This study examines the use of e-government services by North Carolina county governments. The study was conducted to investigate at what stage of e-government North Carolina counties have reached. Three variables were examined to determine which, if any, could explain the e-government stage where the counties are. The three variables were region, economic development tier level, and broadband access.

Methods employed over the course of the study included sending a survey to county IT directors and managers, and examining county websites in the case of non-response. Zero counties were found to be at the Presence stage, while 13% were found to be at the Interactive stage, and 87% are at the Transactional stage—which was divided into Early and Advanced Transactional stages for closer inspection. Though the variables individually can impact Internet or e-government uses, none of them completely explain the e-government stage of North Carolina counties.

Headings:

Broadband communication systems

Electronic government information

Government websites

Internet in public administration

North Carolina local government
E-GOVERNMENT SERVICES IN NORTH CAROLINA: EXAMINING THE INVENTORY

by
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A Master’s paper submitted to the faculty of the School of Information and Library Science of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Library Science.

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INTRODUCTION

Internet access is becoming increasingly important for citizens to fully participate in America’s economic, social, and political environment. As Internet access becomes more widespread, almost ubiquitous, it is critical for governments to harness the benefits of the Internet to share information with citizens and allow citizens to access basic services online. The commonly used catchall term e-government can be used in many contexts, but is basically “government use of information technology…to enhance delivery of information and services to employees and agencies within government and to citizens and business partners” (Schelin 2001, 1). Touted benefits of e-government include less corruption, increased transparency, greater convenience, revenue growth, and cost reductions (World Bank 2011). E-government represents a move away from traditional bureaucratic hallmarks of standardization, hierarchy, and departmentalization toward a new government marked by collaboration, personalization, and coordination (Schelin 2001).

In 2000, Baum and Di Maio identified four main stages of e-government, which have been echoed and built upon. Baum and Di Maio’s four-step model is the most recognizable, and includes: presence, interaction, transaction, and transformation (Coursey and Norris 2008, 524). Presence is the simplest entrance a government can take toward e-government, but offers the fewest options for citizens. An example would be a basic website that lists information about an agency but has no interactive capabilities.
Many refer to these types of sites as the electronic equivalent of a brochure. The second stage is interaction. These sites offer some interaction, but are limited and usually only involve information provision, such as providing downloadable forms, or giving an email contact that can respond to simple questions. The next stage is transaction. These sites are more complex, and allow citizens to complete tasks online at any time. Examples would include allowing citizens to apply for a license renewal or paying their taxes online. Even though these applications are more complex than in the interaction stage, they are still mostly one-way, as the responses are usually standardized and predictable. The last stage is transformation. These initiatives fully utilize technology to fundamentally change how government functions are thought of, organized, and carried out. There are very few examples of agencies at this stage, due to administrative, technical, and fiscal limitations. The aim of these transformational initiatives is to ultimately change and remove organizational barriers and promote solutions that are focused on citizens rather than agencies, and to possibly reorganize, combine, or eliminate some agencies and replace them with virtual organizations. Reinwald and Kraemmergaard have identified a Danish municipality, Gentofte, that has reached the transformational stage, with its award-winning web portal serving as a highly personalized one-stop shop for citizens. The seamless and easy-to-use interface represents intensive collaboration between and transformation of government departments (2010, 5-7). However, at present, most governments are in either the presence or interaction stages, with very few moving into transaction (Seifert 2003, 11).

Central to e-government is Internet access. As hard as it may be to believe, not everyone in America has access to the Internet. Around 80% of Americans have
broadband connections at home or on their smartphones, and around 87% of Americans use the Internet, whether at home, at a friend’s house, or at the public library (Zickuhr and Smith 2013). The access to broadband is lower in rural areas, and around 4% of the population cannot access the Internet at all (Neville 2013, Agri-Pulse 2014). There are different levels of access and use among different groups of people, and these barriers, whether stemming from access or technical skill, impact certain groups more than others.

In North Carolina, efforts began in 1994 to provide high-speed Internet to all citizens in the state. In 2013, after two decades of the combined efforts of many organizations, and many hundreds of millions of dollars later, an FCC Internet service report ranked North Carolina last in the country in the percentage of households with fixed connections with download speeds of at least 3 Mbps, which was the previous minimum speed deemed sufficient for “engaging in modern life” (Michaels 2013, MCNC.org/about.html 2014, Singleton 2015).

1.1 The Research Problem

How can e-government services reach their hoped-for potential if counties and municipalities cannot reach their citizens online, and may also be struggling with Internet access issues themselves? This study will attempt to create a full inventory of e-government services currently offered by county governments in North Carolina, and to give each county a score that corresponds with its e-government stage of development. Counties usually serve rural residents, who often have less access to the Internet than citizens in cities and towns. The scores will be compared to three factors—region, development tier level, and broadband Internet access—to see if any of these factors are related to development stage or can help explain what stage each county is in. It is
important to pursue this research because at present, no complete inventory of e-
government services in North Carolina exists, and despite ongoing and substantial efforts
to expand Internet access throughout the state, thousands of citizens go underserved or
completely unserved, preventing them from participating in social, political, and
economic conversations and transactions online, and also preventing them from easy
access to government information and services. Internet access issues also prevent local
governments in North Carolina from moving to the next stage of e-government, prevent
them from interacting with their citizens electronically, and place them at a disadvantage
compared to peer counties with these services.
LITERATURE REVIEW

In this review, the term “e-government” will be defined, and its history, stages of development, barriers, and common citizen perceptions will be discussed. The access to high-speed Internet in America, and more specifically in North Carolina, will be explored in terms of broadband penetration, the Digital Divide, and access to e-government services.

2.1 E-Government

Offices and agencies within all levels of government have been cultivating their online presence since the 1990s. The 2002 E-Government Act (Public Law No: 107-347) pushed government organizations to use their websites for more than just static content, to allow two-way interaction between citizens and the government, to promote online transactions, and to transform how government works (Center for Effective Government). Ideally, governments would harness the capabilities and potential of technology to run more efficiently and effectively, offering seamless service to citizens.

2.2 Concept of E-Government

E-government, or “government use of information technology, particularly Web-based Internet applications, to enhance delivery of information and services to employees and agencies within government and to citizens and business partners,” was seen in the early 2000s as a way to overcome limitations of traditional government activities and
practices by increasing transparency, convenience, and reducing costs (Schelin 2001, 1; Lenihan 2002; World Bank 2011). According to Bekkers and Zouridis (1999, 185), by moving toward an e-government model, governments could enhance customer service by increasing coordination and collaboration. This was seen as a solution to widespread attitudes toward bureaucratic hallmarks like standardization, hierarchy, departmentalization, and cost savings at the expense of customer service (Schelin 2001). The World Bank (2011) has described e-government as a way to not only provide better delivery of government services to citizens and improve interactions with business and industry, but also as a way to empower citizens through access to information and to develop more efficient management. Aside from citizen service, Schelin (2001, 1) notes “as the twenty-first century advances, government’s overwhelming interest is to use “interoperable” technologies, technologies that allow various departments to share data across information systems or products without special effort on the part of staff.” It is important to note that there is no universally accepted definition of “e-government” and the term is used as a catchall phrase to cover the previously mentioned functions (Yildiz 2007, 650).

2.3 Move Toward E-Government

The “new public administration” theory, which became prominent in the second half of the 20th century, as well as the “reinventing government” movement of the 1990s, placed pressure on governments to run more like businesses (Bekkers and Zuridis 1999, 184). Aiming to increase citizen trust and involvement, these movements attempted to improve outdated and ineffective service delivery methods (Bekkers and Zuridis 1999; Ho 2002; Dawes 2008). In 1993, the Clinton-Gore National Performance Review closely
linked the reinvention of government and its processes to the creative use of information technology, and officials began promising to put people “online instead of in line” (Dawes 2008, S87). Over the past three decades, information and communication technology has slowly but consistently permeated government organizations at all levels. This was largely the result of the conversion of information from analog to digital forms, changes in telecommunications technology, and the convergence of computer and communication technologies (Breitschneider 2003, 738). Until the 1980s, the main uses of technology in government had been largely disjointed, with each agency or department using legacy systems that were not interoperational or connected to any other department’s systems. Most computing was focused only on internal administrative and clerical processes, such as automating mass financial transactions on mainframe computers (Aldrich, Bertot, McClure 2002, 349; Yildiz 2007, 647). The diffusion of personal computers in the 1980s, and their increased use in government during the 1990s and early 2000s changed not only the way the government used technology, but also how government did work (Yildiz 2007, 647; Dawes 2008, S89). As computers became more widespread, so did the belief that technology should be integrated into the functions of the government, especially in relation to the core principles of transparency, participation, and collaboration (Yildiz 2007, 647; Orszag 2009). During the 1990s and early 2000s, some very important legislation supported the further use of IT in government, including the 1995 amendment of the 1980 Paperwork Reduction Act, the 1996 Electronic Freedom of Information Act, the 1996 Personal Responsibility and Work Opportunity Reconciliation Act, the 1996 Information Technology Management Reform Act, and the 2001 E-Government Act, which provided both the organizational and financial
infrastructure of widespread e-government applications (Yildiz 2007, 649; Dawes 2008, S88). After the events of September 11, 2001, e-government began to be seen as a tool to be used against terrorist threats, to promote inter-agency information sharing, increasing security, and protecting information (Yildiz 2007, 649; Dawes 2008, S90). Today, accessibility and government-citizen interaction is easier than ever due to increased technical expertise, the proliferation of connected devices, and the increase in social media, blogs, wikis, and other sites (Dawes 2008).

2.4 Stages of E-Government Development

A government organization does not go from having no web presence to a complete transformation of their service and mission overnight. Many different stages of e-government have been identified, and most governments fall somewhere along the spectrum. Baum and Di Maio were the first to identify the different stages of e-government development, giving a four-step model, which remains popular (2000). The steps they outlined were 1) presence; 2) interaction; 3) transaction, and 4) transformation (Baum and Di Maio 2000; Seifert 2003), briefly reviewed here. Presence refers to an online presence, such as a website, with information that citizens can see and download. This is the basic step. Interaction includes the ability for citizens to contact government organizations and officials online. The transactional stage is self-explanatory, where citizens can complete transactions online. The last stage, transformation, is a bit different and quite idealistic. In this stage, e-government will cause the relationship between citizens and the government to fundamentally change, promoting better customer service and increasing levels of trust (Baum and Di Maio 2000). Layne and Lee (2001, 124) also gave a four-step model, which differs slightly from Baum and Di Maio’s. The first step is
catalogue, where the government creates their online presence and provides information, including downloadable forms, for the public to access. The second step is transaction, which provides services and forms online, and has a working database to support online transactions. Transactions at this phase would be largely standardized, such as paying a fee or renewing a license. Third is vertical integration, where local, state, and federal governments are linked together for different functions and services. Lastly, horizontal integration, which is the connection of different functions and services across the same level of government, so the focus is on the connection of departments to ease transaction and information transfer (Layne and Lee 2001, 124). Wescott (2001, 6-7) proposed a different model, one with six stages instead of four. They were very similar to Layne and Lee’s: 1) setting up an email system and internal network; 2) enabling inter-organizational and public access to information; 3) allowing 2-way communication; 4) allowing exchange of value; 5) digital democracy; and 6) joined-up government (Wescott 2001, 6-7). While beginning in a similar way, Wescott takes the stages further, imagining a future where citizens could interact with each other and the government and become empowered by available information and resources, and barriers between various departments and agencies would be erased in favor of seamless customer service (2001, 13). There are two other models, by Ronaghan in 2001 and Hiller and Belanger, also from 2001. Ronaghan’s model is like Baum and Di Maio’s, except with a two-step presence stage, emerging and enhanced (Ronaghan 2001, 11; Coursey and Norris 2008, 524). Hiller and Belanger proposed a five-step model, which included 1) information dissemination; 2) two-way communication; 3) integration; 4) transaction, and 5) participation (Hiller and Belanger 2001, 15; Coursey and Norris 2008, 524). It is
important to note that these models do not cover every government’s experience or plan, as some skip stages and some offer services at different levels of sophistication (Holden, Norris, and Fletcher 2003). Table 1 gives an overview of each model.

