

ARTICLE 24

Local Government Information Technology

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INFORMATION TECHNOLOGY (IT) has fundamentally altered many aspects of daily life, including interactions with the government. The role of the Internet continues to increase as more citizens use it to find pertinent information, purchase goods and services, and to participate in virtual communities. By capitalizing on the Internet revolution, governments can create new channels of communication and new methods for participation via electronic government (e-government). The changing environment, coupled with citizen and business demands, encourages government involvement in e-government initiatives and related uses of information technologies. Clearly, the role of information technology in the public sector has changed rapidly over the past decade. The computer systems that were once a luxury investment for wealthy cities and counties are now supporting almost every function of local government. In virtually all local governments across North Carolina, information technology investments are becoming an increasingly important area of attention for elected officials and administrative leadership alike.

The state of North Carolina and our cities and counties have received considerable recognition for their efforts in public information technology and e-government. A variety of early activities at the state and local government levels created a favorable environment for technology investments across the state. First, North Carolina enjoys a technology-savvy business and citizen population that adds additional impetus to government investment in technology. In fact, the state has a lobbying group dedicated to fostering the cause of the IT community in North Carolina. This lobbying group is the North Carolina Electronics and Information Technology Association (NCEITA) and is composed of public and private sector leaders in information technology around the state. Second, the state legislature created a

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Joint Select Committee on IT in order to address the significant interests and concerns surrounding IT and its potential for North Carolina. All of these pieces—including the major research universities located throughout the state—make North Carolina quite attractive for technology advancement.

Before 2004, the legislation and administrative policies of the state were fairly limited, indicating that much of the technological advancement celebrated in North Carolina occurred through agency or department-centric, individualistic approaches. The local governments also operated in relative isolation, with little collaboration between departments or jurisdictions. However, the state legislature made sweeping changes to the administrative structure of information technology in 2004 with the advent of S.L. 2004-129 (S 991). This piece of legislation completely restructured the North Carolina Office of Information Technology Services (ITS) and provided a roadmap for local governments on the value of centralization and demand aggregation. The following section outlines the legislative history of information technology in North Carolina, culminating in the efforts of S.L. 2004-129.

Legislative Mandates

The history of North Carolina legislation regarding information technology is quite long. In 1969, Governor Scott, via Executive Order Number 2, created the Committee on Data Processing and Information Systems, which was housed in the Department of Administration. This committee was created in order to guide the state on effective use of new technologies. In 1971, the General Assembly mandated that members of the Council of State become chief advisors to the Department of Administration with respect to the data processing centers in the state. In 1977, Governor Hunt renewed the Governor's Committee on Data Processing and Information Systems, via Executive Order Number 8, signifying a commitment to implementing technology in North Carolina government. During this timeframe, there were approximately eight or nine data processing centers spread throughout state government. By 1983, the State Information Processing Services (SIPS) had consolidated all data processing centers under the Department of Administration. Additionally, the Computer Commission was created in 1983 to guide the investment of North Carolina resources in computer technologies. In 1987, SIPS and the Computer Commission were transferred to the Office of the State Controller under Executive Order 35. In addition, the legislature transferred the responsibility for IT oversight from the Department of Administration to the Office of the State Controller in 1987.

In 1989, the Computer Commission was renamed the Information Technology Commission by the General Assembly. By 1992, the commission had again been renamed the Information Resource Management Commission. Session Law 1991-900 mandated that the IRMC provide state enterprise IT leadership including emphasis and oversight for strategic information technology planning and management, policy development, technical architecture, and project certification. It also placed the IRMC under the Office of the State Controller for reporting purposes.

In 1997, the General Assembly transferred the IRMC to the Department of Commerce. By 1999, the legislature had created an independent staff for the IRMC and created the Information Technology Management and Advisory Council, which was previously known as the SIPS Advisory Board. In 2000, Session Law 2000-174 placed the IRMC, ITMAC, and Information Technology Services Office (along with the Chief Information Officer (CIO) under the Office of the Governor. In addition, the CIO Council fell under the Office of the Governor.

