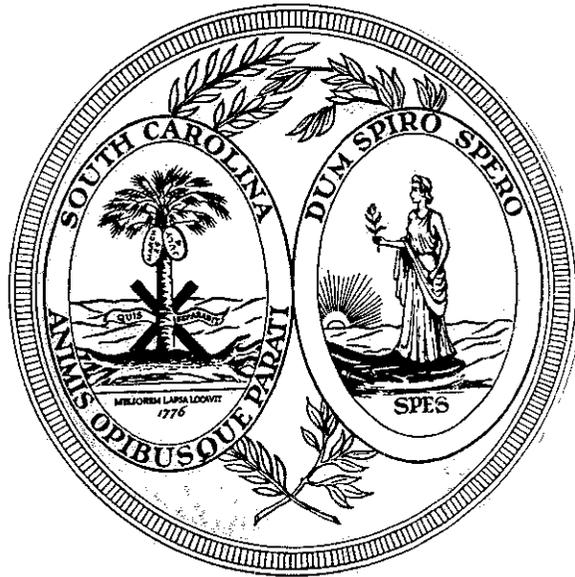


LAC

Report to the General Assembly

July 1997

Improving South Carolina's Management and Use of Information Technology



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The Legislative Audit Council is composed of five public members, one of whom must be a practicing certified or licensed public accountant and one of whom must be an attorney. In addition, four members of the General Assembly serve ex officio.

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**Improving South Carolina's
Management and Use of
Information Technology**

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Executive Summary

Pursuant to the sunset law (§1-20-10 *et seq.* of the South Carolina Code of Laws), the State Reorganization Commission asked the Legislative Audit Council to review the efficiency and effectiveness of information technology (IT) systems throughout state government. Overall, we found that the state's IT management has not given adequate emphasis to the interest of the state as a whole. Every agency independently decides what information systems to use, how to procure hardware and software, and how to obtain training for its staff. This approach results in inefficiency and duplication of effort. It also increases the difficulty in coordinating and implementing IT projects that involve more than one agency.

Greater attention should be given to establishing a common technology infrastructure, sharing information, and implementing IT efforts that will benefit the entire state. To improve IT management, we recommend measures to ensure that the interest of the state as a single enterprise is protected. These measures include the establishment of a chief information officer (CIO) position for the state.

However, effective management of information technology in state government calls for an appropriate balance between centralization, control, and standardization on the one hand, and decentralization and agency autonomy on the other. We also identified many areas where agency autonomy for IT management is the most appropriate focus. Agencies need to improve their management of information technology resources as investments. Agencies should make IT decisions based on consideration of costs and benefits, and implement appropriate controls to measure the results of their investments in technology. We found in many instances the basic policies and practices necessary to protect and control the use of the state's resources were not in place. Many of our recommendations are directed to all state agencies.

Our review focused on 61 executive agencies; we did not review institutions of higher education, or the legislative and judicial departments. We concentrated on data processing and emerging technologies; we did not conduct a detailed review of telecommunications or printing and duplication technologies. Our findings are summarized below.

Information Technology Resources

South Carolina spent approximately \$282 million for information technology in FY 95-96. The agencies that we reviewed accounted for approximately 69% of those expenditures. Over the past five years, these agencies increased their information technology expenditures by 53%. Spending for personnel increased at a lower rate (20%) than for IT goods and services (69%) (see p. 1).

The major costs of information technology are found in the personal computers (PCs), printers, and local area networks (LANs) that exist throughout state agencies. Based on data in a 1997 Budget and Control Board (B&CB) study, the cost of 11 mainframe data centers was just 13% of the FY 95-96 IT expenditures of the agencies we reviewed. These 61 agencies reported owning more than 26,000 personal computers and more than 16,000 printers. Fifty-five (90%) of these agencies reported having at least one LAN for a total of 550 (see p. 6).

Our expenditure information captured only direct costs; the indirect costs of owning PCs are substantial and often "hidden." The Gartner Group, an IT consulting firm, estimates that the five-year cost of owning a PC, including equipment, training, usage, and maintenance, is \$41,500. Hardware and software costs represent 15% of these costs; administration, support, and user costs make up the rest (see p. 9).

IT Management Issues

The Budget and Control Board has broad legal authority to manage the state's information technology. However, the board's structure has not facilitated a coordinated approach to IT issues. The state's IT resources could be more effectively managed by establishing:

- Overall standards and policies for IT.
- Effective coordination of interagency IT efforts.
- A central source of IT information.
- A process to ensure that the state makes the best IT investments.
- A means to ensure central accountability for IT decisions.

More effective management could be achieved by establishing the office of chief information officer (CIO) at a senior level within the board. In addition, the enactment of legislation addressing the management of information technology could lead to greater statewide coordination in the management of IT (see p. 11).

Agencies often do not know the return they have received on their IT investments. We reviewed eight IT projects in different agencies and found that many agencies do not know the costs of their investments; nor have they established ways to measure the benefits of their IT projects (see p. 21).

The B&CB's information technology management office (ITM) does not adequately evaluate or monitor agencies' IT projects. Better oversight could assist the General Assembly in making funding decisions and evaluating return on investment. Other states target IT projects for review based on budget and risk assessment. ITM should require more detailed information for high-cost and high-risk IT projects. The CIO could establish a system for evaluating and monitoring the state's IT projects (see p. 24).

South Carolina has not developed statewide standards for information technology. Individual agencies determine what hardware and software they use. In our survey only 14 (23%) of 61 agencies reported having IT standards within their agency. E-mail and desktop PC software are two areas that would benefit from statewide standards. Without standards, the state may be spending more than is necessary for IT. Also, a lack of standardization can affect the ability of IT systems to share information (see p. 28).

Fewer than half of the 61 agencies we surveyed reported having written policies for the management of information technology. We identified system security, back-up and off-site storage, and disaster planning as key areas where policies are needed to ensure the protection of the state's information resources. Also, written policies for local area networks would help to ensure that LANs are managed consistently and have appropriate controls (see p. 35).

System Integration, Training, and Procurement Issues

The Budget and Control Board is planning to consolidate 11 of the state's mainframe data centers into one new center to be built and operated by the state. According to officials, this consolidation will bring many benefits, including cost savings, development of IT standards, and a sound disaster recovery plan (see p. 39).

Agencies have their own information systems for financial and personnel management because the central state systems do not include all the information and functions that agencies need. It is inefficient for each agency to obtain its own systems for tasks that are common to all agencies. Some states have implemented integrated information systems for administrative functions (see p. 40).

Evidence indicates that agencies are not doing enough to ensure that staff have appropriate IT training. Research suggests that the cost of undertraining may be three times as much as that of training. However, on average, the agencies we surveyed reported spending less than one percent of total IT expenditures for training. Also, the state does not coordinate training or offer centralized information about training opportunities (see p. 44).

Governments are increasingly privatizing IT services, such as management of mainframe data centers, software development, maintenance, and training. South Carolina's privatization efforts have been limited. States should carefully evaluate privatization options, considering costs and benefits. The CIO could examine statewide IT functions to determine where privatization might be beneficial (see p. 47).

The office of information resources (OIR) provides mainframe computer services to 30 state agencies. However, OIR's rates have not been consistently based on the cost of services. Four agencies received reductions of between 33% and 81% from the amounts they would have been charged based on usage; the 26 agencies that paid based on their actual usage subsidized these four agencies. With the potential data center consolidation, it is important that OIR's rate structure be consistent and defensible (see p. 50).

The agencies we surveyed reported spending more than \$10 million for annual maintenance contracts for their IT equipment and software. Agencies should reconsider the costs and benefits of having onsite maintenance contracts for their PC workstations. Some agencies reported substantial savings from providing maintenance for this equipment in other ways (see p. 52).

Use of Emerging Technologies

We reviewed several “emerging” technologies and their use in South Carolina and in other state and federal governmental entities. We assessed the possible benefits and drawbacks from use of these technologies.

Electronic commerce is the use of computers and telecommunications to conduct business transactions. The state could achieve cost savings through increased use of electronic commerce. South Carolina agencies make purchases using a very paper-intensive and slow process. They could reduce costs and improve service if they used governmental procurement cards (credit cards) for these purchases. Based on the experience of entities that have used procurement cards, the state could realize from \$800,000 to nearly \$10 million in annual savings (see p. 57).

With *electronic data interchange (EDI)*, information or electronic versions of forms are sent from one computer to another without creating paper documents. South Carolina has been at the forefront of using EDI for tax filing and for delivering food stamp benefits. However, the state has not taken action to use EDI for purchasing, an application where other states have realized substantial savings. For the state to realize benefits from EDI functions between agencies, direction and coordination are needed at the state level (see p. 61).