### Overview of E-government Development Models

<table>
<thead>
<tr>
<th>Baum and Di Maio</th>
<th>Layne and Lee</th>
<th>Wescott</th>
<th>Ronaghan</th>
<th>Hiller and Belanger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence</td>
<td>Catalogue</td>
<td>Setting up internal network</td>
<td>Emerging presence</td>
<td>Information dissemination</td>
</tr>
<tr>
<td>Interaction</td>
<td>Transaction</td>
<td>Enabling access</td>
<td>Enhanced presence</td>
<td>Two-way communication</td>
</tr>
<tr>
<td>Transaction</td>
<td>Vertical integration</td>
<td>Allowing two-way communication</td>
<td>Interaction</td>
<td>Integration</td>
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<tr>
<td>Transformation</td>
<td>Horizontal integration</td>
<td>Allowing exchange of value</td>
<td>Transaction</td>
<td>Transaction</td>
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<td></td>
<td></td>
<td>Digital democracy</td>
<td>Transformation</td>
<td>Participation</td>
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<td></td>
<td>Joined-up government</td>
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<td></td>
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</tbody>
</table>

Table 1

It is also important to note that a higher stage does not equal greater sophistication. Pardo noted “Anyone can build a website… but digital government is more than that” (Pardo 2000, 1). It is hard to measure sophistication of services, since a website may have any variety of services and capabilities, and different levels of transactional capabilities, information quality, and interconnectedness (Holden, Norris, and Fletcher 2003, 327). Though most governments offer services, interactions, and transactions on these websites, most are still at a low level of sophistication (Holden, Norris, and Fletcher 2003, 327-329). Regardless of level of sophistication, the website is
still the core platform for delivering information and services to citizens, and must be planned carefully (Center for Digital Government 2013).

2.5 Barriers to E-Government Adoption and Success

The adoption of e-government, or the ability to provide information and services to citizens 24 hours a day, 7 days a week, while noble in aim, has been impeded by several barriers (Holden, Norris, and Fletcher 2003, 339). Most of the predictions about e-government, and the different stages it would go through to reach the ideal future were just that—predictions. Though the stages are commonly used to describe where a government is on its way towards improving e-government services, there is not universal agreement that governments move through these stages in the same order or at all. Due to significant barriers that governments face, and by limitations of both the Internet and citizens, hardly any government websites have moved beyond the presence or interaction stages, and generally, e-government has not lived up to the hype (Dahlberg 2001; Moon 2002; Dimitrova and Chen 2006; Coursey and Norris 2008; Chadwick 2011). There are a number of barriers known to impede the adoption and success of e-government.

First, there are many technical barriers, which include lack of technology and IT staff and expertise, lack of information on e-government applications, bandwidth issues, issues with processing credit card payments, a need to upgrade hardware or networks, and issues related to the “digital divide.” Making e-government equally available and accessible to all citizens is one of the largest challenges, due to gaps in access, digital inclusion, and technical skill (Central Information Technology Unit 2000; Cullen and
Secondly, there are political and organizational barriers, including a lack of support from elected officials, lack of interdepartmental collaboration, staff resistance, resident resistance, lack of demand, and lack of use (Ho 2002, 434; Coursey and Norris 2008, 529; Chadwick 2009, 49). The boundaries of government organizations are impacted greatly by electronic information sharing, and ideas about boundaries, accountability, and the ownership of data must be accounted for in new ways (Bekkers and Zouridis 1999, 190).

Third, there are legal barriers, which include problems charging convenience fees for online transactions, as well as privacy and security issues. The importance of information privacy cannot be underestimated, as electronic service delivery requires the collection of citizens’ personal data, which must be protected (Bekkers and Zouridis 1999, 190; Chadwick 2003, 286). Finally, many cite a difficulty justifying the return on investment for these new applications and a lack of financial resources (Ho 2002; Holden 2002; Asgarkhani 2005; Coursey and Norris 2008).

Aside from these barriers, links between the wealth of the county or government and their likelihood of adopting e-government services have been studied as well. Baird, Zelin, and Booker cite lower levels of e-government services in areas with lower median incomes and higher poverty rates. In these areas, governments are dealing with different, more pressing issues, and have less tax money to use to upgrade IT systems and applications (2012, 95). A link between e-government adoption rates and government size and location has been found as well. Larger cities with more money, or cities closer
to urban areas, were more likely to use e-government services on their websites (Holden, Norris, and Fletcher 2002; Moon 2002; Reddick 2004; Baird, Zelin, and Booker 2012).

Given that certain barriers exist, there is a question if e-government applications and services are really effective (Asgarkhani 2005). Without proper planning and support, these endeavors can place too much emphasis on the technology and not enough emphasis on making the applications easy to use or accessible by all citizens. Without an overall plan to improve the political and social environment and to create fundamental change in government-citizen interaction, placing services or information online will not create a more open government; it will only create more convoluted methods of communication and confusion (Wong and Welch 2004; Asgarkhani 2005; Gil-Garcia and Pardo 2005; Godfrey 2013).

### 2.6 Citizen Perceptions of E-Government

A few studies have investigated citizen perceptions within the framework of diffusion theory (Rogers, 2003). Carter and Belanger (2005, 5) found that the three factors that have the largest impact on citizen use of e-government services are compatibility, perceived ease of use, and perceived trustworthiness, while Dimitrova and Chen (2006, 172) found that perceived usefulness, level of uncertainty about using technology, and prior interest in government are related to citizen use of e-government. Lee, Kim, and Ahn (2011, 228) found that trust in traditional government services impacted citizen adoption. If citizens are already online and comfortable using online applications, and trust the information and services provided by the government, they are more likely to accept e-government applications and begin using them (Welch, Hinnant, and Moon 2004; Carter and Belanger 2005; Lee, Kim, and Ahn 2011). These findings
link back to the original purpose of e-government—the desire of governments to use technology to interact with citizens, to provide services, and to increase trust and transparency (Schelin 2001; Yildiz 2007, 650). Though e-government hasn’t universally reached the idealistic “transformation” stage, almost all government entities have a web presence that includes information and some interaction with the public.

2.7 Internet Access

Internet access is central for the implementation, use, and success of e-government. Called the “great infrastructure challenge of the early 21st century” by the FCC, broadband, or high-speed Internet, is becoming increasingly essential, not only for personal use, but as the basis for economic growth, job creation, and global competitiveness. Internet access can be used to improve industries, education, health care, energy, public safety, and the dissemination of information, and to increase communication and interaction with the government and each other (FCC 2011; Oyana 2011). People without access to the Internet are “disadvantaged by not having access to the services and applications that run on it” (Graham 2001, 37). While it is easy to assume that “everyone” in America has access to the Internet, this is not true, though the numbers, while not universally agreed on, are quite high. Despite many organizations collecting information on broadband access, the actual number of Americans who have access to broadband Internet is not agreed upon. Eight million Americans had broadband at home in 2000, and nearly 200 million had broadband at home by 2009 (FCC 2010). In spite of this huge proliferation, as of 2010, the FCC reported that about 100 million Americans still did not have broadband at home, and released the National Broadband Plan in an attempt to ensure “every American has access to broadband capability” (FCC
In 2011, the Census Bureau’s Current Population Survey found that 98% of households in America live in areas with access to broadband Internet connections, even though a much smaller number (around 69%) of households actually use broadband at home (Zickuhr and Smith 2013). The Pew Research Center, as part of its Internet & American Life Project, has done several surveys in recent years to understand different aspects of Internet adoption and usage among Americans. In September 2013, Pew reported that 70% of Americans have broadband connections in their homes, and 2% of Americans have dial-up connections in their homes. Though 72% of Americans have Internet access in their homes, a January 2014 Pew survey found that 87% of American adults use the Internet, which includes those who access the Internet via mobile devices, at the public library, or elsewhere. The survey found that 90% of Americans own a cell phone, and 58% own smartphones, and about 10% of the population connects to the Internet via their mobile devices rather than paying for home Internet service. Given this, the percentage of Americans who can access the Internet at home around 80% (Pew Research Center 2013).

Broadband access is still heavily dependent on location. The National Telecommunications & Information Administration (NTIA) has reported that 98% of Americans have access to broadband, with almost “universal availability” in urban areas, but only 91% in rural areas (Neville 2013). Guerin (2014) reported that of the 19 million Americans without broadband access, 14.5 million of them live in rural areas. Rural Internet access is impacted by a limited number of providers, platform availability, socioeconomic factors, and geographic conditions (Oyana 2011, 254). Tom Wheeler, the FCC Chairman, has recently acknowledged that around 12 million Americans (which is
about 4 percent of the population) live in areas without access to broadband. In a sentiment widely shared among organizations that promote broadband access, Wheeler said the FCC is committed to “unleashing new waves of investment and innovation, which will deliver untold benefits in the form of modern broadband networks for the American people, including rural America. We cannot be a nation of opportunity without networks of opportunity” (Agri-Pulse 2014).

2.8 Internet Access and the Digital Divide

There are different levels of access and use among different groups of people, and Internet use differences based on gender, age group, race, income level, education level, and geographic location have been studied. There are barriers to Internet access that impact certain groups more than others (Pew Research Center 2013). A central problem here is the “digital divide.” There are two digital divides: an access divide and a skills divide (Belanger and Carter 2009, 132). These divides refer to the gap between those who have access to computers and the Internet at home and those who do not, as well as those who have the skills to use technology and those who do not. The skills divide includes issues with technical competence as well as information literacy. There are many factors that are commonly mentioned in connection with the digital divide, including location, socioeconomic status, ethnicity, age, and education level (Belanger and Carter 2009, 133; Barker 2010). As the Pew study found, almost 20% of adults in America do not use the Internet, whether by choice or not. Most of the people who do not have Internet have low incomes or are older than 65 (Dewey 2013). Black and Hispanic households have lower levels of Internet use than white and Asian households. Rural households are much less likely to have access to the Internet at home, and most of those without Internet or high-
speed broadband live in the Southeast (Dewey 2013). Baird, Zelin, and Booker conducted a study that attempted to determine if county governments, who serve primarily rural communities, were impacted in the services they could offer online by the digital divide. They found that counties with lower income levels and higher poverty levels have lower levels of information or interaction available on the county’s website (2012, 98). Even if these citizens had Internet access, the level of e-government in their counties would have to be significantly improved for them to have equal access to information as their neighbors in more urban and wealthy areas. There are significant barriers for both governments and citizens to overcome, especially in rural or poor areas. According to Graham,

“People without Internet access can therefore face extra costs, hurdles and barriers when attempting to improve their social and economic positions. This is because they tend to lack the skills, knowledge, equipment, infrastructure access, capital, money, electricity and telephone access necessary to enter, access, and fully exploit the exploding online universe, and the working, service and communicational flows available within it” (2001, 37).

While it is hard for many to imagine or understand the hurdles that those without access to the Internet must go through, it is important to think about and remedy. Governments at all levels should care about the digital divide because unlike the private sector, the government has an obligation to make their information and services available to all citizens. The divide between those who have and do not have Internet access will sharpen the divide between the “haves” and “have nots” if they cannot easily access information or interact with the government. It has been found that those most likely to use e-government services are white college graduates and professionals, showing that higher education and higher income have an impact on the use of e-government (Dimitrova and Chen 2006, 175). Providing services to only a select portion of the
population will sharpen inequalities and prevent the government from fulfilling its basic mission. While e-government is hindered by the digital divide, it could be possible that e-government is contributing to the continuation of the digital divide by creating another important set of services and materials that those without access cannot use or benefit from (Belanger and Carter 2009, 134). Governments should keep all citizens in mind, and aim to incorporate services and information for all in e-government applications, as well as aim to diminish the digital divide at the same time (Helbig, Gil-Garcia, and Ferro 2009, 90).

2.9 North Carolina- Internet Access and E-Government

In North Carolina, the move toward e-government and the proliferation of Internet access go hand in hand. This movement began in 1994. North Carolina became the first state in the country to deploy high-speed network capabilities to every county through the North Carolina Information Highway, which was accomplished through a collaborative effort between the North Carolina Research and Education Network, more commonly known as NCREN, an advanced communications network operated by MCNC (formerly known as the Microelectrics Center of North Carolina, founded to jumpstart technology-based economic development throughout the state), and the NC State Government Office of Information Technology Services. In 2000, Cronos, an MCNC spinoff, was sold. The proceeds that went to MCNC as a result allowed them to make a $100 million investment in the state (MCNC.org/about.html 2014). Also in 2000, the North Carolina General Assembly created the Rural Internet Access Authority, now known as the e-NC Authority (http://ncbroadband.gov/), which was designed to oversee efforts to provide rural areas with high-speed broadband Internet access. The Authority was also tasked with
“eradicating the digital divide” in North Carolina, which was defined as the “gap between people who do and the people who don’t have access to and the capability to use modern information technology” (Schelin 2001, 2). MCNC pledged $30 million to the Rural Internet Access Authority, which along with cash and in-kind donations from more than 52 private corporations, helped to accelerate the spread of high-speed Internet access across the state at no cost to state government or tax payers (Patterson 2002). e-NC Authority, a division of the North Carolina Department of Commerce, is housed and staffed by the NC Rural Economic Development Center, and remains “committed to the vision of universal high-speed Internet access in North Carolina” (NC Rural Center; Pittman 2007). Of the 100 counties in North Carolina, 85 are classified as rural, so their work is crucial for many North Carolinians. In addition to their focus on rural counties, e-NC Authority has added distressed urban areas to the areas they are targeting for increased connectivity (ncruralcenter.org 2012). Aside from e-NC Authority, there are many other groups working to improve broadband Internet access in North Carolina. Notably, MCNC was involved in the $144 million Golden LEAF Rural Broadband Initiative (GLRBI), which was funded through grants from the U.S. Department of Commerce’s Broadband Technology Opportunities Program (BTOP), and matching funds from private foundations and investments, including from the Golden LEAF Foundation (Kenan-Flagler 2012). Despite all of these efforts, high-speed Internet access in North Carolina, especially in rural areas, is not as widespread or affordable as would be desired. In 2013, an FCC Internet service report ranked North Carolina last in the country in the percentage of households with fixed connections with download speeds of
at least 3 Mbps, which was previously the minimum speed deemed sufficient for “engaging in modern life” (Michaels 2013; Singleton 2015).