As previously noted, the General Assembly created a Joint Select Committee on IT, which helped guide the IT legislation of the state in 2000. That same year, a unique piece of legislation was passed to address the problem of the digital divide in North Carolina. Senate Bill 1343 created the Rural Internet Access Authority (RIAA). This authority is charged with studying and reporting on North Carolina's telecommunications infrastructure and increasing Internet usage across the state. There are four milestones with which the RIAA is charged including ensuring that local dial-up Internet is available statewide; completing an inventory of the state's telecommunications infrastructure; establishing model telecenters; and ensuring that high-speed Internet access is available statewide. This authority has recently been authorized by the General Assembly for continuation until 2006.

Given the individualistic, agency-centric approach toward most IT development in North Carolina, the 2002 law that centralized network security for the state under the CIO was a first critical step toward a holistic approach to IT. Another victory came in the form of the 2003 bill to ensure that all state agencies had Americans with Disabilities Act (ADA) compliant websites by December 2004. These bills indicated that the state was beginning to move into an "enterprise" mindset, which is characterized by strategic technology planning and procurement at the state level versus

traditional agency-level planning and procurement, thus creating greater continuity between departments in terms of Web presence and software/hardware interfaces. Additionally, economies of scale began to be exploited through the use of the “enterprise” approach.

S.L. 2004-129 (S 991) was a legislative milestone for the state’s information technology efforts. The legislation made sweeping changes to the state Office of Information Technology Services (ITS) related to the oversight of the state CIO, the disbanding of the Information Resource Management Commission, and new procurement requirements designed to help the state capitalize on economies of scale.

Prior to the enactment of S.L. 2004-129, the strategic technology vision for the state was based on separate agency and departmental goals and initiatives approved by the Information Resource Management Commission. The new legislation shifted the focus of technology investment to the ITS and mandated that the state CIO develop a biennial State Information Technology Plan. The plan must include an asset inventory, project descriptions, gap analysis related to unmet technology needs, financial statements, and analysis of opportunities for statewide initiatives (G.S. 147-33.72B). The legislation also transferred responsibility for project review and approval from the Information Resource Management Commission to the state CIO. Under the new legislation, the state CIO is authorized to review and subsequently approve or reject all state agency technology projects costing more than \$500,000. The state CIO is also authorized to establish additional project review thresholds based on project cost, risk, and agency size.

These legislatively mandated changes are important for local governments to note for a variety of reasons. First, the legislation has changed the relationships for many county functions by centralizing the technology efforts and providing a single point of contact. More importantly, the legislation highlights the move toward centralization that is occurring across the country at state and local government levels. Local governments have been engaged in centralization efforts for the past several years and, as evidenced by this legislation, the benefits and promises of technology investments are more readily accessed under some levels of centralization. The management trend of enterprise investments and centralization will continue to be important regardless of the technology application.

Scope of Technology in North Carolina Cities and Counties

The local governments of North Carolina have made incredible strides in technology over the past six years. The investments in IT have brought the many cities and counties into standing with other leading local governments across the nation. In virtually every city and county in the state, information technology is playing a vital role in each department and function of the jurisdiction. In fact, while information technology only comprised between 1 and 3 percent of the general fund budget on average in North Carolina, the technology investments support approximately 98 percent of the work conducted by local governments. In order to assist the cities and counties in moving beyond the status quo and leveraging technology as a means of delivering more efficient and effective services, as well as to maintain and gain a competitive economic development advantage, it is important to recognize the positive technological advancements that have made significant impact on service delivery over the past six years. By establishing this strong technological foundation, many North Carolina local governments are poised to reap the rewards associated with greater investment in technology.

The scope of technology in local governments across North Carolina can be grouped into three basic categories: infrastructure, hardware, and applications. The first two categories have seen a plethora of growth as cities and counties have installed various communication media to assist with connecting disparate locations. One common infrastructure and hardware solution across North Carolina has been the installation of fiber between local government facilities or around the jurisdiction. Other governments have chosen to use wireless technologies to connect remote locations without physically laying fiber. As service becomes less location-dependent, it is essential for government employees and off-site departments to have high-quality, secured access to records and databases. Fiber ring and secured wireless initiatives have provided a critical first step to this effort.