Geographic information systems (GIS) have many potential uses in government. The Department of Commerce obtained a GIS system in response to its customers’ needs for information about potential industry sites. The Department of Natural Resources also has a sophisticated GIS system for which applications are not yet fully developed. South Carolina needs better coordination of its GIS systems (see p. 65).

Multimedia kiosks are one method governments use to provide information or services to the public. However, kiosks may not offer the cost benefits of electronic commerce. The experience in other states suggests that the benefits of kiosks may come at a high price (see p. 68).

Benefits from other emerging technologies may depend less on the merits of the technology than on how the technology is implemented in an agency. *Imaging* creates pictures of paper documents which can then be stored and retrieved on a computer. The imaging application at State Retirement Systems has involved a redesign of work processes, while the application at the Office of Insurance Services uses imaging essentially as an electronic filing cabinet (see p. 70).

We also reviewed applications of *advanced telephone (voice) features* and *video technology* at several agencies. These technologies offer benefits to agencies, and we found evidence that some agencies, such as the Department of Corrections and the Board of Technical and Comprehensive Education, have planned their investments in video to measure benefits and savings (see p. 72).

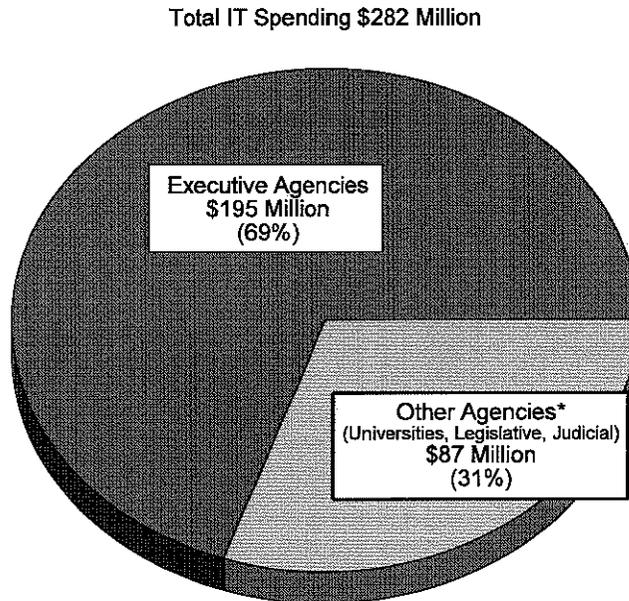
Information Technology Resources

Current Information Technology Environment

South Carolina spent approximately \$282 million for information technology (IT) in FY 95-96. We reviewed the use of information technology by 61 executive state agencies. The agencies that we reviewed accounted for approximately 69% of state IT expenditures (see Graph 1.1). Institutions of higher education, legislative and judicial agencies accounted for the remaining 31%.

Our definition of information technology included data processing and telecommunications. We excluded copying, duplicating, and printing from our review. We surveyed the 61 executive agencies to obtain information about their IT inventories and their management of IT resources (see Appendix B). We also obtained information on agency IT expenditures from the comptroller general, and information about IT personnel from the office of human resources. For more information about our audit scope and methodology, see Appendix A.

Graph 1.1: State Government IT Spending FY 95-96



*We could not obtain information from Legislative Printing and Information Technology Resources (LPITR); these expenditures are not included in the 'Other Agencies' total.

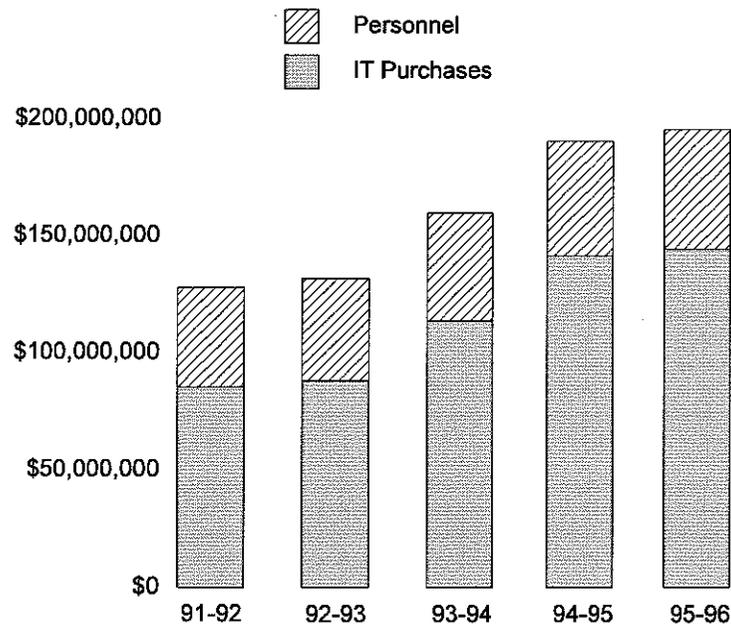
Expenditures for IT Have Been Increasing

Information technology expenditures have greatly increased over the past decade. According to a University of South Carolina report, in FY 84-85 the state spent approximately \$136 million for information technology. By FY 95-96, this amount was \$282 million. Over the past five years, the agencies we reviewed increased their information technology expenditures by 53%, from approximately \$128 million in FY 91-92 to approximately \$195 million in FY 95-96 (see table and graph below).

Table 1.1: Executive Agencies' IT Expenditures FY 91-92 Through FY 95-96

	FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96	4-Year Increase
IT Purchases	\$85,417,848	\$88,010,652	\$113,584,033	\$141,445,081	\$144,222,696	69%
Personnel	\$42,322,272	\$43,651,959	\$46,002,915	\$48,857,107	\$50,982,801	20%
TOTAL	\$127,740,120	\$131,662,611	\$159,586,948	\$190,302,188	\$195,205,497	53%
FTEs	1,318	1,312	1,321	1,332	1,370	4%

Graph 1.2: Rising IT Expenditures Shown in Table 1.1



Spending for personnel increased at a lower rate (20%) than for IT goods and services (69%). The number of personnel classified as information technology professionals increased only 4% over the period. This may be related to changes in the state's computing environment. While IT resources previously were concentrated in mainframe data centers with specialized personnel, agencies now stress the use of personal computers and local area networks. Computing resources are now more likely to be managed by personnel who have other jobs and are not information technology specialists.

The expenditures we show do not comprise the total cost of information technology. Our figures reflect only direct IT expenditures. We could not capture the indirect costs associated with IT, such as administrative support and maintenance, which may be substantial (see p. 9).

Table 1.2 shows the five-year spending totals of the 20 agencies with the greatest IT expenditures. These agencies' spending comprised 91% of the total spent by the 61 agencies. Much of the Budget and Control Board's spending for IT was offset by its revenues. The board functions partially as an IT service bureau; agencies pay the board for telephone and other telecommunication services and for use of the board's two mainframe computers. The board's five-year IT revenues totaled \$144.8 million.

Table 1.2: Agencies With Largest Five-Year IT Expenditures

Agency	Five-Year Expenditures
Budget and Control Board ¹	\$155,443,887
Department of Health and Environmental Control ¹	\$78,346,370
Department of Health and Human Services	\$72,213,231
Department of Social Services	\$69,935,481
Department of Revenue	\$46,875,802
Department of Mental Health	\$40,985,237
Department of Transportation ²	\$38,290,684
Employment Security Commission	\$34,796,284
Department of Corrections	\$30,828,665
Educational Television Commission	\$21,662,919
Department of Education	\$19,792,548
Department of Public Safety	\$19,084,909
Vocational Rehabilitation Department	\$18,826,668
Department of Disabilities and Special Needs	\$17,548,737
State Law Enforcement Division ¹	\$17,387,842
Department of Natural Resources	\$15,542,158
Department of Juvenile Justice	\$8,217,344
Governor's Office	\$8,129,322
Department of Labor, Licensing and Regulation	\$7,499,132
Department of Probation, Parole and Pardon	\$7,373,121
TOTAL	\$728,780,341

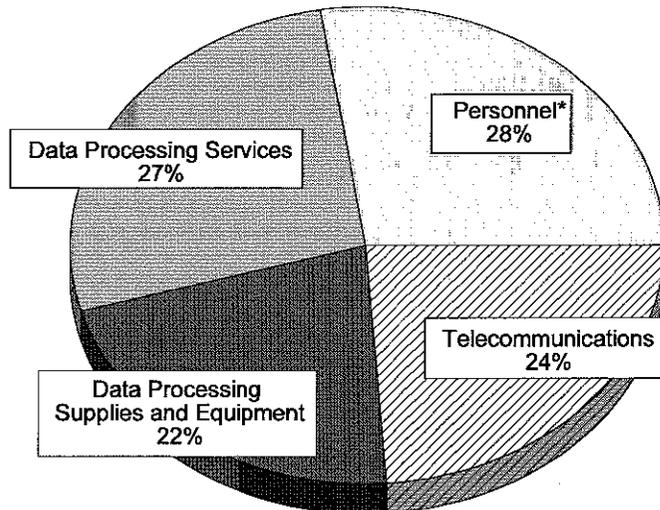
1 The Budget and Control Board received \$144.8 million in IT revenues for the five years; DHEC and SLED received \$8.3 million and \$4 million, respectively, in IT revenues.