2.10 Development Tier System

With the vast majority of North Carolina’s counties designated as rural, there are distinct disadvantages in large areas of the state. The tier system is one measure the state uses to rank counties based on a variety of economic factors (ncruralcenter.org 2014). Since 2007, North Carolina has used a tier system to designate the economic situation in the counties. It is used to determine state funding and economic development opportunities and assistance. Each year, the state will name 40 Tier 1, 40 Tier 2, and 20 Tier 3 counties, with Tier 1 being the most economically distressed, and Tier 3 being the least economically distressed. The Tier system was put in place by statute §143B-437.08, which also provided guidelines for calculating the tier rankings. There are four factors that help determine tier rankings: 1) adjusted property tax base per capita, 2) percentage growth in population, 3) median household income, and 4) average unemployment rate. A few additional criteria impact the rankings as well, such as population size, and how long a county has been at a Tier 1 level. By looking at the map the Department of Commerce provides, most of the current Tier 1 counties are in the eastern and southern parts of the state, with a few spread through the mountains. These areas are also struggling to provide broadband access to their citizens (NC Department of Commerce 2013).
METHODS

This paper presents a study of e-government services in North Carolina. In an effort to understand what services each county offers, a survey was conducted, and in the case of non-response, information was gathered from the county website. An inventory of e-government services was completed, and each county was given a score that corresponds to their stage of e-government: 1) Presence, 2) Interactive, 3) Early Transactional, 4) Advanced Transactional, or 5) Transformational. These findings were compared with each of the three variables—broadband penetration, economic development tier designation, and region—to give a clear picture of the state of e-government services in North Carolina.

3.1 The Sample

In order to establish a representative sample of the 100 county governments in North Carolina, a target number was determined using a confidence level of 95%. The resulting target number was 80 counties. Though the target number was high, information was sought from all 100 counties so a complete picture of the state of e-government in North Carolina could be created. The sample was drawn from each of the 100 county websites in the state, from which each county’s IT Director was identified and contacted, and if there was not one, the county manager. In case of non-response, the relevant information was gathered from the county website to the extent of its availability.
3.2 The Survey and other variables

I utilized, with some adjustments, the survey instrument created by the International City/County Management Association (ICMA), which they most recently conducted in 2011 to examine local governments’ use of e-government (see Appendix B for survey instrument text). The survey consisted mainly of “check all that apply” questions concerning services and capabilities of the local government’s website. The questions were written to determine how interactive the government is with the public online. There were also questions regarding the management of the website, which clarify how involved the IT staff is in creating and supplying these services. Baird, Zelin, and Booker used an earlier version of this survey in their 2012 study, and added two additional items about types of information presented on a government’s website: “provides general news and information to the public” and “provides economic development information to the public” (2012). These are valuable additions and were included in the survey. This study differs from Baird, Zelin, and Booker’s as they collected data directly from government websites as a direct measure of the level of information and interaction made available to citizens instead of partly relying on survey data (2012). As this study used human participants, but their answers were in an official capacity about public services, the study was exempt from IRB review.

Distribution and Data Collection

The survey was sent out electronically on December 8, 2014, and two follow up emails were sent, on January 13 and January 22, 2015 to non-respondents. Even with repeated requests, the response rate remained low, with 40 out of 100 counties
responding. I contacted instructors Shannon Tufts and Stacey Hypes at the UNC School of Government, who know many of the county IT directors through the Certified Government Chief of Information Officers course they teach, and they sent out a reminder on my behalf on January 28, 2015. The text of the initial email and the follow-up emails can be found in Appendix A. For the counties that did not respond to the survey, they were either contacted via phone (Avery, Cabarrus, Catawba, Cumberland, Gates) or the information was found on the county’s website. I began to call each county, but had trouble getting anyone to answer the phone, and despite leaving messages, did not hear back from any county except Catawba. I looked back at the survey instrument, and realized that if I hoped to complete an inventory of each county’s e-government services, the focus of my efforts should be on the questions regarding those services and not on the other, more extraneous questions. Due to the low survey response and lower success rate in reaching county IT officials over the phone, I made the decision to go to each of the remaining counties’ websites and inventory the e-government services they offered. Focusing on question 20 (Please provide the following information about e-government on your local government website), I was able to go through each county’s website methodically to determine what services they offered online and which were only offered in person (inventory in Appendix D). I also checked to determine if the counties offered the services outlined in Question 16 (streaming video, video on demand, Instant Messaging (IM), chat rooms, moderated discussions, mobile apps, podcasts, and e-alerts), as well as if they used social media. Over the course of three days, February 12-14, 2015, I completed collecting data from the county websites.
Other Variables

Region, development tier designation, and broadband access were chosen for survey results comparison because these factors have been shown to correlate with online activities and online government activities. For example, if there is less broadband access in rural areas, it is likely that fewer constituents have access to the Internet in those areas. As economically distressed areas have fewer resources to devote to website development and IT staffing, the lack of resources and less than universal Internet access makes the development of a website seem less important in the face of other, more pressing matters (Baird, Zelin, and Booker 2012). It is important to note that broadband access can vary in different areas, even within a county. In addition to the data obtained by the survey, information about broadband access in each county was obtained from multiple sources including the FCC (2014) and NC Broadband (2014). Information about each county’s development tier designation was obtained from the NC Department of Commerce (2014). Each county was designated as either being located in the mountains, piedmont, or coastal region based on NCpedia’s maps (2012).

3.3 Findings

The survey garnered responses from 39 counties (Table 2). I gathered information from 56 county websites, and spoke to officials from five counties: Avery, Catawba, Cabarrus, Cumberland, and Gates. Gates County started the survey, but stopped because the official was new in his position and was unsure of how to respond to some of the questions. I followed up by phone to get an overall picture of services offered.
**Counties that Responded to the Survey**

<table>
<thead>
<tr>
<th>Alexander</th>
<th>Carteret</th>
<th>Edgecombe</th>
<th>Lenoir</th>
<th>Rowan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anson</td>
<td>Chatham</td>
<td>Forsyth</td>
<td>Macon</td>
<td>Rutherford</td>
</tr>
<tr>
<td>Bladen</td>
<td>Craven</td>
<td>Gaston</td>
<td>Moore</td>
<td>Sampson</td>
</tr>
<tr>
<td>Brunswick</td>
<td>Currituck</td>
<td>Graham</td>
<td>New Hanover</td>
<td>Surry</td>
</tr>
<tr>
<td>Buncombe</td>
<td>Dare</td>
<td>Harnett</td>
<td>Northampton</td>
<td>Tyrrell</td>
</tr>
<tr>
<td>Burke</td>
<td>Davidson</td>
<td>Hoke</td>
<td>Randolph</td>
<td>Wake</td>
</tr>
<tr>
<td>Caldwell</td>
<td>Davie</td>
<td>Hyde</td>
<td>Richmond</td>
<td>Wilson</td>
</tr>
<tr>
<td>Camden</td>
<td>Durham</td>
<td>Lee</td>
<td>Rockingham</td>
<td></td>
</tr>
</tbody>
</table>

Table 2

Non-response did not appear to be linked to size or economic well-being, respondents were from several areas of the state and included counties of varying sizes and economic levels. Of the 100 counties, 12 do not have a separate IT department: Alleghany, Beaufort, Camden, Clay, Greene, Hertford, Jones, Martin, McDowell, Pamlico, Perquimans, and Tyrrell. These counties contract out their IT services as needed. Hyde County does not have an IT department, but has a Public Information Officer, who shares information with and interacts with the public. Northampton County’s IT department is not separate, but exists within the Finance department. Pamlico County’s website is maintained by its administrative assistant to the county manager. It is interesting that except for Alleghany and Clay, the counties without separate IT departments are all on the coast or in the eastern part of the state. Many of
these counties are very small, and their low populations and budgets do not allow them to keep a large staff, so contracting out as needed makes sense.

The question in the survey that I judged to be most important was Question 20, with its list of e-government services that the survey respondents could choose if their county offered them. Table 2 shows the services.

### Possible E-government Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
<th>Codes/ordinances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online payment of taxes</td>
<td>Online delivery of local government records to the requestor</td>
<td></td>
</tr>
<tr>
<td>Online payment of utility bills</td>
<td>Online service requests, such as pothole repair</td>
<td>Online communication with individual elected and appointed officials</td>
</tr>
<tr>
<td>Online payment of fines/fees</td>
<td>Online registration for use of recreation facilities/activities</td>
<td>GIS mapping/data</td>
</tr>
<tr>
<td>Online completion/submission of permit applications</td>
<td>Online voter registration</td>
<td>Employment info/applications</td>
</tr>
<tr>
<td>Online request for local government records</td>
<td>Online property registration</td>
<td>Council agendas/meetings</td>
</tr>
</tbody>
</table>

Table 3

### 3.3.1- E-government stages and Scoring

To determine each county’s level of e-government, the survey responses and information gathered on the county websites in regard to Question 20 were studied. The
combination of services offered by each county was inventoried, but no attempt was made to measure the quality of each type of service offered. Based on the services offered, each county was given a score based on the service type and level of two-way interaction these counties provide. Initially, the scores were numbered to correspond with the levels of e-government: 1) Presence, 2) Interactive, 3) Transactional, or 4) Transformational. However, after looking closely at the large number of counties given the relatively high score of 3, and survey responses from county officials who scored themselves differently than the services their county offered would suggest, the scoring for the “Transactional” stage was divided into 3) Early Transactional and 4) Advanced Transactional, with Transformational being given a 5. The services at each level are shown below. A labeled map of North Carolina is included in Appendix C. For maps of the state included below, the county names are left blank to improve readability.

It is important to note that numerous counties counted “Online voter registration” as one of the services provided. However, in North Carolina, voters must fill out a voter registration application and return it to the board of elections in the county they reside in (North Carolina State Board of Elections). Voter registration cards are then mailed to the voter by the board of elections. The survey question asked if this transaction could be completed online, but that would not be legal in North Carolina, so for those who checked this option, it is assumed they did not understand the question and was not counted as a transactional service. In most counties, one can download and print the appropriate application form from the website and perhaps this was the source of confusion.
The lowest score, 1, correlates with the “presence” stage. Areas at the presence stage offer only the less-sophisticated services such as downloadable forms, codes/ordinances, general news and information, employment information, and council meeting minutes. In North Carolina, there are no counties that can truly be considered to be at the lowest stage of e-government. If an area is in the presence stage, it does not mean that they do not offer their citizens services, it just means that most of their services are offered and completed in person rather than online.

For the counties with more interactive services, such as online records requests, e-newsletters and e-alerts, GIS mapping/data, online communication with individual officials, economic development information, and a greater use of social media, they were given a score of 2, which correlates with the second stage of e-government, interaction. Anson, Ashe, Avery, Chowan, Clay, Graham, Pamlico, Polk, Stokes, Swain, Tyrrell, Warren and Wilkes Counties fit into this category. A total of 13 counties are at the Interactive stage.