Another major technological impact has been generated by the powerful communication medium of e-mail. By installing an e-mail server and using e-mail technologies as collaborative tools, local government employees are able to generate greater work output at a lower cost (measured by time spent per task). The power of e-mail to allow virtually instantaneous communication across departments, jurisdictions, and the state has enabled faster problem resolution, increased sharing of data and ideas, and easier access to people and information. Furthermore, the use of e-mail has greatly improved the citizen relationships by allowing another channel of communication.

The third important technology investment is a World Wide Web presence. By creating and maintaining an outstanding website, cities and counties have been on the cutting-edge of citizen, visitor, and business engagement. In fact, many economic development experts indicate that a high-quality Web presence is the most important tool in a local government's development efforts.¹ The National Governor's Association and the National Conference of State Legislatures offer publications concerning the value of technology investments and impact on economic development. Furthermore, websites provide a unique and timely vehicle for communication with citizens and visitors alike. It is an essential feature in any local government.

A final critical technological impact has been garnered through the investment in Geographical Information Systems (GIS). The use of GIS greatly enhanced the work of local governments. For example, GIS has improved internal government efforts by aiding in meter and pipe location. It has improved the efforts of planning departments by enabling staff members to access a comprehensive database that spatially represents areas and items of interest. In addition, GIS is one of the most productive and useful tools in technology revolution. The power and breadth of the software is being used in crime fighting, fire fighting, and countless other ways.

Most cities and counties of North Carolina have seen an incredible amount of change over the past decade. Many have progressed from nontechnical to successful, technology-friendly governments with many of the investments previously mentioned. However, some local governments have only recently begun to invest or consider investing in technology. These smaller or more financially challenged governments have faced a variety of issues but have created unique opportunities to leverage existing infrastructure and assets.

The term *digital divide* was originally coined to describe the division between economic groups regarding access to information technology. However, there is another type of digital divide facing our local governments. The majority of rural counties and municipalities in North Carolina are experiencing significant economic hardships. These local governments are strained for the basic resources and investments in information technology not deemed mission-critical. Therefore, the gap between the technological haves and have-nots in our local governments is widening.

One interesting solution to this governmental digital divide is being pioneered in small communities throughout North Carolina. The use of cross-boundary collaboration has become a best practice among economically strained local governments. In the collaborative model, local governments partner together in an attempt to leverage demand aggregation, economies of scale, and staff capacity enhancement in the technological arena. For example, demand aggregation can occur when a county offers a centralized procurement process that includes its municipalities in order to increase the overall value of the bid or order, while enhancing the negotiating power of the governments. In order to capitalize on economies of scale, counties may seek to share IT staff on a rotational model, which allows for increased technical capacity due to greater monetary incentives.

The current economic stress facing the state mandates that new models be employed in order to address the gaps in service delivery and cross-boundary collaboration is one such model.

There are numerous ways to invest in public sector information technology. Some of the most common investments are focused on electronic communications and department-specific applications. However, new cross-departmental, and even cross-jurisdictional, efforts are beginning to emerge. These efforts follow the trends in the private, federal, and state sectors and create greater value-add for the strategic investments.

Trends

A variety of management trends have occurred in the last few years related to information technology adoption and implementation in the public sector. This section highlights some of the most critical trends, including the advent of e-government and the move to enterprise-wide technology efforts. Both of these trends offer significant advantages to citizens, businesses, employees, and visitors. In addition, the trends have proven to generate cost-savings, increased efficiencies, and greater effectiveness in a variety of cases. The final trend explored is the advent of the CIO and the increasing professionalism of the role of Information Technology staff.

1. John B. Horrigan, "Consumption of Information Goods and Services in the United States," *Pew Internet and American Life Project*, November 23, 2003; Mary Madden, "The Changing Picture of Who's Online and What They Do," *Pew Internet and American Life Project*, December 22, 2003.