2 Three-year expenditures. The Department of Transportation began using the comptroller general's accounting system in FY 93-94.

FY 95-96 Expenditures

The 61 agencies we reviewed spent about \$195 million in FY 95-96 for information technology. These expenditures are categorized by type in Graph 1.3.

Graph 1.3: FY 95-96 IT Costs



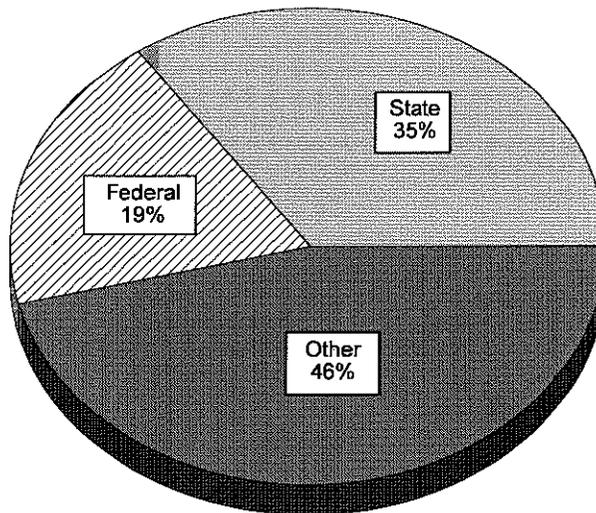
*Includes estimate from LAC surveys of non-IT personnel with IT duties.

FY 95-96 expenditures are shown by source of funds in Table 1.3 and Graph 1.4. State general funds accounted for approximately 35% of IT expenditures.

Table 1.3: IT Expenditures by Source of Funds FY 95-96

	State	Federal	Other	Total
IT Expenditures	\$42,055,078	\$29,586,967	\$72,580,651	\$144,222,696
Personnel Expenditures	\$26,039,784	\$6,800,410	\$18,142,607	\$50,982,801
TOTAL	\$68,094,862	\$36,387,377	\$90,723,258	\$195,205,497
Percentage	35%	19%	46%	100%
FTEs	705	177	489	1,371

Graph 1.4: Source of Funds for IT Expenditures FY 95-96



The Computing Environment

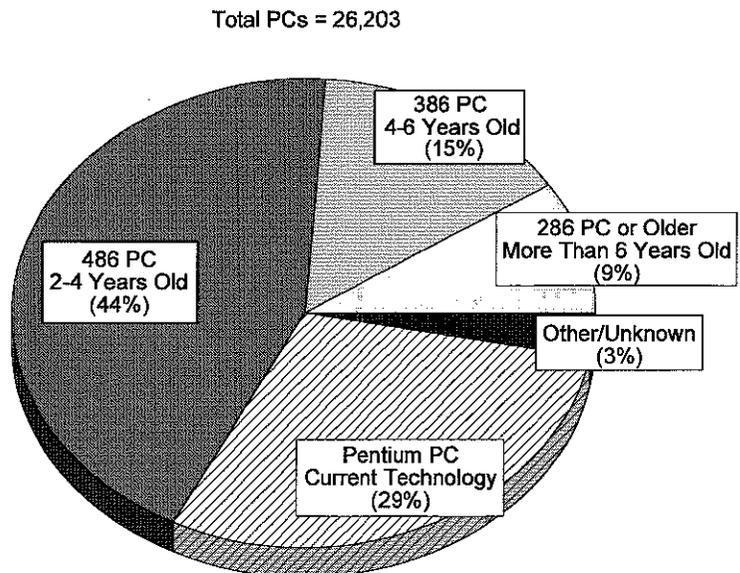
The current computing environment in state government has shifted following a national move toward decentralization of computer equipment. Formerly, agencies' information systems were often based on centralized data centers with mainframe computers. Now it is more common to find a more decentralized structure with personal computers connected through local area networks (LANs). This trend is reflected in IT expenditures.

The major costs of information technology are found in the personal computers, printers and local area networks throughout state agencies. The Budget and Control Board's January 1997 data center consolidation study found that, excluding facilities costs, the 11 mainframe data centers recommended for consolidation accounted for about \$25.6 million in FY 95-96. This is just 13% of the IT expenditures for the agencies we reviewed.

Personal Computers

Agencies report owning many personal computers and printers; they comprise a substantial part of the state's investment in IT. The 61 agencies in our survey reported owning more than 26,000 personal computers. The PCs are made by many different manufacturers, and most are IBM or IBM-compatibles. Agencies reported owning approximately 400 Apple PCs. The age and processing capabilities of the PCs varies. See Graph 1.5 for a breakdown of the computers reported by processor/age.

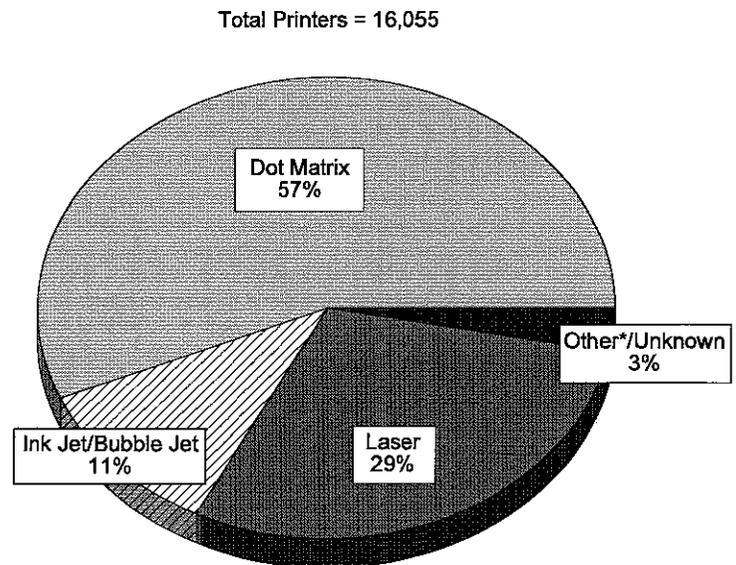
Graph 1.5: Personal Computers Reported by 61 Agencies



Source: LAC IT survey.

The agencies also reported owning more than 16,000 printers. See Graph 1.6 for a breakdown of the type of printer reported. Many of these computers and printers are linked together in local area networks. Fifty-five (90%) of the sixty-one agencies we surveyed reported having at least one local area network for a total of 550 networks. The Department of Health and Environmental Control reported the most LANs with 154.

Graph 1.6: Printers Reported by 61 Agencies



*Other includes mainframe printers and plotters.

Source: LAC IT survey.

IT Communications Equipment Inventory

The 61 agencies reported their inventory for some IT communications equipment items. Table 1.4 displays the number of modems, fax machines, cellular telephones and pagers (beepers) reported by the 61 agencies. Nearly all the agencies reported modems and fax machines; 49 (80%) reported having cellular phones and 46 (75%) reported using pagers. Generally, large agencies with many locations disbursed throughout the state had greater inventories of this type of equipment.

**Table 1.4: IT Communications
Equipment Reported by 61
Agencies**

	Modems	Fax Machines	Cellular Phones	Pagers
Number Reported	3,781	1,536	1,950	6,112

Source: LAC IT survey.

Costs Associated with PCs and LANs

The costs associated with the use of personal computers are substantial and often "hidden." A 1996 consultant study of Connecticut's management of IT stated that "shadow spending," the use of non-IT staff to perform IT functions, was estimated to add 100% to personnel spending. According to a 1994 report prepared by the Nevada Department of Information Services, the support required for a PC-based system is similar to that required for a mainframe system, but the return on investment is not the same. The cost is proportionately much higher to support the PC environment. The report cited a consultant's estimate that the cost per end user in a mainframe environment is \$2,282, and the cost per end user in a PC environment is \$6,445, almost three times as much.

The Gartner Group, an information technology advisory firm, estimates that the five-year cost of owning a PC, including equipment, training, usage, and maintenance, is \$41,500. Hardware and software costs represent an estimated 15% of these costs; administration, support and user costs comprise the rest.

The Gartner Group cites the inadequacy of PC support and training as major factors that drive up costs in companies. Gartner recommends standardizing systems to keep them simple (see p. 28) and improving training (see p. 44) as strategies to control costs.

Chapter 1
Information Technology Resources

Information Technology Management Issues

Organizational Structure for Managing Information Technology

The South Carolina Budget and Control Board (B&CB) has broad legal authority to manage the state's information technology (IT) resources; however, the board's structure has not facilitated a coordinated approach to IT issues. More effective management could be achieved by establishing the office of chief information officer (CIO) at a senior level within the board. In addition, the enactment of legislation addressing the management of information technology could lead to greater statewide coordination in the management of IT.