**Stage 2) Interactive Counties**

![Interactive Counties Map](image)
The counties with more sophisticated services, such as online tax payments, online bill or fine payments, online property registration, online service requests, and online applications/submissions of permit application, were initially given a score of 3, correlating with the transactional stage of e-government. This score was given to 87 counties. The vast majority of these counties provided not only online tax and bill pay, but several other transactional and interactive services as well. However, several of these counties only offered one transactional service, most often online tax payments, and would otherwise be scored at 1) Presence or maybe an early 2) Interactive. Thirty counties were classified as 3) Early Transactional: Alexander, Alleghany, Beaufort, Bertie, Cleveland, Columbus, Cumberland, Duplin, Franklin, Granville, Greene, Haywood, Henderson, Hertford, Jackson, Madison, Martin, McDowell, Mitchell, Northampton, Pasquotank, Perquimans, Randolph, Rutherford, Transylvania, Washington, Watauga, Wayne, and Yancey. Pender and Chatham counties fit into this category, but only offered online parks reservations, not tax payments. The remaining eleven counties given a score of 3) Early Transaction—Bladen, Caswell, Cherokee, Guilford, Halifax, Hyde, Iredell, Lincoln, Montgomery, and Pitt—fit solidly into this category by virtue of having several interactive services rather than only a few combined with one basic transactional service. In total, 41 counties out of 100 are at the Early Transactional stage.
Stage 3) Early Transactional Counties

The counties that provide multiple transactional e-government services were given the updated score of 4) Advanced Transactional. These counties mostly offered a variety of interactive services as well as online tax payments and online utility bill payments; online completion and submission of permit applications, or online reservation of parks and recreation facilities. The counties that are at this level are: Alamance, Brunswick, Buncombe, Burke, Cabarrus, Caldwell, Camden, Carteret, Catawba, Craven, Currituck, Dare, Davidson, Davie, Durham, Edgecombe, Forsyth, Gaston, Gates, Harnett, Hoke, Johnston, Jones, Lee, Lenoir, Macon, Mecklenburg, Moore, Nash, New Hanover, Onslow, Orange, Person, Richmond, Robeson, Rockingham, Rowan, Sampson, Scotland, Stanly, Surry, Union, Vance, Wake, Wilson, and Yadkin. In total, 46 counties are at the Advanced Transactional stage.
Stage 4) Advanced Transactional Counties

None of the counties have reached the highest stage, or 5) Transformational stage, so no counties were given the updated score of 5. However, it is important to note that Cabarrus County is well on its way to reaching the transformational stage. It has a large number of services on its site, and is in the process of developing its site to allow residents to customize what shows up on their screen, choosing which services they need and what type of information they want, and allowing most of their business to be conducted online. Other counties may be moving in this direction, but did not so indicate in their survey response, phone conversations, or on their websites.

At the end of the survey, the respondents were given these basic definitions of the e-government categories:

- **Presence** refers to an online presence, such as a website, with information that citizens can see or download. This is the basic step.
- **Interaction** includes the ability for citizens to contact government organizations and officials online.
- The **transactional** stage is where citizens can complete their transactions online.
- The last stage, **transformation**, is a bit different. It is thought that e-government will cause the relationship between citizens and the government to change
fundamentally, promoting better customer service and increasing levels of trust between citizens and government.

Given these definitions, respondents were asked to choose which stage they felt their county falls into. The vast majority of survey respondents chose Transaction. This stage was also the most common for the websites examined. However, some counties ranked themselves differently than expected especially based on the given definitions. Multiple counties responded that their county was at the lowest level, or presence. Bladen, Burke, Dare, Davie, Gates, Hyde, Moore, Northampton, Randolph, Richmond, Rockingham, Tyrrell, and Wilson all scored their counties at the Presence stage. However, of these, Tyrrell was actually at the Interaction stage; Bladen, Burke, and Hyde were all at the Early Transactional stage; and the rest were at the Advanced Transactional stage. A few counties also ranked themselves as 2) Interaction: Lenoir, Macon, Rowan, and Sampson. All four of these counties actually fall into the Advanced Transactional stage. Brunswick and Cumberland counties ranked themselves as being in the Transformational stage, but Cumberland is in the Early Transactional and Brunswick is in the Advanced Transactional stage. It is unclear why these counties ranked themselves differently, but is most likely due to a misunderstanding of the question or misunderstanding of which services were transactional or interactional.
DISCUSSION

Overall, a larger number of counties than expected are in the Transactional stage, though many of them are currently offering only one transactional service online. Enabling citizens to pay taxes online ensures that counties receive the money that they depend on to operate. According to the Forsyth County tax page, North Carolina law does not have a provision to allow local governments to absorb the cost of processing online tax payments through third-party vendors, so convenience fees are charged, which vary based on the amount of the tax bill (2015). Many counties contract with a third party vendor to handle payments due to small staff size, lack of expertise, lack of infrastructure to handle these types of transactions, or convenience.

The counties in each stage of e-government seem to be scattered fairly evenly around the state, and between each of the three regions, which will be discussed more below. Development tier level is an interesting variable to compare e-government stage to, as it seems economic stability could correlate to higher usage of technology, or that economic instability could prevent significant outlays of money to set up the necessary infrastructure for online payments, for example. High-speed broadband penetration in each county is also an interesting, though not quite precise, variable to compare e-government stage to as well, as it seems in places with lower Internet access, e-government services would not be widely used or implemented.
I hope through the exploration of these three variables to find which, if any, can fully predict the stage of e-government any county in North Carolina is in. Each of these variables likely have an impact on the stage of e-government a county is likely or able to provide, but which one is the best predictor, or even if any of them can predict the stage of a county, was what this study hoped to answer. While economic and Internet access limitations are the most obvious, location, culture, tradition, politics, and many other factors can impact the opportunities that are available to a county, and the improvement and sophistication of their technological infrastructure and services. This study focused mostly on economic issues, but other factors may be able to explain this issue more successfully. While this study focuses on creating an inventory of e-government services available in each county in North Carolina, and attempts to determine if region, economic development tier designation, or broadband accessibility can predict the stage of e-government in a county, this leaves many areas to future research. For example, it seems that the counties in the Advanced Transactional stage more or less fall around major highways--Interstates 95, 85, 77, and 40 (LearnNC 2009). Areas along these highways include several large cities and centers of commerce. More research could be done to see if a highly mobile population, or if counties with citizens from other parts of the country coming to work and reside there have a stronger demand for online services. E-government movements in other states or countries could be looked at as well. There are many factors that influence a county’s decision or ability to provide services online, and many more directions future research can take.
4.1 Limitations

Before discussing the study, it is important to mention some limitations. There are two primary limitations to be aware of: the relatively low survey response (39 out of 100) and the decision to gather missing information from county websites. Even after repeated attempts to engage county IT directors and managers, the response rate for the survey remained low. Though some feel a 30% response rate is sufficient, for the purposes of this study, and the desire to create an inventory of e-government services, the response rate was too low to move forward with without additional research (IAR 2011). By deciding to gather the most important e-government services that each county offered from county websites, I was able to have more information and to create a more complete picture of the state of e-government in North Carolina. However, as noted before, some survey respondents checked that they offered online voter registration, which is not available in North Carolina. My understanding of the e-government services and what could be checked off the list in the survey most likely differed at least slightly from that of the survey respondents, so our answers may not have been exactly the same. However, as most counties list services on their websites using the same terminology as was used on the survey, I feel confident that I inventoried the services from the county websites the same that most of the county officials would have if they had answered the survey. Despite these limitations, I believe that this study serves as a good starting point for future research on e-government services in North Carolina.
4.2- Findings compared to Region

NCpedia (2012) gives an overview of the state’s three regions, shown in Figure 4.

North Carolina’s Three Main Regions

While the Coastal Plain is sometimes divided into the Inner Coastal and Tidewater sub-regions, for the purposes of this paper, I will be using the three main regions: Mountains, Piedmont, and Coastal Plain. There are three distinct landforms of the Southeast and of North Carolina, which is where the regional names come from. The mountains, piedmont, and coastal plain differ from each other geographically, with different types of soil and different elevations and types of land (NC Public Schools). These three regions differ geographically, but in history, politics, and economy as well. Tradition, culture, and political figures can impact the work done at the local and county level. As is reflected in the development tier designations, much of the Coastal Plain is economically depressed, and has been historically. The transition away from an agricultural-based economy has impacted some areas more than others, and geographic isolation, as well as changing
demographics and population numbers all impact how counties are funded, and thus how e-government services are funded. The location of colleges and universities can also impact the population in a given area, and can potentially increase the number of citizens paying property tax if they come in for work or stay in the area after graduation. It is also possible that areas with highly educated populations are more likely to embrace new technologies, but just because a university is located in a county does not mean it will be at the highest stage of e-government, as Pitt (East Carolina University), Jackson (Western Carolina University), Watauga (Appalachian State University), Pasquotank (Elizabeth City State University), and Cumberland (Fayetteville State University, Methodist University) counties demonstrate. There are many other colleges and universities in each region of the state, but while these areas have educated populations, it does not seem as though that is necessarily an indicator of e-government adoption or usage. More research could be done on this topic in the future. While the counties at each stage of e-government are scattered throughout the state, the majority of counties that do not have separate IT departments are in the Coastal Plain. By looking at each region separately, the differences will be easier to see. Figures 5-7 below show each region with the counties color-coded to show what level of e-government they are currently in.
In the Mountain region, the majority (twelve) of counties are the 3) Early Transactional stage. Seven counties are 2) Interactive, and only four are 4) Advanced Transactional. The majority of the Mountain counties are at lower levels of e-government, and even the majority of the transactional counties are in the less-advanced stages. However, many of these counties have small populations, so perhaps in-person government services are convenient and sufficient enough.

It is important to note that the mountain region has seen its share of economic woes. In 1965, the Appalachian Regional Commission, a federal-state partnership, was formed to aid economic development in this region, which was lagging far behind the rest of the nation on most economic indicators (ARC). The Appalachian region as defined by the Commission includes 420 counties in 13 states, including 29 counties in North Carolina. Each year, counties in this area are given one of five possible economic designations—distressed, at-risk, transitional, competitive, or attainment. These designations are based on three indicators: three-year average unemployment rate, market income per capita, and poverty rate. In 2015, the Commission ranked four (Cherokee,
Graham, Swain, Rutherford) of the 29 North Carolina counties as being distressed, and thirteen (Clay, Macon, Yancey, Mitchell, Avery, Watauga, Ashe, Alleghany, Surry, Wilkes, Caldwell, Burke, McDowell) as at-risk (ARC 2015). Of the distressed counties, Graham and Swain are at 2) Interaction and Cherokee and Rutherford are at 3) Early Interaction. Of the at-risk counties, Clay, Avery, Ashe, Wilkes are at 2) Interaction; Yancey, Mitchell, Watauga, Alleghany, and McDowell are at 3) Early Transactional; and Macon, Surry, Caldwell, and Burke are at 4) Advanced Transactional. Though these counties are some of the most economically distressed in the Appalachian region, the level of e-government they are at varies.

**E-government Stages in the Piedmont Region**

![E-government Stages in the Piedmont Region](image)

Figure 6

The Piedmont Region, which is home to some of the largest cities in the state, such as Charlotte, Raleigh, Winston-Salem, and Durham, has a higher concentration of 4) Advanced Transactional counties than the Mountain region. Only three counties are at 2) Interactive, while eleven are at 3) Early Transactional and twenty-two are at 4) Advanced Transactional. This region is home to several major colleges and universities, as well as
the Research Triangle Park, and major banking and manufacturing centers, and many of
the counties have large populations.

**E-government Stages in the Coastal Plain Region**

The Coastal Plain Region, while encompassing more counties than the other two
regions, also encompasses some of the smallest and least population dense counties in the
state, mostly in the northeast corner and along the coast. It may be difficult for the
counties with low populations to afford to provide e-government services, as there are
fewer people paying taxes to fund county services. However, in some of these counties
with outlying islands or remote populations, online services would be attractive and
convenient. The vast majority of the counties in this region were almost evenly split
between 3) Early Transaction (eighteen) and 4) Advanced Transaction (twenty). Only
three counties were at 2) Interactive. This region still depends heavily on agriculture, but
defense, marine trades, and tourism are large parts of the economy as well. Many of the
smaller, poorer counties are at 3) Early Transaction, but as county governments rely on
property tax payments to operate, allowing citizens to pay these bills online, even if many
other services are done in person, is reasonable and an easy way to increase timely tax payments and revenue.

The three regions, while not equally dividing the state, each have a variety of e-government stages. The Piedmont has the highest concentration of Advanced Transactional counties, with 61%. Thirty-one percent of these counties are at the Early Transactional stage. The Coastal Plain also has a high concentration of Advanced Transactional counties, with about 49% at this level. Forty-four percent of the counties in this region are at the Early Transactional stage. 52% of the counties in the Mountain region are at Early Transactional stage. Twenty-two percent of the Mountain counties are at the Interactive stage. Roughly half of the counties in the Piedmont and Coastal Plain are at the Advanced Transactional stage, with half of the Mountain counties being a bit lower, at the Early Transactional stage—only 17% of those counties are at Advanced Transactional. Looking at the stages in each region is interesting, and shows how advancement has been made in different areas of the state. Piedmont counties are more likely to be at higher levels of e-government service. However, region is not a perfect predictor of stage, and vice versa.

