty-nc.gov
Cleveland	http://www.clevelandcounty.com
Columbus	http://www.columbusco.org
Craven	http://www.cravencounty.com
Cumberland	http://www.co.cumberland.nc.us
Currituck	http://www.co.currituck.nc.us
Dare	http://www.darenc.com
Davidson	http://www.co.davidson.nc.us
Davie	http://www.co.davie.nc.us
Duplin	http://www.duplincountync.com
Durham	http://www.co.durham.nc.us
Edgecombe	http://www.edgecombecountync.gov
Forsyth	http://www.forsyth.cc
Franklin	http://www.co.franklin.nc.us
Gaston	http://www.co.gaston.nc.us
Granville	http://www.granvillecounty.org
Greene	http://www.co.greene.nc.us
Guilford	http://www.co.guilford.nc.us

Halifax	http://www.halifaxnc.com
Harnett	http://www.harnett.org
Iredell	http://www.co.iredell.nc.us
Jackson	http://www.jacksonnc.org
Johnston	http://www.johnstonnc.com
Jones	http://www.co.jones.nc.us
Lee	http://www.leecountync.com
Lenoir	http://www.co.lenoir.nc.us
Macon	http://www.maconnc.org
Madison	http://www.madisoncountync.org
Martin	http://www.martincountyncgov.com
McDowell	http://www.mcdowellgov.com
Mitchell	http://www.mitchellcounty.org
Montgomery	http://www.montgomerycountync.com
Moore	http://www.moorecountync.gov
New Hanover	http://www.nhcgov.com
Onslow	http://www.co.onslow.nc.us
Orange	http://www.co.orange.nc.us
Pamlico	http://www.pamlicocounty.org
Pasquotank	http://www.co.pasquotank.nc.us
Pender	http://www.pender-county.com
Perquimans	http://www.perquimanscountync.gov
Person	http://www.personcounty.net
Pitt	http://www.pittcountync.gov
Polk	http://www.polknc.org
Randolph	http://www.co.randolph.nc.us
Rockingham	http://www.co.rockingham.nc.us
Rowan	http://www.rowancountync.gov
Rutherford	http://www.rutherfordcountync.gov
Sampson	http://www.sampsonnc.com
Scotland	http://www.scotlandcounty.org
Stokes	http://www.co.stokes.nc.us
Surry	http://www.co.surry.nc.us
Transylvania	http://www.transylvaniacounty.org
Union	http://www.co.union.nc.us

Vance	http://www.vancecounty.org
Warren	http://www.warrencountync.com
Watauga	http://www.wataugacounty.org
Wayne	http://www.waynegov.com
Wilson	http://www.wilson-co.com
Yadkin	http://www.yadkincounty.gov