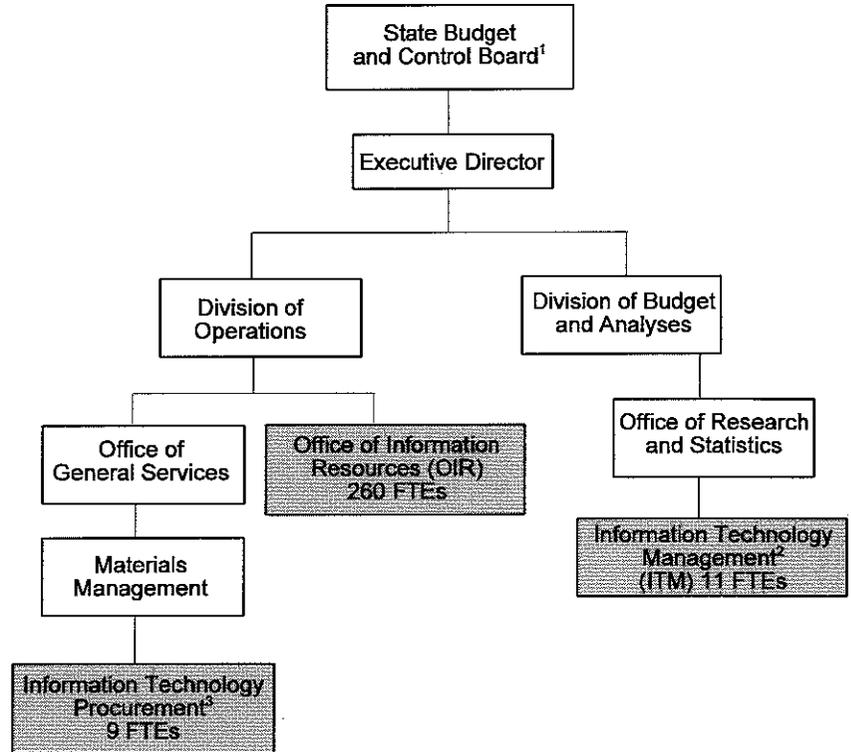
Background

The Budget and Control Board is the agency responsible for managing information technology on a statewide basis. IT responsibilities are shared by three offices dispersed throughout the board (see Chart 2.1).

- ❑ The office of information resources (OIR) is responsible for management and operation of the state's telecommunications. In addition, OIR provides services to agencies through an information processing center (which serves approximately 30 agencies through OIR's two mainframes), data network facilities, a print shop, and a training center.
- ❑ The office of information technology management (ITM), within the office of research and statistics, is responsible for providing strategic direction to the state and overall planning and coordination of IT with state agencies.
- ❑ The information technology procurement office, within the materials management office of general services, is responsible for IT procurement. This office handles statewide term contracts for IT items and provides oversight for the purchase of items above agencies' procurement limits.

In 1987, the B&CB formed the information technology advisory committee (ITAC), composed of officials from approximately eight agencies, primarily to assist in the exchange of information among agencies, and to recommend IT policies for the board's approval. The committee has functioned as an informal means of communicating and sharing IT information. However, the committee is strictly advisory, is not formally constituted, and lacks the authority to take any binding action.

Chart 2.1: State Budget and Control Board Information Technology Organization Structure



- 1 This chart omits divisions and offices which are not directly involved in information technology.
- 2 Information technology management (ITM) has also been known as information technology planning [or policy] and management (ITPM) and IT planning.
- 3 This office was established in statute (§11-35-1580) as the information technology management office (ITMO).

Source: Budget and Control Board.

Information Resources Council

In March 1996, the Governor issued Executive Order No. 96-05 to establish the Information Resources Council (IRC) of South Carolina. The IRC is composed of nine appointees, five from the private sector and four from state or local government. One of the initial appointees is from state government. The first meeting of the IRC was held on April 1, 1997, more than a year after it was formed. The IRC's primary stated role is to provide assistance and coordination in planning for the effective and efficient use of IT, and to help develop policies and facilitate statewide IT strategies and goals. The IRC has established six standing committees to address IT-related areas that require close coordination across government. IRC officials stated that it will make recommendations to the Governor by the end of 1997 about an appropriate IT strategy for the state.

Several other states have established similar public/private bodies to advise on IT issues. It is useful for government to obtain assistance and information about IT from the private sector. The IRC will act as an advisory group to the Governor, who is chairman of the B&CB. As discussed below, the B&CB has statutory authority to manage IT resources for the state.

Effectiveness of Present Management Structure

Section 1-11-430 of the South Carolina Code of Laws requires the B&CB to secure all telecommunications equipment and services for the state. This law, in effect, mandates a unified structure, and we found no evidence of problems in the state's system for managing telecommunications. On the other hand, the B&CB does not have an effective organizational structure for overall management of data processing.

The state procurement code §11-35-1580, enacted in 1981, made the B&CB responsible for areas such as:

- Assessing the need for and use of IT.
- Evaluating the use and management of IT.
- Operating a comprehensive inventory and accounting reporting system for IT.
- Developing policies and standards for management of IT in state government.
- Initiating a state plan for the management and use of IT.

The job of carrying out these functions has been given to the office of information technology management (ITM), which, according to the FY 94-95 annual accountability report, helps set the state's strategic direction through "establishing . . . IT policy, . . . coordinating [IT] planning involving more than one agency . . . [and] evaluating the use and management of information technology." However, as shown by the organizational chart on page 12, the location of the ITM office within the B&CB structure makes it difficult for ITM to assume a leading role. ITM has not performed these functions adequately, as illustrated in the following examples.

Policies and Standards

At a B&CB meeting in August 1987, the board approved five general statewide IT policies, which were to provide a framework within which ITM was to develop specific policies and standards to better manage the state's IT resources. However, statewide policies and standards have not been developed (see p. 28). Also, many agencies do not have appropriate policies for IT management (see p. 35).

Tracking IT Assets

Even though required by law, the B&CB has not developed a system to provide information about IT assets statewide. The state procurement code [§11-35-1580(1)(e)] requires a "comprehensive inventory and accounting reporting system for information technology." The 1983 State Plan on Technology (SPOT), prepared by ITM, described a number of proposed projects aimed at furthering the state's IT management goals. One project was the development of an automated tracking system for IT hardware and software. However, according to B&CB officials, the statewide tracking system was never implemented.

In addition, for five years (FY 90-91 to FY 94-95) provisos in the state appropriation acts required agencies to submit an inventory report each January to ITM, in a format prescribed by the B&CB. While the board outlined the format in a memo to agency heads, it did not implement the proviso; rather, it informed agencies that the B&CB would request inventory information from time to time. Agency responses to our survey indicated that many agencies do not routinely maintain information on their IT assets.

A system for tracking information technology is needed to manage resources effectively and make decisions about future investments. In addition, accurate information could assist the state in determining appropriate statewide standards and assessing statewide needs, such as the resources required to prepare for the year 2000 date change (see p. 16).

Evaluating IT Investments

ITM is responsible by law for “evaluating the use and management of information technology.” However, we found that ITM does not adequately evaluate or monitor agencies’ IT projects. The IT planning process does not provide the information needed to determine return on investment or ensure that high-risk projects are identified and monitored (see p. 24).

Coordinating Inter-agency Planning

Planning of projects involving more than one agency has not been effectively coordinated. Several current initiatives to improve productivity in government through the use of IT depend on the coordination of several agencies (for example, geographic information systems, see page 65; and electronic commerce, see page 57). However, the B&CB has not ensured that coordinated activity will occur. The state’s approach to providing a means to share innovation (“best practices”) and the year 2000 date change are two examples of this problem.

Best Practices

While the information technology advisory committee has provided a forum for agency officials to informally exchange information and ideas, there is no formal mechanism for sharing one agency’s successful IT innovation with another agency. The April 1995 report of the state accounting system improvement team identified this problem and pointed out that, if agencies do not share innovations, they lose the opportunity to benefit from other agencies’ work. Also, agencies may work independently to solve problems that have already been solved by other agencies. The report recommended that the B&CB’s executive director should assign to ITM the task of developing a method of sharing innovations among state agencies, but no action has been taken.

Year 2000

Resolving the year 2000 “problem” in information systems is recognized nationwide as a mammoth and expensive undertaking that will require a high degree of coordination and planning. Until members of the General Assembly proposed in early 1997 that the state take a coordinated approach to the year 2000 problem, B&CB officials did not provide statewide direction or coordination.

THE YEAR 2000 PROBLEM

What: Many large computer systems use a two-digit year-dating system that assumes 1 and 9 are the first two digits of the year. If not reprogrammed, those computers will think the year 2000—represented as 00—actually is 1900. That could bring some systems to a halt, and cause wrong results in determining effective dates for such items as benefits, retirement eligibility, inmate release, and license expiration.