4.3- Findings Compared to 2015 Development Tier Designations

Each year, the North Carolina Department of Commerce ranks the state’s 100 counties based on economic well-being and assigns each a Tier designation. The forty most distressed counties are designated as Tier 1, the next forty as Tier 2, and the twenty least distressed as Tier 3 (2014). Tier designations determine eligibility for a number of different grant programs that the North Carolina Department of Commerce administers including building reuse, water and sewer infrastructure, and the downtown revitalization
Main Street program. Tier designations are also a factor in the state’s performance-based Job Development Investment Grant (JDIG) program. The development tiers are calculated using average unemployment rate, median household income, percentage growth in population, and adjusted property tax base per capita. This ensures that a more complete picture of the county’s economic state is calculated. Additional qualifiers such as population, previous tier designation, and poverty rate are taken into account as well.

On the site, there are links for each county so more in-depth economic, demographic, and geographic information is available. The tier designations go back to 2007 online.

The 2015 Tier designations are given below.

**Tier 1:** Alleghany, Anson, Ashe, Beaufort, Bertie, Bladen, Camden, Caswell, Chowan, Clay, Columbus, Edgecombe, Gates, Graham, Greene, Halifax, Hertford, Hyde, Jackson, Jones, Lenoir, Macon, Martin, Montgomery, Nash, Northampton, Pasquotank, Perquimans, Richmond, Robeson, Rockingham, Rutherford, Scotland, Surry, Swain, Tyrell, Vance, Warren, Washington, and Wilson

**Tier 2:** Alamance, Alexander, Avery, Burke, Caldwell, Catawba, Cherokee, Cleveland, Craven, Cumberland, Currituck, Dare, Davidson, Davie, Duplin, Franklin, Gaston, Granville, Guilford, Harnett, Hoke, Lee, Madison, McDowell, Mitchell, Onslow, Pamlico, Person, Pitt, Polk, Randolph, Rowan, Sampson, Stanly, Stokes, Transylvania, Wayne, Wilkes, Yadkin, and Yancey

**Tier 3:** Brunswick, Buncombe, Cabarrus, Carteret, Chatham, Durham, Forsyth, Haywood, Henderson, Iredell, Johnston, Lincoln, Mecklenburg, Moore, New Hanover, Orange, Pender, Union, Wake, and Watauga
Figure 8 shows the counties by tier designation, using the NC Department of Commerce’s map with lines marking the regions added.

**2015 Development Tier Designations**

In the Mountain region, eight counties are at Tier 1, eleven are at Tier 2, and four are at Tier 3. Notably, some of the counties the Appalachian Regional Commission ranked as being distressed (Cherokee) or at-risk (Yancey, Mitchell, Avery, Watauga, Wilkes, Caldwell, Burke, McDowell) were given tier 2 and 3 designations. In the Piedmont, eight counties are at Tier 1, seventeen are at Tier 2, and eleven are at Tier 3. In the Coastal Plain, twenty-four counties are at Tier 1, twelve are at Tier 2, and five are at Tier 3. Though the Coastal Plain encompasses more counties than the other regions, it is interesting that over half of the Tier 1, or most depressed counties, are in this region, and are concentrated in the northeast corner of the state. The other Tier 1 counties are scattered mostly in the Mountains and the Sandhill region of the Coastal Plain and eastern Piedmont. Most of the Tier 2 counties are spread through the middle of the state, through
the lower Coastal plain, western Piedmont, and northern Mountain regions. The majority of the Tier 3 counties are in the Piedmont, specifically clustered around Raleigh and Charlotte (Wake and Mecklenburg counties). Other Tier 3 counties are located near other counties that contain major cities, such as Asheville, Winston-Salem, or Wilmington. Figures 9-11 will show each tier level by e-government stage.

Even though Tier 1 counties are the most economically depressed, 78% are at either the Early or Advanced Transactional stages of e-government. While only eight of the forty counties are at the Interactive stage, only thirteen counties total were in that stage; so over half are Tier 1 counties. Even though there are several counties in this tier at the Advanced Transactional stage, twenty-five of the forty are in the lower three stages, many of them only offering one transactional service if at all. Still, despite economic struggles, 38% of the Tier 1 counties are at the highest stage of e-government that counties in the state have reached.
E-government Stages of Tier 2 Counties

Tier 2 counties are economically stronger than Tier 1 counties, however four (or 38.5%) of the Interactive counties are in this tier. Forty percent of these counties are at the Early Transactional stage, and 48% of these counties are at the Advanced Transactional stage. In comparison with Tier 1, almost half of the counties in this tier are at the highest level of e-government reached in the state, and about 88% of the counties are providing at least some transactions online.
Tier 3 is markedly more advanced, with all of the top twenty counties in the Transactional stage—seven (35%) in the Early Transactional and thirteen (65%) in the Advanced Transactional stage. While it is understandable that larger cities like Raleigh (the state capital), Charlotte, and Wilmington would have more resources to provide more services online, many of the other counties in this tier do not contain large cities. Haywood County, at 3) advanced transactional, just moved from Tier 2 to Tier 3 this year, and its largest city is Waynesville, which is still small and does not contain a college or university (Waynesville 2013).

Overall, the Tier system gives a quick overview of the economic condition of North Carolina’s counties, and shows that certain parts of the state, such as the northern Coastal Plain and certain parts of the mountains, are economically depressed. It is clear that as one moves from Tier 1 up to Tier 2, and finally to Tier 3, there are many more Advanced Transactional stage counties, and fewer counties at the lower stages of e-government. However, even Tier 1 had several counties at the Advanced Transactional stage, so tier designation is not an exact predictor of e-government stage, and vice versa.
4.4- Findings compared to Broadband Access in North Carolina

In 2013, an FCC Internet service report ranked North Carolina last in the country in the percentage of households with fixed connections with download speeds of at least 3 Mbps, which at the time was the minimum speed deemed sufficient for “engaging in modern life” (Michaels 2013). As of January 19, 2015, using data from Fall 2014, NC Broadband, which is a division of the North Carolina Department of Commerce, released its Broadband Availability Across Download Speeds Report (2015). Even at the lowest download speed it investigates, (≥768 kilobytes per second) that 99% of households in the state have access to, there are 38,793 households without that availability. Looking at the ≥3 megabytes per second download speeds that the FCC formerly deemed necessary for “engaging in modern life,” 98.4% of households statewide have broadband available at that speed or higher. Though this percentage seems high, 61,583 households do not have these speeds available to them. Figure 13 shows the availability map from NC Broadband’s report (2015).
≥ 3 mpbs Download Speed Availability

An estimated 98.4% of households statewide have broadband available at this speed or higher, which leaves 61,583 households without this availability.

This speed is slow, and as speeds can slow during peak times of use, such as in the evening, higher speeds are more desirable. NC Broadband also provides other maps that display availability for download speeds at greater or equal to 6 Mbps, 10 Mbps, 50 Mbps, 100 Mbps, and 1 Gbps, as well as upload speeds. Only 1.1% of households in North Carolina are able to access download speeds of 1 Gbps. These maps may change over the course of the next few years, when Google Fiber comes to the Triangle and if municipal broadband is allowed to expand (Google Fiber 2015; Gryta 2015). During the recent push for net neutrality and broadband access, the FCC updated their definition of broadband. As part of their 2015 Broadband Progress Report, the FCC voted to change the definition of broadband by raising the minimum download speed needed to 25 Mbps, and the minimum upload speed to 3 Mbps. This change triples the number of US households without broadband access, and pushes companies to provide higher speeds to meet this standard (Singleton 2015). According to the January 30, 2015 report on Broadband Availability in America by the FCC, 14% of North Carolinians do not have
access to 25 Mbps/3 Mbps broadband Internet service, and up to 35% of rural residents of the state do not have access (FCC 2015a). The NC Broadband has different levels of availability across the state for these speeds, which will be shown in Figures 14 and 15.

≥ 25 mbps Download Speed Availability

An estimated 92.3% of households statewide have broadband available at this speed or higher, which leaves 289,751 households without this availability.

Figure 13

Figure 14 shows the availability of ≥ 25 Mpbs download speeds across North Carolina. According to their research, 92.3% of households in North Carolina have access to broadband at this speed or higher, but 289,751 households are unable to connect at these speeds.
Figure 15 shows the availability of ≥ 3 Mbps upload speeds across North Carolina. Around 91% of households in North Carolina have access to broadband at these speeds or higher, but 335,102 households are left without this availability.

Though the FCC and the NC Broadband numbers differ slightly, it is still obvious from the maps that the speeds the FCC now deems necessary to have are not available for many North Carolinians, especially in the Coastal Plain, the mountains, and the lower Piedmont.

Looking at the FCC’s state reports (spreadsheet included in Appendix E), the county in North Carolina with the highest number of citizens who cannot access broadband is Brunswick County in the southern Coastal Plain, where 49% of the population, or over 57,600 people, are unable to connect to high-speed broadband Internet service. In looking at only the rural areas in Brunswick County, about 73% of citizens are without access. Notably, even though so many are unable to connect,
Brunswick is at the 4) Advanced Transactional level of e-government. Contrast that to Mecklenburg County, where basically 0% of the population is unconnected or less than 2,000 people are without broadband service (FCC 2015b).

In comparing broadband availability to the e-government stages, many areas where the counties are at the Interactive stage are in areas not fully covered by broadband service. Clay County, an Interactive-level county, is almost completely without broadband coverage, but Wilkes County, another Interactive-level county, is mostly covered. The broadband availability map seems more comparable to the Development Tier designation map, as several of the areas not covered with broadband access are also Tier 1 counties. By geographical location, most of the areas without access are in the Coastal Plain region, though several places in the Mountains and southern Piedmont are without access as well.

CONCLUSION

Before beginning this study, based on the literature and general knowledge about North Carolina, I expected most counties to be at the Interactive stage. After completing the e-government services inventory and assigning scores to the counties, I was surprised that so many counties were Transactional. Regarding the three variables, I originally thought that region would be the largest predictor, with some variances in counties with large cities, followed by broadband access, and then economic development tier level. Before the survey was sent, I expected the number of services offered online by the majority of counties would be very low. To my surprise, no counties could truly be considered to be at the lowest stage of e-government, presence, and almost half of all
counties are at the 4) Advanced Transactional stage. I also expected that the counties in the Coastal Plain region would be at the lower stages, simply because many counties in that region struggle economically and have small populations.

The development tier level designations were not surprising, as many counties stay at a given tier level for several years, and correlate with places with higher poverty rates and lower economic activity. Based on previous research, the coverage shown on the broadband availability map was unsurprising, but disappointing. So many areas in North Carolina are without high speed Internet access, although it is taken for granted in much of the state.

In a similar study, Baird, Zelin, and Booker studied websites of 344 randomly selected counties to determine what e-government services were offered, and concluded that counties with lower incomes and higher poverty levels have significantly fewer e-government services available to their citizens (2012). The economic development tier designations give a quick look into these types of counties, but that measurement system was not sufficient to completely explain what level of e-government all counties are at. It is safe to say that more counties with lower economic activity are in the lower stages of e-government, but many factors can impact this, as 38% of Tier 1 counties were at 4) Advanced Transactional.

Aside from the economic development tiers designations, region and broadband access did not fully explain the e-government stage of North Carolina counties fully or accurately either. Several of the counties in the mountains that the Appalachian Regional Commission considered to be among the most distressed in the Appalachian region were in the higher stages of e-government. Many counties in the lower stages were located in
the Coastal Plain or Mountains, and most of the higher stage counties were located in the Piedmont, many counties at varying levels were located in each region, making this predictor imperfect as well. The broadband access maps were interesting, and seemed to somewhat correlate with economic tier level, but the most dire example of percentage of citizens without broadband connections was at 3) early transactional.

It is interesting that so many counties in North Carolina are at the Advanced Transactional stage, especially in the wake of many years of economic hardship, especially in smaller counties in North Carolina. The reality is that many counties are working hard to provide economic and staffing difficulties, citizens’ lack of awareness that these services exist, and in some areas, lack of sufficient high-speed Internet access to allow citizens to freely and easily take advantage of these online services (Baird, Zelin, and Booker, 2012, 103). Much of the literature available on e-government is from the early 2000s, with more recent literature focusing on citizen engagement and customer service rather than the adoption of these services. There seems to be an assumption that these services are already widespread, and while many are, North Carolina has a long way to go before every county reaches the Advanced Transactional or Transformational stages of e-government.