E-Government

E-government has become a mainstay in local, state, and federal government. According to the 2004 International City/County Managers Association e-government survey, over 91 percent of municipalities with populations larger than 2,500 have websites, compared to 73 percent in 2002. In North Carolina local governments, the Center for Public Technology has found that over 80 percent of all local governments have websites and more governments are developing a Web presence each month. Additionally, the 2003 Pew Internet and American Life Project indicate that 77 percent (97 million people) of American Internet users have accessed at least one governmental website. Not only are citizens looking for improved ways to interact with the government, elected officials demand improved services to enhance their legacies.

Although there is widespread interest in the topic, e-government lacks a consistent, widely accepted definition. It is often related to revolutionizing the business of government through the use of information technology, particularly Web-based technologies, which improve internal and external processes, efficiencies, and service deliveries. The American Society for Public Administration (ASPA) and United Nations Division for Public Economics and Public Administration (UNDPEPA) have defined e-government as “*utilizing the Internet and the world wide web for delivering government information and services to citizens.*”²

According to the UN and ASPA, there are five main stages of e-government. The lack of an organizational website is not defined by a stage, but may be considered Stage Zero. Stage One is the *emerging* Web presence, which involves static information presented as a type of on-line brochure. The main goal of the emerging Web stage is to provide an on-line mechanism for communicating key general information about the government to interested citizens and entities. The website lacks information about services and is not organized in a citizen-focused manner. Typically, the government has used a “go-it-alone” approach, which visually represents the “stovepipes” or “silos” that exist within agencies—there is little coordination across agencies and levels of government in Stage One websites.

In Stage Two, *enhanced* Web presence, the role of the website becomes associated with information on services, although it is still organized by departments rather than by user groups. Enhanced Web presence sites typically have e-mail as a means of two-way communication. Stage Two, however, rarely has forms available for download. Stage Two offers limited communication and greater information about the services of the government but it does not meet the citizen-centric approach that has been advocated for e-government.

Stage Three, *interactive* Web presence, begins to move into the citizen-centric realm of e-government. Typically, the information is portrayed by intuitive groupings that cross agency lines. For example, the website might use a portal as the single point of entry into various departments and service areas. The portal would offer major groupings like business, new resident, seniors, children, or other standard groups. Then, the end user would select the grouping that applies and be launched into a new section of the portal where the most common services requested for the group are located. The services would not be listed by departmental areas, but rather by functional areas. Stage Three sites have downloadable forms with on-line submissions, e-mail contact for various governmental employees, and links to other governmental websites.

Stage Four, *transactional* Web presence, offers the ability to conduct secure on-line transactions. This stage is also organized by user needs and contains dynamic information. The website may offer a variety of transactions, including paying for services, paying bills, and paying taxes. Transactional Web presence includes on-line submission of forms, many downloads, e-mail contact, and several links to other governments. The use of digital signatures also falls under Stage Four.

The final stage, Stage Five, involves *seamless* government. Although this stage represents an ideal, there is no real example of its application. Stage Five involves a cross-agency, intergovernmental approach that only displays one front, regardless of service area. For example, a seamless website would offer local, state, and federal government services via the state portal without the end user recognizing what level of government provides the service. A Stage Five site would offer vertical and horizontal integration and would require true organizational transformation with respect to administrative boundaries.

2. UN and ASPA. “Benchmarking E-government: A Global Perspective—Assessing the UN Member States,” 2001. Available at <http://www.unpan.org/egovernment2.asp>.

With a working knowledge of the typology associated with e-government, it is easy to assess the current status of the concept. Much of the literature indicates that Stage Two, enhanced Web presence, is the typical placement of an American local government on the e-government continuum. Alexander and Grubbs note, “[f]ew sites capitalized on the interactive nature of the Internet to conduct public discussions, maintain bulletin boards, or provide data and information available for download.”³

This statement holds true for North Carolina local governments as well. However, local governments are making strides in this arena, spurred by the recognition of the website as a vital economic development tool.