Why: Programmers in the 1950s and '60s—and even some in the '70s and '80s—abbreviated the years into two digits to save costly memory space. Most of them never expected the programs they wrote would still be running at the turn of the century.

How: Programmers must comb through computer programs to look for places where dates are stored and change those lines of code to handle four-digit years. Those programs must be extensively tested to ensure they'll operate properly after the change is made.

Source: The Washington Post, April 15, 1997.

As of April 1997, the B&CB had not assessed the status of agencies' responses to the year 2000 problem. According to OIR officials, they were drafting a request for proposals (RFP) for a vendor to perform assessments and conversions for state agencies, but this was not finalized.

In our survey of state agencies, 23 (38%) of 61 agencies responded that they have not assessed the impact of the year 2000 computer problem on their information systems. Several large agencies, including the State Department of Education, the Department of Health and Environmental Control, and the Department of Labor, Licensing and Regulation, stated that they have not assessed the problem. Only five agencies provided estimates of projected costs for making the necessary changes to their systems. The B&CB's survey response about its own information systems stated that the board had “just

recently begun the process of analyzing the impact of the Year 2000.” The B&CB should have taken earlier action to assist state agencies in planning and to ensure that the systems it operates for other agencies are year 2000 compliant.

Other states have done more to plan and coordinate a response to this issue. In October 1996, the National Association of State Information Resource Executives (NASIRE) issued a report that summarized the results of a survey of states’ year 2000 conversion efforts. Thirty-one of forty-four states indicated that they were in the planning stage, and thirteen indicated that they were in the implementation/testing stage of conversion. Comments from states in the planning phase reflect that, generally, they are well ahead of South Carolina.

Central coordination is necessary to ensure that state officials are informed about the magnitude of conversion costs and potential disruptions in services. Common vendor contracts could help agencies make a cost-effective response to a statewide undertaking of this size. Central coordination could also assist agencies to assess their conversion needs, provide information necessary to address budget and funding concerns, establish post-conversion testing mechanisms, and provide general guidance and support. A centralized approach should also help reduce duplication of effort across agencies and provide a way to identify common issues.

Recommendations

1. To respond to the year 2000 date problem, the Budget and Control Board should coordinate the assessment and monitor the implementation of necessary modifications to the state’s information technology systems.
2. The Budget and Control Board should, as soon as possible, contract with private vendors to make available year 2000 assessment and/or conversion services to state agencies.
3. The Budget and Control Board should develop a systematic method of sharing IT innovations among agencies.

Chief Information Officer

We identified several areas in the B&CB's management of IT where more coordination is needed. The state's IT resources could be more effectively managed by establishing:

- Overall standards and policies for IT.
- Effective coordination of interagency IT efforts.
- A central source of IT information.
- A process to ensure that the state makes the best IT investments.
- A means to ensure central accountability for IT decisions.

The management of IT is dispersed throughout the board in three different organizations. None of the responsible IT officials reports directly to the board's executive director. To accomplish effective statewide management of IT, accountability and responsibility for IT should be clearly coordinated and centralized. One way to achieve a unified direction is through a statewide chief information officer.

Leading private organizations, the federal government, and many states have instituted the position of chief information officer to assume responsibility for the management of IT resources. The General Accounting Office (GAO) conducted studies at private organizations, such as Kodak and Xerox, and at several governmental agencies. According to the GAO:

Leading organizations have found that one important means for establishing a clear organizational focus for information management is to position a Chief Information Officer (CIO) as a senior partner with the organization's top executives.

It is increasingly recognized that senior managers must be involved in understanding the organization's information technology investment decisions, and that IT investment decisions cannot be delegated to technical staff. The CIO is responsible for advising top executives and serving as a bridge between them and information technology professionals.

While we found that the organization structures of other states varied considerably in their statewide management of IT, there is a trend for states to establish a chief information officer position. According to a 1996 NASIRE report, 36 states reported having a CIO. While the CIO's authority and responsibilities vary, it is generally accepted that a CIO should be organizationally high enough to participate in top level decision making.

A CIO in South Carolina could coordinate inter-agency efforts. For example, a CIO could direct development of the state's electronic commerce efforts (see p. 57). In addition, a CIO could set state policies and standards, ensure accountability, and maintain inventory information. Necessary support staff for the CIO could be obtained from the B&CB's 280 FTEs currently allocated to IT management and operations.

Recommendations

4. The General Assembly may wish to consider establishing the office of chief information officer, reporting directly to the Budget and Control Board's executive director.
5. In the interim, and in the event the General Assembly does not establish a CIO, the Budget and Control Board should take action to more effectively carry out its legal responsibilities, including the duties listed in §11-35-1580 of the South Carolina Code of Laws.

Information Technology Management Act

A separate act containing requirements for managing the state's IT resources could facilitate greater coordination and effectiveness in managing IT. Information technology law is located in the state procurement code and in appropriation act provisos. Since the enactment of the procurement code in 1981, IT has evolved into an increasingly important and valuable resource, which should be managed to best advantage to help fulfill agencies' missions. An IT act could provide state officials with clearer information on IT policy and responsibilities and would be an appropriate way to establish the office of chief information officer.

Recommendation

6. The General Assembly may wish to consider enacting an information technology management act to provide for the statewide management of the state's IT resources. This act should include the establishment of any offices that the General Assembly decides to create, such as a chief information officer.

Individual Agency Structures

Agencies also need to consider whether IT management is appropriately placed in their organizations. Often IT agency managers have not held senior management positions and therefore have not been actively involved in an agency's strategic planning. Rather, they have often been technical employees, more concerned with systems operations. In the LAC survey, only nine agencies indicated that they have an IT manager who reports directly to the agency head.

Top agency executives often do not have adequate technical expertise to knowledgeably plan for and apply technology to improve the way they do business. With increasingly sophisticated technology, it is important to have an IT manager at a high level within an organization, to help the agency plan appropriately for the future. The federal government now requires that agencies have CIOs. The Information Technology Management Reform Act of 1996 (P.L. 104-106) required individual executive agencies to designate a CIO to be responsible for assisting agency heads and senior staff in the management of IT. The CIO participates in the agency's annual strategic planning process and is responsible for ensuring that the agency's information technology provides an integrated framework within which to achieve its strategic goals and its IT goals.

Recommendation

7. Agencies should review their organizational structure of IT management to ensure that information technology planning is a part of the agency's overall strategic planning.

IT Planning and Monitoring

South Carolina does not have adequate information to determine its return on investment in information technology. The state could have more confidence that resources are used efficiently and effectively if agencies had better cost information and measures of results, and if central state government provided more oversight.

Agencies' Project Management Process

Agencies often do not know the amount of their investment in IT or the return that they have received on their investment. We reviewed information technology projects developed by eight state agencies. The projects included hardware purchases, conversion of old systems, and development of new systems. Table 2.1 lists the projects we reviewed.

Table 2.1: Agency Projects Reviewed

Agency	Project	Description
Department of Corrections	Conversion of Offender Management System	System which maintains information on all corrections inmates.
Department of Health and Environmental Control (DHEC)	Administration Information Management System	New system to perform administrative functions.
Department of Juvenile Justice (DJJ)	Risk Assessment System	System which assigns a risk score to a juvenile, used in recommending prosecution and disposition.
Department of Mental Health (DMH)	Community Mental Health System	Provides billing and tracking services for clients served in community mental health facilities.
Department of Public Safety (DPS)	Network & PCs in district offices	Provides automation to district offices.
State Retirement Systems	Information Management System	System to perform all retirement services, such as member information and payroll.
Department of Revenue	Electronic Filing System	System to allow tax professionals to file tax returns electronically.
Department of Social Services (DSS)	Child Support Enforcement System	Federally mandated system to maintain information on child support payments.

Tracking of Costs

Agencies did not have complete information on the total costs of their projects. Without this information, the true cost of these projects cannot be determined. For example, DJJ developed its risk assessment system using existing resources. They did not track the costs of staff time or training and could not provide any cost information. Although DMH used an outside vendor for its community mental health system, the project was not completed as stated in the RFP. DMH staff completed the project but they could only provide the amount paid to the vendor. The Department of Revenue and DJJ provided very little or no cost information. Of the eight agencies whose projects we reviewed, only DHEC provided information tracking the use of existing agency resources, such as staff time.

Agencies did not have complete cost information and their projects have also taken longer to complete than estimated. For example, DHEC's administrative information system project is two years behind schedule and is not yet fully implemented. The project is now scheduled to be completed by March 1998. The vendor for DMH's community mental health system estimated the project would take one year to complete. However, actual implementation took three years.