Based on the findings and comparison with the three variables, there does not seem to be a clear picture, and none of the variables fully explains the state of e-government in North Carolina counties today. Counties depend on property tax revenues to operate, and changing and moving populations have a real impact on the services that counties can provide. Counties operate largely independently from one another, and the progression through the stages of e-government is similarly independent and fragmented.
Counties, even ones near each other or in the same region are moving through the stages at different rates and choosing to provide different services to their citizens online and in person. Within the scope of this study, there does not seem to be one factor that accurately explains or predicts the stage that each county is at. As mentioned before, economics is not the only factor that impacts counties; history, culture, politics, as well as citizen demand, all play a role as well. These other factors may very well explain the differences in the counties and what e-government services they are offering online, and there are plenty of directions future research in this area can take. Even though the findings were not conclusive, the inventory of e-government services available in North Carolina was completed, which did not exist until now. Overall, this study fills a gap in the knowledge about e-government in North Carolina and raises many important questions.
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APPENDIX A: Emails Sent to Participants

Subject: Invitation to participate in a study of e-government services in North Carolina

Dear [Firstname],

My name is Anna Snyder and I am a Master of Science in Library Science and Master of Public Administration student at the University of North Carolina at Chapel Hill. I am conducting a research study, in partial fulfillment of my degree requirements, on the state of e-government in North Carolina. Based on your job title, I believe you are eligible to take part. The purpose of the research is to determine what e-government services are currently being offered in each county in North Carolina, and what factors can impact those services.

The survey, which will ask you questions about your county’s e-government services, should take less than 15 minutes of your time and is voluntary. You may stop taking the survey at anytime, and you may skip any question for any reason. You will not receive any direct benefit from being in this research study.

If you choose to participate and would like to see the results of my research, it will be made available through the Carolina Digital Repository later this year.

If you have any questions regarding this survey, you may contact me via email at amsnyder@email.unc.edu. Alternatively, you may contact my advisor, Evelyn Daniel, at daniel@ils.unc.edu or (919) 962-8062.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have any questions or concerns regarding your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at (919) 966-3113 or via email at IRB_subjects@unc.edu with study number 14-2828.

By clicking here: https://unc.az1.qualtrics.com/SE/?SID=SV_aXFU2G4vOj8p57D and completing the survey, you agree to be a participant in this study.

Thank you for your time!

Anna Snyder
2015 Candidate for Masters of Science in Library Science and Master of Public Administration, UNC Chapel Hill

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Subject: Reminder: Please participate in a study of e-government services in North Carolina

Dear [Firstname],

You recently received an invitation to participate in a study of e-government services available at the county level in North Carolina. It looks like you haven’t submitted a survey yet. For this study to be useful, it is important for every county to be represented.

[link to survey: https://unc.az1.qualtrics.com/SE/?SID=SV_aXFU2G4vOj8p57D]

The survey consists of 30 questions and should take around 15 minutes to complete. By participating, you will contribute to the understanding of the state of e-government in North Carolina.

Please contact me with any questions you have about the survey at amsnyder@email.unc.edu. Alternatively, you may contact my advisor, Evelyn Daniel, at daniel@ils.unc.edu or (919) 962-8062.

Best,
Anna Snyder

2015 Candidate for Masters of Science in Library Science, Master of Public Administration, UNC Chapel Hill

Good afternoon. I hope this message finds you well.

One of our UNC graduate students is researching e-Government for her thesis. She needs input from County IT Directors to complete her studies. Would you be so kind as to take a few minutes and answer the following survey questions by Wednesday, February 4 at noon?

Please contact Anna Snyder with any questions you have about the survey at amsnyder@email.unc.edu. Alternatively, you may contact her advisor, Evelyn Daniel, at daniel@ils.unc.edu or (919) 962-8062.

Your participation is greatly appreciated.
Thank you for your time.

Stacey L. Hypes
UNC School of Government
Program Analyst
919.962.4248
APPENDIX B: Survey Instrument

WEBSITE MANAGEMENT

1. Name:

2. Organization:

3. County:

4. Email address:

5. Title:

6. When was your county’s official website created?

7. Does your county have a dedicated Information Technology (IT) department?  
   Yes  No

8. Which department or individual has overall responsibility for the day-to-day management of your local government’s official website? (Check only one)  
   -County manager/Chief Administrative Officer/Office
   -Chief technology officer/office
   -Public Information Officer/office
   -Other (please describe)

9. Does your local government have a dedicated web master for the official local government website?  Yes  No

10. How does your local government provide the following? (Check all applicable).

<table>
<thead>
<tr>
<th>Service</th>
<th>In-house by local govt staff</th>
<th>Another local govt</th>
<th>State govt</th>
<th>Local govt association</th>
<th>Public-private partnership</th>
<th>Currently outsources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website hosting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website design</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Website operations and management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration of website with local govt databases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-payment/e-transaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. Does your local government use cloud computing?  Yes  No

12. If your local government uses cloud computing, please identify the purpose(s).  (Check all applicable)
E-GOVERNMENT FUNCTIONALITY AND MANAGEMENT

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

13. Does your local government have a separate information technology department that is responsible for all information technology needs AND for all e-government needs in your local government?   Yes   No

14. If you do not have a separate information technology department or if your IT department is not responsible for e-government, which department or individual is responsible?  (Check only one)

<table>
<thead>
<tr>
<th>County manager/Chief administrative officer/office</th>
<th>Public information officer/office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief technology officer/office</td>
<td>Other (please describe)</td>
</tr>
</tbody>
</table>

15. Please check the number that best describes whether the e-government applications and services provided through your local government’s website today mostly provide information one-way to citizens or are they mostly interactive and transaction oriented?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-way communication to citizens</td>
<td></td>
<td></td>
<td></td>
<td>Mostly interactive/transaction oriented</td>
</tr>
</tbody>
</table>

16. Does your local government offer any of these services online?  (Check all applicable)

<table>
<thead>
<tr>
<th>Streaming video</th>
<th>Video on demand</th>
<th>Instant Messaging (IM)</th>
<th>Chat rooms</th>
<th>Moderated discussions</th>
<th>Mobile apps (iPhone and Droid)</th>
<th>IVR</th>
<th>CRM/311</th>
<th>Podcasts</th>
<th>E-alerts</th>
<th>Other (please describe)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
17. Does your county government use social media? Yes  No

18. If your county government uses social media, which social media is used? (Check all applicable)

<table>
<thead>
<tr>
<th>Social Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
</tr>
<tr>
<td>YouTube</td>
</tr>
<tr>
<td>Blogs</td>
</tr>
<tr>
<td>Twitter</td>
</tr>
<tr>
<td>Flickr</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

19. Please check the number that best describes whether your local government’s predominant use of social media today is for one-way communication with citizens or it is mostly two-way/interactive communication.

<table>
<thead>
<tr>
<th>Communication Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-way communication to citizens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mostly interactive/transaction oriented</td>
</tr>
</tbody>
</table>

20. Please provide the following information about e-government on your local government website. (Check all applicable)

<table>
<thead>
<tr>
<th>Service</th>
<th>We DO NOT provide this service online</th>
<th>We DO PROVIDE this service online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online payment of taxes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online payment of utility bills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online payment of fines/fees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online completion and submission of permit applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online requests for local govt records</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online delivery of local govt records to the requestor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online service requests, such as pothole repair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online registration for use of recreation facilities/activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online voter registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online property registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forms that can be downloaded for manual completion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Online communication with individual elected and appointed officials
GIS mapping/data
Employment info/applications
Council agendas/meetings
Codes/ordinances
E-newsletters sent to residents/businesses
Provide general news and information to the public
Provides economic development information to the public
Other (please describe)

21. Why does your local government provide e-government applications and services? (Check all applicable)

| Citizen access to local govt information | Save money |
| Citizen access to the local govt | Produce revenue |
| Citizen access to appointed officials | Citizen participation in government/e-democracy |
| Citizen access to elected officials | Other (please specify) |

22. From the reasons listed above, please identify which is the most important reason.

23. Please identify the top 5 barriers to e-government initiatives your local government has encountered. (Check all applicable)

| Lack of technology/web staff in the IT dept. | Issues regarding privacy |
| Lack of technology/web staff in the operating departments | Issues regarding security |
| Lack of technology/web expertise in the IT department | Lack of financial resources |
| Lack of technology/web expertise in the operating departments | Need to upgrade technology (PCs, networks, etc) |
| Lack of information about e-govt applications in the IT dept | Resident/business resistance to change |
| Lack of information about e-govt applications in the operating departments | Lack of resident/business interest/demand |
| Lack of support from elected officials | Website does not accept payment by credit card |
| Issues relating to convenience fees for online transactions | Inadequate bandwidth |
| Lack of collaboration among departments | Lack of support from top administrators |
| Difficulty justifying the return on investment | Other (please specify) |
| Staff resistance to change | |

24. Of the barriers that you identified, which is the most difficult one that your local government faces regarding e-government?
25. How has e-government changed your local govt? (Check all applicable)

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced number of IT staff</td>
<td>Reduced administrative costs</td>
</tr>
<tr>
<td>Changed the role of IT staff</td>
<td>Improved efficiency of business processes</td>
</tr>
<tr>
<td>Reduced time demands on IT staff</td>
<td>Re-engineered/re-engineering business processes</td>
</tr>
<tr>
<td>Increased time demands on IT staff</td>
<td>Improved customer service</td>
</tr>
<tr>
<td>Reduced number of departmental staff</td>
<td>Decreased transaction times</td>
</tr>
<tr>
<td>Changed the role of departmental staff</td>
<td>Increased citizen contact with elected and appointed officials</td>
</tr>
<tr>
<td>Reduced time demands on departmental staff</td>
<td>Improved local govt communication with the public</td>
</tr>
<tr>
<td>Increased time demands on departmental staff</td>
<td>Generated revenue from fees, advertising</td>
</tr>
</tbody>
</table>

26. Of the changes that you identified, which one is the most significant positive change that your local government faces regarding e-government?

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

<table>
<thead>
<tr>
<th>Development Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed in-house by local govt staff</td>
<td>Developed by a local govt association</td>
</tr>
<tr>
<td>Developed by consultants and local govt staff</td>
<td>Developed through a public-private partnership</td>
</tr>
<tr>
<td>Outsourced to Application Service Providers</td>
<td>Other (please describe)</td>
</tr>
<tr>
<td>Programs purchased from vendors and integrated into our databases</td>
<td></td>
</tr>
</tbody>
</table>

E-GOVERNMENT FINANCING

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

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal or state grants</td>
<td>Cable fees</td>
</tr>
<tr>
<td>Transaction fees from services provided</td>
<td>Utility funds/revenues</td>
</tr>
<tr>
<td>General fund revenues</td>
<td>Website advertising</td>
</tr>
<tr>
<td>Risk-sharing (a private sector firm provides the application and receives a percent of the revenue)</td>
<td>Convenience fees for the services provided</td>
</tr>
<tr>
<td>Municipal bond financing</td>
<td>Other (please specify)</td>
</tr>
<tr>
<td>Enterprise fund</td>
<td></td>
</tr>
</tbody>
</table>

29. From the list above, which is the most important source of funding for e-government in terms of the total dollar amount expended?

E-GOVERNMENT STAGE

E-government services are often categorized as being in these four categories: presence, interaction, transaction, and transformation.

- Presence refers to an online presence, such as a website, with information that citizens can see or download. This is the basic step.
• Interaction includes the ability for citizens to contact government organizations and officials online.
• The transactional stage is where citizens can complete transactions online.
• The last stage, transformation, is a bit different. In this stage, it is thought that e-government will cause the relationship between citizens and the government to fundamentally change, promoting better customer service and increasing levels of trust.