A review of the 2004 International City/County Managers Association’s (ICMA) E-government Survey finds that approximately 90 percent of cities and counties with populations over 2,500 are not offering transactional websites. This trend is also seen in North Carolina, with approximately 8 percent of cities and counties offering transactional services. Furthermore, based on the 2004 ICMA E-government Survey, only 8.6 percent of cities and counties offer on-line payment of taxes, 9.2 percent offer on-line payment of utility bills, and 7.3 percent offer on-line payment of fines and fees. The state and federal government offer more robust transactional services, but local governments are recognizing the need to offer electronic services to satisfy customers, as well as to reduce the costs associated with traditional walk-in and mail service delivery. E-government will continue to be a critical area for local government investment as citizens, businesses, employees, and visitors increasingly expect Internet-based options for governmental services.

E-government has been viewed in a variety of ways. One context for examining e-government centers on recognition that e-government is more than just a shift in communication patterns or mediums. At least potentially, it involves a transformation of the organizational culture of the government. Recent authors argue that governments are mandated by citizen and business demands to operate within new structures and parameters precipitated by information technology. These new requirements, which fundamentally alter the nature of government, are made possible through the strategic use of information technology to accomplish enterprise goals.

Enterprise Approaches

The primary management goal for information technology is to support the business objectives of the local government and to facilitate departmental efforts to provide efficient and effective services to citizens, businesses, and visitors. Information technology has become a strategic partner in governmental efforts to provide high-quality, consistent, and equitable services. The driving vision for information technology within many North Carolina cities and counties includes the development of an enterprisewide focus on IT, a focus on the customer, and the use of IT as an enabler in efficient and effective customer service. This vision marks a significant departure from the traditional government “silo” approach with its individualistic, department, or agency-centric efforts, as illustrated in Table 24-1

Many future technology efforts will cross multiple local government departments with a single goal of providing services to citizens, businesses, and visitors. In this new environment, technology is used as the basis for communication, interoperability, and data and resource sharing. Furthermore, technology is the vehicle through which cost reduction can occur by increasing efficiency and effectiveness of services through the use of an enterprise architecture and standards. Local governments throughout North Carolina are using enterprise approaches to achieve high levels of return on investments, greater customer satisfaction, and increased cost-savings.

Chief Information Officers and Professional Staffing

Information technology has fundamentally altered many aspects of daily life, including interactions with public and private sectors. The role of the Internet continues to increase as more citizens use it to find pertinent information, purchase goods and services, and to participate in virtual communities. By capitalizing on the Internet revolution, governments can create new channels of communication and new methods for participation via e-government. The changing environment, coupled with citizen and business demands, encourages government involvement in e-government initiatives and related uses of information technologies.

3. Jason Hansen Alexander, and Joseph W. Grubbs. “Wired Government: Information Technology, External Public Organizations, and Cyberdemocracy,” *Public Administration and Management: An Interactive Journal* 3, 1(1998). Available at <http://www.pamij.com>.

Table 24-1. Enterprise Approaches

Silo Approach	Enterprise Approach
Departmental Focus <ul style="list-style-type: none"> • Planning done at department levels • Limited cross-departmental efforts 	Enterprise Focus <ul style="list-style-type: none"> • Organizational strategic planning • Comprehensive, cross-departmental projects
Hardware, Software, Architecture <ul style="list-style-type: none"> • No standardization • Large support requirements • Redundant or incompatible applications 	Hardware, Software, Architecture <ul style="list-style-type: none"> • Standardization • Economies of scale and support • Common applications
Technology Skills <ul style="list-style-type: none"> • Limited and isolated skill base 	Technology Skills <ul style="list-style-type: none"> • Sharing of technical skills • Skill and knowledge transfer
	Enterprise Design <ul style="list-style-type: none"> • Shared data, relational databases • Integrated applications

Chief information officers (CIOs) emerged as a mechanism to connect the business units in an organization with the information technology staff. In essence, CIOs are the linchpin between these two seemingly disparate, and often contentious, components of an organization. In the past few decades, CIOs have been revered as supreme organizational aligners and lamented as over-titled technocrats. Regardless of the hype and hyperbole surrounding the role of chief information officer, one thing is certain: the job of CIO is always demanding, and often difficult. The CIO is responsible for disseminating the critical technology plans to senior executives in order to engender their support, while maintaining one foot firmly entrenched in the realm of new and emerging technologies. The CIO must possess the vision for the future while maintaining an eye on the historical legacies of the organization. Too often, chief information officers are forced to take sides between the business units and the information technology department, when, in fact, their role is to build the bridges between these organizational silos. The role of the CIO is critical and the job requires skillful navigation of the various minefields and bear traps that can ensnare and destroy technology projects.