Benefits

Agencies have not always measured the results or benefits of their IT projects. For many projects we reviewed, agencies cited qualitative benefits such as improved performance and efficiency without reporting how the benefits were measured or determined. For example, corrections and DMH cited improved performance and service as actual or projected benefits from their new systems.

Three agencies did cite measurable benefits. DSS reported an almost \$70 million increase in collections of child support payments over six years. According to officials, this increase was due, in part, to the child support enforcement system. State retirement systems developed 12 performance goals, such as the number of days to finalize retirements and the percentage of telephone questions answered on the first call, to evaluate the agency's overall performance. With the electronic filing system, the Department of Revenue measures the cost and the error rate in processing paper tax returns versus electronic returns (see p. 64).

Planning Information

We could not always determine whether agencies followed an adequate IT planning process. Some agencies had documentation for the planning process. For example, the Department of Corrections and State Retirement Systems used consultants to help to develop their new systems. The consultants prepared reports which discussed the agencies' current situations and alternative solutions to meet their needs. These reports included information such as estimated costs and time, project steps, and suggested performance measures. The Department of Juvenile Justice and the Department of Public Safety, who developed their new systems in-house, could provide very little planning information.

Agencies should plan new IT projects so that they can determine their return on investment. Without adequate information, they cannot make informed decisions regarding the use and cost-benefit of information technology.

Recommendation

8. State agencies should ensure that IT projects are adequately planned. They should ensure that they track costs, monitor progress, and measure results.
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Agencies' Small Purchase Decisions

Decisions to purchase personal computers, printers, and other small IT items are made by individual agencies. We did not review their processes for deciding what equipment is needed or how these investments are evaluated.

In the private sector, as well as in government, leaders are concerned about controlling "small" IT investments for maximum productivity at least cost. Industry advisors recommend that companies determine *how* equipment such as PCs will make their employees more productive *prior* to the purchase of the equipment. They encourage the use of cost-benefit analysis. However, even determining what assets the companies own can be difficult when PCs are scattered throughout the organization and departments frequently purchase their own equipment. A comprehensive IT inventory is a necessary tool to help companies evaluate and manage their IT assets (see p. 14).

Decentralized purchasing and lack of control over IT assets is a problem for state government. Individual agencies do not always know what equipment they have, whether or not it aids productivity, or whether its benefits exceed costs. Agencies should work toward controlling their IT investments to maximize productivity at least cost.

Recommendation

9. Agencies should ensure that investments in IT equipment are planned, controlled, and evaluated to maximize benefits at least cost.
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Budget and Control Board's Efforts to Monitor IT Project Planning

Information technology management (ITM) does not adequately evaluate or monitor agencies' IT projects. Better oversight could assist the General Assembly in making funding decisions and evaluating return on investment. As early as 1986, a University of South Carolina study pointed out the state's lack of data on information technology. The report states that “. . . additional quantitative benefits can be derived if the state has a better understanding of not just what technology exists, but of how it is being used to facilitate the management of information within and among agencies.”

Section 11-35-1580(1)(d) of the South Carolina Code of Laws assigns responsibility to the information technology management office for “. . . evaluating the use and management of information technology.” As part of this evaluation, ITM requires agencies to submit information technology plans. The information is self-reported by the agencies and is not verified by ITM. The current planning document required by ITM contains only brief descriptive information about proposed projects. This limited information does not provide ITM with enough data to determine whether a project has been adequately planned. Additionally, the information is not updated as the project progresses. Thus, ITM cannot easily determine if a project is on schedule or budget.

Since 1994, ITM has taken a less active role in the IT planning process. Prior to 1994, ITM's role was regulatory. Agencies were required to have ITM approval for each IT purchase, such as PCs, printers, etc. In response to concerns that this approach was too regulatory, ITM changed its role and became a consultant for agencies on their IT purchases. Currently, ITM does

not become involved in an agency's IT projects unless requested by the agency or another entity, such as a special committee. For example, in September 1996, ITM reported it was assisting five agencies with their IT projects.

Prioritization

For the 10% of projects requesting new state appropriations, ITM does some evaluation. The FY 96-97 appropriation act and the FY 97-98 appropriation bill direct the B&CB to identify IT requests involving new state appropriations, evaluate the requests, and compile them into a report that is sent to the Governor and two legislative committees. In response to this proviso, ITM publishes an annual prioritization report. The report is brief, giving only a one sentence description of the project and its proposed funding. In its FY 96-97 report, ITM classified requests for new funds according to three priorities: high, medium, and low. Individual requests were not prioritized within each classification. Table 2.2 shows the criteria for assigning those priorities.

Table 2.2: Classifications of Requests for New State Appropriations for IT

High Priority	The item requested is judged critical to the agency's continued operation in some area.
	Example: Department of Insurance's replacement of outdated computer system by downsizing to a microcomputer-based system. Total cost: \$1,139,056.
Medium Priority	The requested item promises significant benefits and/or cost savings but is not judged absolutely critical to the agency's operations.
	Example: State Election Commission's need for more computer space due to the requirements of the federally mandated motor voter law. Total cost: \$847,120.
Low Priority	Benefits are likely but are of lesser significance than those ranked above it.
	Example: Department of Health and Human Services' modification of existing Medicaid system and development of eligibility and enrollment subsystem. Total cost: \$4,383,789.

Source: Information Technology Management.

Most Projects Are Not Prioritized

In FY 96-97, 90% of the state IT projects involved the use of existing agency funds, and ITM does not place priorities on projects paid for with existing agency funds. For example, some large projects, such as DHEC's administrative system, fell outside the scope of ITM's priority process. Instead, ITM either approves or defers these projects paid for with existing agency funds. Deferred means the justification provided for the project was insufficient. As long as a project is deferred, it cannot go forward. Thirteen percent of all requests made in FY 96-97 were deferred. ITM has never denied an agency's IT request.

Other States' Project Planning Process

Some states target projects for review. They do not review every IT project. However, those states' central information technology agencies exercise closer oversight of projects with large budgets or those which are considered to be high risk. A high-risk project has a high probability of failure and would cause major consequences to the agency and/or the state if it were to fail. These states require more detailed information for any IT requests whose total costs exceed a certain dollar amount. Table 2.3 gives examples of the total cost amounts of projects that require more detailed information be submitted to central state government.

Table 2.3: Total Project Cost for Increased Oversight in Other States

State	Total Project Cost for Closer Review
Washington	\$1,500,000
Arizona	\$1,000,000
Texas	\$1,000,000
Florida	\$500,000
New Mexico	\$500,000
North Carolina	\$500,000
Kentucky	\$100,000

For those projects which exceed the total project cost amount, the additional information required differs for each state. For example:

- ❑ Florida requires a cost-benefit analysis which includes the projected costs of the total system, any savings to result from the system, and any other intangible benefits. This information is used to make budget recommendations to the Governor's Office and the legislative appropriations committees.
- ❑ Texas uses a risk analysis questionnaire with 21 questions requiring descriptive answers. With this information, the Department of Information Resources (DIR) determines which projects are at greater risk for failure. The projects which are determined to be of medium or high risk are monitored more closely by DIR.

Other states require that agencies submit information in a standard form that is reviewed by the central state information technology agency. For example, Florida reviews the analysis to determine if the estimates for projected costs and benefits are valid and consistent with the agency's budget request.

Other states, such as California, Florida, and Texas, use the information collected to determine if a project is high risk. Once the risk of a project is determined, states use those decisions to determine the level of monitoring required for the project. The purpose of project monitoring is to identify areas of high risk, take corrective action, and, if a project is failing, advise stopping the project. Additionally, project monitoring allows states to identify best practices to share with all agencies and successful projects that could be used as models for other agencies (see p. 15).

Evaluation of Results

Some states, such as Florida, require the analysis be reviewed at the completion of every major phase of the project and re-evaluated one year after implementation. Texas requires that agencies define performance measures for each project. Texas may also request that an agency undergo a post-implementation evaluation review using these measures. Post-implementation analysis and follow-up studies provide both increased accountability and improved estimation techniques for future projects.

Conclusion

Without adequate information and oversight regarding information technology projects, ITM and the General Assembly are not able to determine if the state is receiving an adequate return on its IT investment. The planning processes used by many of the agencies we reviewed did not ensure that they had adequate information to measure the return on investment or project performance.

ITM should require more detailed information for high-cost and high-risk IT projects and verify information critical to project implementation. Using this information, they could determine which projects might be high risk. Higher-risk projects could be monitored to ensure the projects' successful completion.

Recommendation

10. If the General Assembly creates the position of Chief Information Officer (CIO) for the state, the CIO should be responsible for establishing a system for evaluating and monitoring the state's IT projects. In particular, those projects which exceed a certain cost or which are determined to be high risk should be subject to closer oversight to ensure their successful completion. If there is no CIO, the Budget and Control Board should implement this system.