30. Given these definitions, which stage of e-government would you say your county predominantly falls in?

<table>
<thead>
<tr>
<th>Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction</td>
</tr>
<tr>
<td>Transaction</td>
</tr>
<tr>
<td>Transformation</td>
</tr>
</tbody>
</table>
Appendix C: Labeled County Map of North Carolina
Appendix D: E-government Services Inventory by County

**Alamance County**
Online services: Video on demand
Social media: Blog
E-government services: Online tax payments, online completion and submission of permit and inspection applications, meeting agendas and minutes, GIS, employment information and applications, local government records search, online communication with individual elected and appointed officials, general news
E-government stage: 4) Advanced Transactional

**Alexander County**
Online services: Streaming video, video on demand, e-alerts
Social media: Facebook, YouTube, Twitter, Flickr
E-government services: Online tax payment, downloadable forms, GIS, employment information and applications, meeting agendas and minutes, codes and ordinances, general news, economic development information
E-government stage: 3) Early Transactional

**Alleghany County**
Online Services: Video on demand
E-government services: Online tax payment, downloadable forms, codes and ordinances, meeting minutes and agenda, GIS, online local government records requests, economic development information
E-government stage: 3) Early Transactional

**Anson County**
Social media: Facebook
E-government services: Downloadable forms, GIS, employment information and applications, meeting agendas and minutes, general news, economic development info
E-government stage: 2) Interactive

**Ashe County**
Online services: Streaming video, e-alerts
Social media: Facebook, YouTube, Twitter
E-government services: Downloadable forms, meeting minutes and agenda, codes and ordinances, online local government records search, GIS, employment information and applications, economic development info
E-government stage: 2) Interactive

**Avery County**
E-government services: GIS, employment information and applications, meeting agendas, general news
E-government stage: 2) Interactive
Beaufort County
Online services: Video on demand
E-government services: Online tax payments, online communication with individual elected and appointed officials, employment information and applications, downloadable forms, codes and ordinances, GIS, newsletters, economic development
E-government stage: 3) Early Transactional

Bertie County
Online services: E-alerts
E-government services: Online tax payments, online utility bill payments, GIS, local government records search, meeting minutes and agendas, employment information and applications, codes and ordinances, economic development information
E-government stage: 3) Early Transactional

Bladen County
Online services: E-alerts
Social media: Facebook
E-government services: Online tax payments, online utility bill payments, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, economic development information
E-government stage: 3) Early Transactional
Note: Ranked themselves as 1) Presence

Brunswick County
Social media: Facebook, YouTube, Twitter
E-government services: Online payment of taxes, online payment of utility bills, online completion and submission of permit applications, online service requests, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news
E-government stage: 4) Advanced Transactional
Note: Ranked themselves as 5) Transformational

Buncombe County
Online services: Streaming video, video on demand, instant messaging (IM), mobile apps, e-alerts
Social media: Facebook, YouTube, Twitter
E-government services: Online payment of taxes, online requests for local government records, online delivery of local government records to the requestor, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional
Burke County
Online services: Streaming video, video on demand
Social media: Facebook, YouTube
E-government services: Online payment of taxes, online completion and submission of permit applications, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances
E-government stage: 4) Advanced Transactional
Note: Ranked themselves as 1) Presence

Cabarrus County
Online services: Video on demand, e-alerts, and newsletters
Social media: Facebook, YouTube, Twitter, RSS feeds
E-government services: Online tax payments, online utility bill payments, online completion and submission of permit applications, local government records search, online registration for park facilities, online property registration, downloadable forms, online communication with elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional

Caldwell County
Online services: Streaming video, video on demand, e-alerts
Social media: Facebook, Twitter
E-government services: Online tax payments, online utility bill payments, online requests for local government records, online delivery of local government records to the requestor, downloadable forms, GIS, employment information and applications, meeting meetings and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional

Camden County
Online services: Streaming video
E-government services: Online tax payments, online payment of fines/fees, online requests for local government records, online voter registration*, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional

Carteret County
Online services: Streaming video, video on demand, e-alerts
Social media: Facebook, Twitter
E-government services: Online tax payments, online payment of utility bills, online payment of fines/fees, online registration for use of recreation facilities/activities, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes
and, agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional

**Caswell County**
Online services: E-alerts
Social media: Facebook, RSS feeds
E-government services: Online tax payments, online service requests, downloadable forms, online communication with elected and appointed officials, GIS, employment information and applications, meeting agendas, e-newsletters, general news, economic development information
E-government stage: 3) Early Transactional

**Catawba County**
Online services: Mobile app
Social media: Facebook, YouTube, Twitter, Instagram, Flickr, Foursquare, blog
E-government services: Online tax payments, online completion and submission of permit applications, downloadable forms, GIS, online communication with elected and appointed officials, codes and ordinances, economic development information
E-government stage: 4) Advanced Transactional

**Chatham County**
Online services: Video on demand, e-alerts
Social media: Facebook, YouTube, Twitter
E-government services: Online registration for use of recreation facilities/activities, downloadable forms, GIS, employment information and applications, meeting minutes and agendas
E-government stage: 3) Early Transactional

**Cherokee County**
E-government services: Online tax payments, local government records search, online communication with elected and appointed officials, GIS, meeting minutes and agendas, employment information and applications, general news, economic development information
E-government stage: 3) Early transactional

**Chowan County**
Online services: E-alerts, e-newsletter
Social media: Facebook
E-government services: Local government records search, online communication with elected and appointed officials, meeting minutes and agendas, codes and ordinances, GIS, employment information and applications, general news, economic development information
E-government stage: 2) Interaction
Clay County
E-government services: GIS, general news, economic development information
E-government stage: 2) Interactive

Cleveland County
Online services: E-alerts
Social media: Facebook, Twitter
E-government services: Online tax payments, employment information and applications, local government records search, codes and ordinances, GIS, general news, economic development info
E-government stage: 3) Early Transactional

Columbus County
E-government services: Online tax payments, downloadable forms, meeting minutes, GIS, employment information and applications, economic development information
E-government stage: 3) Early Transactional

Craven County
Online services: Streaming video, video on demand, e-alerts
Social media: Facebook, YouTube, Twitter
E-government services: Online tax payments, online payment of utility bills, online payments of fines/fees, online requests for local government records, online delivery of local government records to the requestor, online registration for use of recreation facilities/activities, online voter registration*, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced transactional

Cumberland County
Online services: Video on demand
Social media: Facebook, YouTube, Twitter, RSS feeds, local television station
E-government services: Online tax payments, online local government records search, GIS, online communication with elected and appointed officials, meeting minutes and agendas, codes and ordinances, general news
E-government stage: 3) Early transactional
Note: Ranked themselves at 5) Transformational

Currituck County
Online services: Streaming video, video on demand, e-alerts
Social media: YouTube, Twitter, Flickr
E-government services: Online tax payments, online payment of utility bills, online payment of fines/fees, online completion and submission of permit applications, online registration for use of recreation facilities/activities, online voter registration*, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news

officials, GIS, employment information and applications, meeting minutes and agendas, codes/ordinances, e-newsletters, general news, economic development info
E-government stage: 4) Advanced Transactional

**Dare County**
Online services: Video on demand, mobile apps
Social media: Facebook, YouTube, Twitter, Flickr
E-government services: Online tax payments, online utility bill payments, online completion and submission of permit applications, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news
E-government stage: 4) Advanced Transactional
Note: Ranked themselves as 1) Presence

**Davidson County**
Online services: Video on demand, chat rooms, mobile apps, e-alerts
Social media: Facebook, YouTube, Twitter, Flickr, RSS feeds
E-government services: Online tax payments, online payment of fines/fees, online service requests, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional

**Davie County**
Online services: Video on demand, mobile apps, e-alerts
Social media: Facebook
E-government services: Online tax payments, online payment of utility bills, online service requests, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news
E-government stage: 4) Advanced Transactional
Note: Ranks themselves at 1) Presence

**Duplin County**
Online services: E-alerts, audio recordings
E-government services: Online tax payments, online local government records search, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, economic development information
E-government stage: 3) Early Transactional

**Durham County**
Online services: Video on demand
Social media: Facebook, YouTube, Twitter, RSS feeds
E-government services: Online tax payments, online payment of fines/fees, downloadable forms, GIS, employment information and applications, meeting
minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional

**Edgecombe County**
Online services: E-alerts
Social media: Facebook, Twitter
E-government services: Online tax payments, online payment of utility bills, online delivery of local government records to the requestor, online voter registration*, downloadable forms, GIS, employment information and applications, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional

**Forsyth County**
Online services: Streaming video, podcasts
Social media: Facebook, YouTube, Blog, Twitter, Flickr, RSS feeds
E-government services: Online tax payments, online registration for use of recreation facilities/activities, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional

**Franklin County**
E-government services: Online tax payments, online reporting of missing or damaged signs, online local government records search, GIS, downloadable forms, online communication with elected and appointed officials, meeting minutes and agendas, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

**Gaston County**
Social media: Facebook, YouTube
E-government services: Online tax payments, online requests for local government records, online registration for use of recreation facilities/activities, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional

**Gates County**
Online services: Video on demand
Social media: Facebook
E-government services: Online tax payments, online payment of fines/fees, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, general news
E-government stage: 4) Advanced Transactional
Note: Ranked themselves at 1) Presence

**Graham County**
E-government services: GIS, meeting minutes and agendas, employment information and applications, downloadable forms, economic development info
E-government stage: 2) Interaction

**Granville County**
Online services: E-newsletter
E-government services: Online tax payments, online local government records search, GIS, downloadable forms, meeting minutes and agendas, online communication with elected and appointed officials, codes and ordinances, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

**Greene County**
E-government services: Online tax payments, online communication with elected and appointed officials, downloadable forms, GIS, codes and ordinances, meeting agendas and minutes, employment information and applications, economic development information
E-government stage: 3) Early Transactional

**Guilford County**
E-government services: Online tax payments, online payments of fines, online local government records search, online communication with elected and appointed officials, meeting minutes and agendas, employment information and applications, GIS, codes and ordinances, general news
E-government stage: 3) Early Transactional

**Halifax County**
E-government services: Online tax payments, online local government records search, online utility bill payment, online communication with elected and appointed officials, meeting minutes and agendas, downloadable forms, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

**Harnett County**
Online services: E-alerts, e-newsletters
Social media: Facebook, Twitter
E-government services: Online tax payments, online payment of utility bills, online completion and submission of permit applications, online requests for local government records, online delivery of local government records to the requestor, online voter registration, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional

**Haywood County**
Online services: E-alerts, video on demand
Social media: RSS feeds
E-government services: Online tax payments, online local government records search, online communication with elected and appointed officials, downloadable forms, meeting minutes and agendas, employment information and applications, codes and ordinances, general news
E-government stage: 3) Early Transactional

**Henderson County**
Online services: Video on demand, local television station
E-government services: Online tax payments, online local government records search, downloadable forms, GIS, meeting minutes and agendas, online communication with elected and appointed officials, employment information and applications, codes and ordinances, general news
E-government stage: 3) Early Transactional

**Hertford County**
E-government services: Online tax payments, online local government records search, GIS, meeting agendas and minutes, online communication with elected and appointed officials, downloadable forms, employment information and applications, economic development information
E-government stage: 3) Early Transactional

**Hoke County**
Online services: Instant messaging, mobile apps, e-alerts
E-government services: Online tax payments, online payment of utility bills, online completion and submission of permit applications, online service requests, online registration for use of recreation facilities/activities, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news
E-government stage: 4) Advanced Transactional

**Hyde County**
Social media: Facebook, Twitter
E-government services: Online payment of utility bills, online local government records search, online voter registration*, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development info
E-government stage: 3) Early Transactional
Note: Rank themselves at 1) Presence
**Iredell County**
Social media: RSS feeds
E-government services: Online tax payments, online inspections scheduling, online parks and recreation registration, downloadable forms, GIS, online local government records search, meeting minutes and agendas, online communication with elected and appointed officials, employment information and applications
E-government stage: 3) Early Transactional

**Jackson County**
Online services: E-alerts
E-government services: Online tax payments, online communication with elected and appointed officials, downloadable forms, meeting minutes and agendas, codes and ordinances, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

**Johnston County**
Online services: E-alerts
E-government services: Online tax payments, online utility bill payments, online payment of fines/fees, online local government records search, online communication with elected and appointed officials, GIS, meeting minutes and agendas, downloadable forms, employment information and applications, general news, economic development information
E-government stage: 4) Advanced Transactional

**Jones County**
E-government services: Online tax payments, online utility payments, online local records search, downloadable forms, meeting minutes and agendas, GIS, employment information and applications, announcements, general news, economic development information
E-government stage: 4) Advanced Transactional

**Lee County**
Online services: Streaming video, video on demand, instant messaging, mobile apps, e-alerts
Social media: Facebook, Blogs, Twitter
E-government services: Online tax payments, online payment of utility bills, online payment of fines/fees, online completion and submission of permit applications, online service requests, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional

**Lenoir County**
Online services: Video on demand
Social media: Facebook
E-government services: Online tax payment, online completion and submission of permit applications, online delivery of local government records to the requestor, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, general news, economic development information
E-government stage: 4) Advanced Transactional
Note: Ranks themselves at 2) Interactive

Lincoln County
Online services: E-alerts, e-newsletters, video on demand
E-government services: Online tax payments, online service requests, online local government records search, meeting minutes and agendas, downloadable forms, GIS, employment information and applications, ordinances
E-government stage: 3) Early Transactional

Macon County
Social media: Facebook
E-government services: Online tax payments, online submission of permit applications, online local government records requests, online delivery of local government records to requestor, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news
E-government stage: 4) Advanced Transactional
Note: Ranked themselves as 2) Interactive

Madison County
Online services: E-alerts
E-government services: Online tax payments, online local government records search, downloadable forms, employment information and
E-government stage: 3) Early Transactional

Martin County
E-government services: Online tax payments, online local government records search, GIS, downloadable forms, online communication with elected and appointed officials, downloadable forms, meeting agendas and minutes, employment information and applications, codes and ordinances, general news, economic development information
E-government stage: 3) Early Transactional