As established as the role of CIO is within the private sector, it is only just emerging in the public sector. The role of the CIO has been adopted from the private sector as one way to navigate the emerging reality of public sector information technology and e-government. As early as 1981, the title Chief Information Officer (CIO) emerged in the private sector literature as the defined leadership role for information technology. Extensive research has been conducted on the attributes and characteristics of successful CIOs in the private sector. Some of the most commonly cited traits include being a generalist, having significant power and authority in the organization, and providing a common vision for the implementation of strategic information technology. Based on the success of the CIO in providing leadership and status to information technology projects in the private sector, the federal public sector followed suit by institutionalizing the position with the passage of the 1996 Clinger-Cohen Act.

The 1996 Clinger-Cohen Act heightened the status of information technology in government. It established a chief information officer in every federal agency, making agencies responsible for developing an IT plan. Now as e-government

becomes a priority at the federal, state, and local government levels, the existence of the CIO and a strategic planning structure becomes critical to facilitating e-government implementation. The importance of successful IT projects and their requisite investments is critical in both public and private sectors, as evidenced by the Clinger-Cohen Act and solidified by the rapid proliferation of CIOs in a variety of public and private organizations.

It is clear that the advent of technology has fundamentally altered the way governments conduct business. In North Carolina, cities and counties are using technology to improve service delivery, enhance efficiency, and increase transparency and accountability. The citizen and business demand for electronic access to building permits, dog licenses, and birth certificates has heightened the need for investing in information technology. Even more importantly, many North Carolina local governments are moving away from traditional bureaucratic emphasis on departmental "silos" and information isolation to a new paradigm, which emphasizes coordinated network building, external collaboration, and

customer services, due to information technology investments. Furthermore, information technology is providing new opportunities for civic engagement and participation from a variety of citizens and groups. North Carolina local governments have been engaged in the information technology revolution and the continued investment and support of these efforts is imperative.

Additional Assistance

The Center for Public Technology (CPT) is housed within the School of Government's Institute of Government. The center was created in 2001 in response to requests from local governments for help developing the capacity to improve services and strengthen their communities through the skillful use of information technology.

The center focuses on three dimensions: education/teaching, advising, and research and writing. CPT offers training, assessment and evaluation, and best practices for engaging in e-government, along with a host of other services. One important offering is the Chief Information Officers Certification Program, the first local government-specific course in the nation to certify IT professionals as chief information officers. The center also offers specialized training on topics such as security, wireless technologies, IT investment methodologies, performance-based technology contracting, the role of information technology in growing populations, and stakeholder evaluation of e-government efforts. The training is integrated with other courses offered by the Institute of Government and by associations such as the Carolinas Association of Governmental Purchasing, the State of North Carolina, Western Carolina University's Local Government Training Partners, and Public Technology Inc.

The Center for Public Technology also offers advising services to help address issues, opportunities, and challenges in IT management that are specific to North Carolina local governments. Finally, the center conducts a variety of research and publishes on numerous technology-related topics, including studies of leadership, best practices, legislative updates, and case studies. Additional information on the Center for Public Technology can be found at www.cpt.unc.edu.

Additional Resources

- Friedman, Thomas L. *The World Is Flat: A Brief History of the Twenty-first Century*. New York: Farrar, Straus, and Giroux, 2005.
- Garson, G. David. *Public Information Technology and E-Governance: Managing the Virtual State*. Boston, MA: Jones & Bartlett, 2006.
- Garson, G. David, ed. *Handbook of Public Information Systems, Second Edition*. New York: Marcel Dekker, 2005. The second edition has many new articles and others are all revised.
- Gordon & Glickson, LLC. *Information Technology Outsourcing: A Handbook for Government*. Washington, D.C.: International City and County Management Association, 2005.
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