Statewide Information Technology Standards

South Carolina has not developed statewide standards for any area of information technology. Individual agencies determine what hardware and software they use. As a result, the state may be spending more than is necessary for IT. In addition, a lack of standardization can affect the ability of IT systems to share information both within and between agencies, thereby reducing efficiency.

South Carolina's Attempts to Standardize

The Budget and Control Board has the authority to set IT standards. Section 11-35-1580 of the South Carolina Code of Laws gives the B&CB the authority to develop “. . . policies and standards for the management of information technology in state government.”

In the 1980s South Carolina recognized the importance of standards. The 1983 State Plan on Technology (SPOT), developed by ITM, cited the need for the development of statewide technical standards, policies, and specifications for IT. The plan states:

The key to aiding managers in making cost effective use of modern technology is through establishing statewide technical and functional standards and specifications which reflect the state's long term goals.

In an August 1985 supplement to SPOT, the board noted areas where standards could prove beneficial, including PC applications software, database software, and financial applications software. In 1982 the board issued office automation standards. However, according to a B&CB official, the office automation standards are no longer applicable due to changes in technology.

During the 1990s, however, South Carolina has not developed any formal IT standards. ITM developed “draft” policies in several areas, including e-mail and data communications. However, none of these policies has been approved by the B&CB. A January 1997 B&CB study of the state's data centers notes that, while South Carolina has made extensive use of technology, “. . . much of the progress made has been on an agency-by-agency basis, leaving the state with . . . differing levels of modernization with little standardization.” In our survey of state agencies, only 14 (23%) of 61 agencies reported having IT standards within their agency.

We reviewed several IT areas which could benefit from the adoption of standards. These include e-mail and PC software.

Electronic Mail (e-mail) Standards

The state has not adopted a standard e-mail software. In our survey of state agencies, 55 (90%) of the 61 agencies surveyed reported having Internet access, 39 (64%) reported using e-mail to communicate with other state agencies, and 33 (54%) reported having a home page on the Internet.

According to the B&CB, there are over 11,000 e-mail users in state government, and agencies are sending over 24,000 messages a day. According to the B&CB, state agencies reported using at least ten different e-mail software programs. Table 2.4 shows the number of programs in use in state government and the number of users for each program.

Table 2.4: E-Mail Programs in Use in South Carolina and Number of Users

E-Mail Program	Number of Users
GroupWise	8,965
CC: Mail	1,749
Microsoft Mail	177
Office Logic	153
Futurus Team	127
UCLA Mail	55
QuickMail	45
Eudora Mail	3
Microsoft Explorer	2
Vax Mail	1
Total	11,277

Source: Budget and Control Board.

In addition, individual agencies are using several different e-mail programs internally. For example, the B&CB reported using six different programs. The Employment Security Commission reported using two different programs.

Officials have recognized the need for e-mail standards. As stated previously, the B&CB has developed a draft policy. This policy would require that all e-mail software be compatible with Simple Mail Transport Protocol (SMTP) or Novell GroupWise. In addition, the policy discusses the need for standardization of addresses. However, state agencies are not required to adhere to these standards. According to an OIR official, eight state agencies are currently using a standard other than SMTP.

Choosing a standard e-mail program could make training easier and lower administrative costs. According to a B&CB official, the B&CB spends approximately \$57,000 on e-mail services to state agencies. This includes costs associated with translating and transporting messages from one program to a different program. This cost could be reduced by standardizing on one program. In addition, problems created by using differing programs could be reduced. According to a B&CB official, technical problems occur almost daily as a result of the state's use of different e-mail or word processing programs. Also, each program has a separate directory of addresses which cannot be combined with the address directory of any other program. If the state were to standardize on one program, there would be a common directory.

There could also be additional savings in the areas of postage and long distance calls. A Kentucky report estimates that one state agency was spending \$1 million per year mailing documents between state offices. According to a B&CB official, greater use of e-mail could result in less long distance telephone use. Further, establishing an e-mail standard could allow greater citizen access to state agencies.

Personal Computer Software

The state has not adopted standards for software programs used on personal computers. In response to our survey, 61 state agencies reported having more than 26,000 PCs. We requested information from state agencies on the word processing, spreadsheet, and database programs used in their agencies. We found 24 agencies using two or more word processing programs, 26 agencies using two or more spreadsheet programs, and 23 agencies using two or more database programs. Table 2.5 shows the number of word processing, spreadsheet, and database programs used in three state agencies.

Table 2.5: Number of Word Processing, Spreadsheet, and Database Programs Used by DHEC, B&CB, and Museum Commission

	DHEC	B&CB	Museum Commission
Word Processing	4	3	2
Spreadsheet	3	2	2
Database	8	4	4

Source: LAC IT survey of state agencies.

As Table 2.5 shows, the use of multiple programs within an agency was not limited solely to large agencies. The Museum Commission, with 64 FTEs, reported using two word processing, two spreadsheet, and four different database programs. Table 2.6 shows the different word processing programs used and the number of users for three state agencies.

Table 2.6: Word Processing Programs and Number of Users at DHEC, B&CB, and Museum Commission

Word Processing Program	DHEC Users	B&CB Users	Museum Commission Users
WordPerfect	2,450	380	20
Word	534	650	18
WordStar	0	3	0
Professional Write	35	0	0
DisplayWrite	10	0	0
Total	3,029	1,033	38

Source: LAC IT survey of state agencies.

While many agencies reported using different programs, other agencies have standardized. For example, the departments of health and human services and probation, pardon, and parole reported using one word processing, one spreadsheet, and one database program for all their users.

Using a variety of different word processing, spreadsheet, and database programs can result in increased administrative costs. Significant time and effort can be spent converting a file created in one program into another. Adoption of standards for PC software could make the sharing of files between agencies easier, particularly when documents are e-mailed.

Advantages and Disadvantages of Standardization

Implementation of IT standards can have a number of benefits. Standardization can make it easier for agencies to communicate and share information with one another and with the state's citizens. The General Accounting Office (GAO) has cited the need for the federal government to develop government-wide system standards and model systems so that common operational and business functions can be addressed more efficiently and at lower cost.

Development of IT standards can result in significant cost savings for the state. A state official in Missouri reported that when the state adopted a standard database software for its mainframe systems, the state saved almost \$7 million. An official in Tennessee stated that Tennessee combined two computer mainframe operations into one and saved \$1 million in operating costs. This was due, in part, to the fact that the two mainframes were running the same software applications.

Other advantages cited by states contacted include:

- Additional savings through economies of scale.
- More efficient use of staff.
- Improved employee training and lower training cost.
- Increased employee mobility.
- Greater ease in implementing new IT projects.

Disadvantages cited include:

- Difficulty in obtaining a consensus on a standard.
- Higher initial costs in raising agencies to standard.
- Difficulty in maintaining up-to-date standards.
- Reduced flexibility.
- Difficulty in monitoring and enforcing standards.

South Carolina officials also stated that the need for standards is less today than it has been in the past because the “marketplace” will demand that various hardware and software systems be compatible.

Other States

We found evidence of a national trend for states to set IT standards. We conducted a telephone survey of six southeastern states and found differing levels of standardization. Tennessee has developed standards in a number of areas, including word processing, spreadsheet, and e-mail. Virginia has developed a limited number of standards including one for telecommunications cabling. Table 2.7 shows examples of IT standards in four states.

Table 2.7: Examples of IT Standards in Selected States

Area	IT Standard	State
Communications Protocol	TCP/IP	KY, NC, OR, & WA
Desktop Publishing	PageMaker	KY & TN
Word Processing	MSWord/ WordPerfect	KY & TN

Source: Lists of standards for Tennessee, Kentucky, Oregon, Washington, and North Carolina.

Alabama, Georgia, and North Carolina are all currently involved in the development of IT standards. In addition, New York has developed recommended standards in various IT categories which agencies are encouraged, but not required, to adhere to.

In most states, the standards are developed by a central information resource agency. These standards are generally developed with input from the affected state agencies. Tennessee, for example, is currently developing a document imaging standard using a committee composed, in part, of officials from three different state agencies. In addition, some states have an exemption process which allows an agency to deviate from the state standard provided it can adequately document the need to do so. Most states also report having a system for the regular review of standards to ensure they remain up to date.

Recommendations

11. If the General Assembly creates the position of chief information officer for the state, the CIO should be responsible for reviewing the state's need for information technology standards. In areas where standards are warranted, the CIO should adopt standards and communicate them to all state agencies.
12. In adopting standards, the CIO should provide for agency input in setting standards, a regular review of standards, and an exemption process.
13. If there is no CIO, the Budget and Control Board should carry out these responsibilities.

Policies for Information Technology Management

Many agencies do not have written policies for the management of information technology. Written policies aid in protecting the state's resources and promoting their effective use.

We asked the 61 executive agencies we surveyed to submit copies of their written policies for information technology. Our results are shown in Table 2.8.