McDowell County
Social media: Facebook, Twitter, county television station
E-government services: Online tax payments, online local government records search, meeting minutes and agendas, downloadable forms, GIS, employment information and applications, codes and ordinances, general news, economic development information
E-government stage: 3) Early Transactional

**Mecklenburg County**
Social media: Twitter
E-government services: Online tax payments, online utility bill payments, online reservations for parks and recreation facilities, online local government records requests, GIS, downloadable forms, employment information and applications, GIS, general news
E-government stage: 4) Advanced Transactional

**Mitchell County**
Online services: E-alerts, county television station
E-government services: Online tax payments, meeting minutes and agendas, downloadable forms, GIS, codes and ordinances, employment information and applications, general news
E-government stage: 3) Early Transactional

**Montgomery County**
Online services: E-alerts
E-government services: Online utility bill payments, online service requests, online local government records search, downloadable forms, online communication with elected and appointed officials, codes and ordinances, meeting minutes and agendas, employment information and applications, GIS, general news
E-government stage: 3) Early Transactional

**Moore County**
Online services: Video on demand, sign up for phone alerts
Social media: Facebook, YouTube, Blogs, Twitter
E-government services: Online tax payments, online payment of utility bills, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional
Note: Ranks themselves as 1) Presence

**Nash County**
Online services: E-alerts, e-newsletters
E-government services: Online tax payments, online parks and recreation activity registration, online communication with elected and appointed officials, meeting agendas and minutes, codes and ordinances, employment information and applications downloadable forms, economic development information
E-government stage: 4) Advanced Transactional

**New Hanover County**
Online services: Streaming video, video on demand, moderated discussions, e-alerts
Social media: Facebook, YouTube, Blogs, Twitter, Flickr
E-government services: Online tax payments, online payment of fines/fees, online completion and submission of permit applications, online delivery of local government records to the requestor, online registration for use of recreation facilities/activities, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information

E-government stage: 4) Advanced Transactional

Northampton County
E-government services: Online tax payments, downloadable forms, GIS, employment information and applications, codes and ordinances, general news, economic development information
E-government stage: 3) Early Transactional
Note: Ranks themselves as 1) Presence

Onslow County
Online services: Video on demand, streaming videos, county television station, Blackboard Connect
Social media: Twitter, RSS feeds
E-government services: Online tax payments, online utility bill payments, online registration for parks and recreation activities, online completion and submission of permit applications, online local government records search, online communication with elected and appointed officials, GIS, downloadable forms, employment information and applications, meeting minutes and agendas, general news
E-government stage: 4) Advanced Transactional

Orange County
Online services: Video on demand, county television station
E-government services: Online tax payments, online service requests, online local government records search, online reservation or registration for facilities and activities, meeting minutes and agendas, downloadable forms, employment information and applications, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional

Pamlico County
Online services: E-alert
E-government services: Online communication with elected and appointed officials, meeting agendas and minutes, online local government records search, GIS, downloadable forms, economic development information
E-government stage: 2) Interactive

Pasquotank County
Online services: E-alerts
Social media: Facebook,
E-government services: Online tax payments, online local government records search, online communication with elected and appointed officials, employment information and applications, meeting agendas, downloadable forms, GIS, economic development information
E-government stage: 3) Early Transactional

**Pender County**
Online services: E-alerts, video on demand, streaming video
E-government services: Online park facility reservations, online tax records search, online local government records search, online communication with elected and appointed officials, GIS, meeting agenda and minutes, downloadable forms, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

**Perquimans County**
Online services: E-alerts
E-government services: Online tax payments, online communication with elected and appointed officials, online local government records search, downloadable forms, GIS, codes and ordinances, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

**Person County**
Online services: E-alerts, video on demand
E-government services: Online tax payments, online registration for parks and recreation activities, meeting minutes and agendas, GIS, downloadable forms, online communication with elected and appointed officials, codes and ordinances, economic development information
E-government stage: 4) Advanced Transactional

**Pitt County**
Online services: E-alerts, PittTV, video on demand,
Social media: Twitter, Flickr
E-government services: Online tax payments, online local government records search, meeting agenda and minutes, online communication with elected and appointed officials, downloadable forms, codes and ordinances, employment information and applications, economic development information
E-government stage: 3) Early Transactional

**Polk County**
Social media: Facebook, Twitter, Google+, RSS feeds
E-government services: Online communication with elected and appointed officials, online local government records search, GIS, meeting agendas and minutes, downloadable forms, employment information and applications, economic development information
E-government stage: 2) Interaction

**Randolph County**  
Social media: Facebook, YouTube, Twitter  
E-government services: Online tax payments, online delivery of local government records to the requestor, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information  
E-government stage: 3) Early Transactional

**Richmond County**  
Online services: Streaming video, video on demand  
Social media: Facebook, Twitter  
E-government services: Online tax payments, online payment of utility bills, online completion and submission of permit applications, downloadable forms, online communication with elected and appointed officials, GIS, meeting minutes and agendas, codes and ordinances  
E-government stage: 4) Advanced Transactional  
Note: Ranks themselves as 1) Presence

**Robeson County**  
Online services: E-alerts  
E-government services: Online tax payments, online utility bill payments, online communication with elected and appointed officials, online property records search, online service reports, GIS, downloadable forms, employment information and applications, economic development information  
E-government stage: 4) Advanced Transactional

**Rockingham County**  
Online services: Streaming video, video on demand, e-alerts  
Social media: Facebook, YouTube, Blogs, Twitter, Flickr  
E-government services: Online tax payments, online registration for use of recreation facilities/activities, online property registration, downloadable forms, online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information  
E-government stage: 4) Advanced Transactional  
Note: Ranked themselves as 1) Presence

**Rowan County**  
Online services: Streaming video, video on demand, mobile apps  
Social media: Facebook, YouTube  
E-government services: Online tax payments, online completion and submission of permit applications, online local government records requests, online delivery of local government records to the requestor, online registration for use of recreation facilities/activities, downloadable forms, online communication with individual
elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, e-newsletters, general news, economic development information
E-government stage: 4) Advanced Transactional
Note: Ranked themselves as 2) Interactive

Rutherford County
Online services: Streaming video
Social media: Facebook, Twitter
E-government services: Online tax payments, online local government records search, meeting minutes and agendas, GIS, economic development information
E-government stage: 3) Early Transactional

Sampson County
Social media: Facebook
E-government services: Online tax payments, online payment of utility bills, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional
Note: Rank themselves as 2) Interactive

Scotland County
Social media: Facebook, Twitter, Flickr, RSS feeds
E-government services: Online tax payments, online parks and recreation activity registration, online communication with elected and appointed officials, GIS, meeting minutes and agendas, codes and ordinances, downloadable forms, employment information and applications, e-newsletter, economic development information
E-government stage: 4) Advanced Transactional

Stanly County
Online services: E-alerts, video on demand
E-government services: Online tax payments, online utility bill payments, online local government records search, online communication with elected and appointed officials, GIS, meeting minutes and agendas, downloadable forms, employment information and applications, general news, economic development information
E-government stage: 4) Advanced Transactional

Stokes County
E-government services: Online local government records search, online communication with elected and appointed officials, GIS, downloadable forms, meeting agendas and minutes, employment information and applications, economic development information
E-government stage: 2) Early Transactional
Surry County
Online services: E-alerts
Social media: Facebook, Twitter
E-government services: Online tax payments, online registration for use of recreation facilities/activities, online property registration, online local government records request, GIS, meeting minutes and agendas, employment information and applications, downloadable forms
E-government stage: 4) Advanced Transactional

Swain County
E-government services: Online local government records search, online communication with elected and appointed officials, meeting minutes and agendas, GIS, codes and ordinances, employment information and applications, economic development information
E-government stage: 2) Interactive

Transylvania County
E-government services: Online tax payments, online local government records search, online communication with elected and appointed officials, downloadable forms, codes and ordinances, employment information and applications, GIS, economic development information
E-government stage: 3) Early Transactional

Tyrrell County
E-government services: Online communication with individual elected and appointed officials, GIS, employment information and applications, meeting minutes and agendas
E-government stage: 2) Interaction
Note: Ranks themselves as 1) Presence

Union County
Online services: E-alerts, podcasts, Union County TV
Social media: Facebook, YouTube, Twitter, Google+, RSS feeds
E-government services: Online tax payments, online utility bill payments, online completion and submission of permit applications, online camping reservations, online local government records requests, GIS, meeting agendas and minutes, employment information and applications, general news, economic development information
E-government stage: 4) Advanced Transactional

Vance County
E-government services: Online tax payments, online utility bill payments, online local government records requests, online local records delivered to requestor, downloadable forms, employment information and applications, general news, economic development information
E-government stage: 4) Advanced Transactional
Wake County
Social media: Facebook, Twitter, Flickr
E-government services: Online tax payments, online utility bill payments, online voter registration*, online local government records request, online delivery of local government records to the requestor, employment information and applications
E-government stage: 4) Advanced Transactional

Warren County
Online services: E-alerts
E-government services: Online tax records search, online local government records search, online service requests, meeting agendas and meetings, GIS, codes and ordinances, downloadable forms, employment information and applications, economic development information
E-government stage: 2) Interactive

Washington County
Social media: Facebook
E-government services: Online tax payment, online communication with elected and appointed officials, online local government records search, meeting minutes and agendas, GIS, downloadable forms, codes and ordinances, employment information and applications, economic development information
E-government stage: 3) Early Transactional

Watauga County
E-government services: Online tax payments, online local government records request, meeting minutes and agendas, online communication with elected and appointed officials, GIS, downloadable forms, employment information and applications, general news
E-government stage: 3) Early Transactional

Wayne County
Online services: Video on demand, county television station
E-government services: Online tax payments, online local government records search, meeting minutes and agendas, codes and ordinances, downloadable forms, employment information and applications, general news, economic development information
E-government stage: 3) Early Transactional

Wilkes County
Online services: Video on demand
E-government services: Meeting minutes and agendas, downloadable forms, GIS, general news, economic development information
E-government stage: 2) Interactive

Wilson County
Online services: Streaming video, mobile apps, e-alerts
Social media: Facebook, Twitter
E-government services: Online tax payments, online requests for local government records, online service requests, online voter registration*, downloadable forms, GIS, employment information and applications, meeting minutes and agendas, codes and ordinances, general news, economic development information
E-government stage: 4) Advanced Transactional
Note: Ranks themselves as 1) Presence

**Yadkin County**
Online services: E-alerts
Social media: Facebook, Twitter, RSS feeds
E-government services: Online tax payments, online reporting, online requests for local government records, online delivery of local government records to the requestor, downloadable forms, GIS, meeting minutes and agendas, general news, economic development information
E-government stage: 4) Advanced Transactional

**Yancey County**
E-government services: Online tax payments, local government records search, GIS, downloadable forms, meeting minutes, employment information and applications
E-government stage: 3) Early Transactional

*Online voter registration is unavailable in North Carolina, at least in a fully transactional manner. Citizens can go on the county website to download and print an application, which is then returned in person or by mail to their local board of elections. In hindsight, this option should have been omitted from the survey.*
Appendix E: Broadband Availability by County in North Carolina

In the FCC’s 2015 Broadband Progress Report, broadband availability by county is given for the entire country. This appendix will include the parts of the table that pertain to North Carolina counties, focusing on access in all areas, rural areas, and urban areas. For all areas, the population without access, percentage of population, population density, and per capita income will be given for each county. In the urban and rural area sections, only the population without access and the percentage of population will be given as comparisons.


<table>
<thead>
<tr>
<th>All Areas</th>
<th>Population Without Access (1,000s)</th>
<th>Percentage of Population</th>
<th>Population Density (Population/Land Area)</th>
<th>Per Capita Income (2013 Inflation Adjusted Dollars)</th>
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</thead>
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<td>North Carolina</td>
<td>1,446.2</td>
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<td>Population</td>
<td>Growth Rate</td>
<td>2010 Population</td>
<td>2015 Population</td>
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<td>Percent</td>
<td>Growth Rate</td>
<td>Taxable Value (Millions)</td>
<td>Levy (Millions)</td>
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<tr>
<td>Population Without Access (1,000s)</td>
<td>Percentage of Population</td>
<td>Population Without Access (1,000s)</td>
<td>Percentage of Population</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------</td>
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</tr>
<tr>
<td>North Carolina</td>
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<td></td>
</tr>
<tr>
<td>1,153.7</td>
<td>35%</td>
<td>292.5</td>
<td>4%</td>
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<tr>
<td>Alamance</td>
<td>8.3</td>
<td>19%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Alexander</td>
<td>4.8</td>
<td>17%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Alleghany</td>
<td>9.7</td>
<td>87%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Anson</td>
<td>15.3</td>
<td>72%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ashe</td>
<td>20.2</td>
<td>86%</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
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