Table 2.8: Agencies' Written IT Policies

Policy	Number and Percent of Agencies Reporting a Policy
Purchase of IT items	29 (48%)
System Security	29 (48%)
Back-up and Off-site Storage	24 (39%)
Licensing Software	21 (34%)
Internet Use	18 (30%)
Disaster Planning	16 (26%)
Local Area Network Administration	16 (26%)
IT Training	11 (18%)

Source: LAC IT survey.

Policies to Safeguard Resources

We identified system security, back-up and off-site storage, and disaster planning as key areas where policies are needed to ensure the protection of the state's information resources. Security policies ensure proper access to information and protection from unauthorized use. Timely and regular back-up of an agency's computerized records allows for recovery in the event of system failure. Off-site storage of an agency's computerized information is necessary in the event of physical damage to the agency, such as that caused by hurricane, fire, or flood. Providing off-site storage is a part of overall disaster planning. An agency's disaster plan provides for the continued operation of the agency when its physical facilities are threatened or destroyed.

In January 1997 the Budget and Control Board released a report that identified 12 state data centers (entities with mainframe computers). Only 4 of the 12 data centers reported on our questionnaire that they have a current disaster plan. The B&CB submitted a consolidated questionnaire for its offices; several of them, including the office of research and statistics and the office of information resources (which have authority for information technology management), and the office of insurance services did not submit current disaster policies or plans.

Every agency has information that it needs in order to continue providing services. As agencies put more of their critical information on PCs or local area network servers, they should also plan for continued operation in the event of a disaster.

Local Area Network Policies

Agencies are moving away from mainframe computers toward a PC environment where employees use information technology primarily through local area networks (LANs). While the operations of mainframe data centers are usually managed by information technology professionals, local area networks may be administered by employees who do not have background or training in information technology. Written LAN policies help to ensure that local area networks are managed consistently and have appropriate controls.

Fifty-five of the 61 agencies we surveyed reported having one or more local area networks (for a total of 550), yet only 16 reported having written policies for network management. Written policies improve communication, provide a guide for systems maintenance, modification and recovery, can be used as a tool for training, and reduce the impact of personnel turnover.

DHEC reported having 154 local area networks in its offices across the state. In a 1995 assessment of its use of information technology, the agency recognized the following problems:

There are no standards regarding LAN installation, configuration or management. Directory structures, backup software and procedures, and various other aspects of LAN management are being done based on the view of the person responsible for the server. Because servers are often set up differently and are generally not documented, trouble shooting, repair and other administrative functions cannot easily be performed by anyone other than the one individual who set it up. This makes it difficult to work on a server if that person is unavailable.

In June 1997, DHEC reported that a project is currently underway to standardize "some aspects of LAN server administration." It is likely that there are problems with LAN management in other agencies in state government.

Conclusion

Office of information resources staff stated they think that the state has not done adequate disaster planning because of lack of resources and the perceived low risk of disaster. They think that even agencies that have written back-up policies may not follow them. They cited an example where an agency lost six months of data because it had not followed its back-up policy. The state may suffer costly losses through disaster or inefficient system operation if agencies do not develop and implement appropriate policies.

Recommendation

14. State agencies should review their written policies for information technology management. They should develop and implement policies necessary to protect the state's resources and ensure appropriate management controls.

Chapter 2
Information Technology Management Issues

System Integration, Training, and Procurement Issues

Data Center Consolidation

The Budget and Control Board (B&CB) is planning to consolidate 11 of the state's mainframe data centers into one new center to be built and operated by the state. Officials stated that this consolidation will bring many benefits to the state.

Background

The state has considered data center consolidation for a number of years. In response to an FY 89-90 appropriation act proviso, the state contracted with Ernst and Young to determine the feasibility and cost savings associated with combining some of the state's data centers. This study, published in 1990 at a cost of approximately \$90,000, recommended consolidating 12 agency data centers into three centers. According to B&CB officials, because of government restructuring, no action was taken in response to this study.

Proviso 17A.5 of the FY 96-97 appropriation act required the B&CB to develop a long-term strategic plan for consolidating the management of computing services and centralizing all state data centers, excluding those in institutions of higher education. The B&CB contracted with Hitachi Data Systems to assist in completing a new consolidation study that was published in January 1997.

This study, for which Hitachi was paid \$348,000, reviewed 12 data centers and recommended consolidating 11 of them into 1 center. The study recommended allowing the Employment Security Commission's (ESC) center to continue operating independently. According to officials, they did not recommend including ESC in the consolidation because of that agency's federal funding. The new center would continue to support the various mainframe computing environments now used by the affected agencies.

Benefits of Consolidation

The study projected savings, beginning in the third year of consolidation, that would total \$30 million in ten years. According to officials, savings would be achieved primarily from personnel reductions and consolidation of software licenses.

Officials cited other advantages of the proposed consolidation. They stated that the new center will have standards (see p. 28) and a sound disaster recovery plan (see p. 35). Eventually, the consolidation will result in network consolidation and allow agencies to more easily share data.

As of April 1997, B&CB officials were planning to consolidate the data centers, pending passage of a proviso in the FY 97-98 appropriation bill. They were arranging for a site and procuring a design plan. The study called for a contract with a system integration firm, budgeted at \$3.5 million, to accomplish the consolidation.

Administrative Information Systems

South Carolina has a decentralized structure for managing administrative functions, such as personnel and accounting. Agencies have their own information systems for financial and personnel management because the central state systems do not include all the information and functions that agencies need. It is inefficient, however, for each agency to obtain its own systems for tasks that are common to all agencies. Some states have implemented integrated information systems for administrative functions.

Accounting Systems

The 61 agencies we surveyed reported using a variety of accounting systems (see Table 3.1). Besides the agencies that have procured systems from vendors, 16 agencies reported they have designed their accounting systems in-house. These systems operate on a range of hardware from PCs to mainframe computers.

Table 3.1: Accounting Systems Purchased by Agencies

Accounting System	Source/Vendor	Number of Agencies Reporting
BARS	University of SC	16
SABAR	Palmetto Software	11
SAAS	University of SC	5
GAFRS	B&CB (OIR)	2
Peachtree	Peachtree	1
Accounting Manager	Computer Systems Innovations	1
Total Accounting for Government	Government Systems	1
AOD	Application Oriented Design	1

Source: LAC IT survey.

The statewide accounting and reporting system (STARS) managed by the comptroller general's office is a central system for most agencies; institutions of higher education do not use STARS, but have their own systems. According to comptroller general officials, the basic purpose of STARS is to tie an agency's expenditures back to appropriations and the budget. However, because most agencies need more detailed financial information than STARS offers, they must obtain their own financial systems to meet those additional needs.

Some agencies have designed their own systems, while others have purchased systems from vendors. The Department of Health and Environmental Control is in the process of implementing a new administrative system (which is to include personnel management) that will cost more than \$6 million when it is complete (see p. 21). DHEC's license for the new system does not allow it to be shared with other agencies.

Some agencies have had problems obtaining a system that meets their needs. For example, after a lengthy search, the Arts Commission purchased a system for \$19,764 that, even after modifications, did not meet the agency's requirements. The commission has now purchased a different system for \$19,000 that does meet agency needs. A commission official stated that a standard system for agencies to use would have been a welcome alternative.

Personnel Systems

Agencies also reported using a variety of personnel systems. Table 3.2 lists the personnel systems procured from vendors. In addition, 19 agencies reported they designed their personnel systems in-house. As with accounting systems, the personnel systems use a variety of hardware, from PCs to mainframe computers. Some personnel functions, such as insurance and payroll, are done manually in some agencies.

Table 3.2: Personnel Systems Purchased by Agencies

Personnel System	Supplier/Vendor	Number of Agencies Reporting
BARS	University of SC	8
SABAR	Palmetto Software	7
SAAS	University of SC	3
CAPS	B&CB (OIR)	2
ABRA	Best Programs	1
Peachtree	Peachtree	1

Source: LAC IT survey.

The state's central personnel system, managed by the B&CB's office of human resources (OHR), administers personnel classification and compensation for the state. However, the OHR system does not include other aspects of personnel management, such as payroll, benefits administration, and leave reporting. Agencies need additional systems for these tasks.

OHR is implementing a new information system that will revise the present system. The new system is being designed in-house by the office of information resources (OIR) and is scheduled for implementation in July 1997. Because OIR has not tracked the costs of systems it has developed for central state government, the costs of the new system are unknown.

Officials also do not know how the new system will be used by agencies. OHR officials stated that the new system will add additional features and provide additional space for agencies to maintain personnel information. They hope that some agencies will be able to use the new system for all personnel needs, but they do not know whether they will choose to do this. However, officials from agencies with information systems that integrate payroll and personnel information told us they could not replace their systems with the new OHR system because it does not have a connection to the STARS system that processes the state's payroll.

Moving Toward Integrated Systems

The report of the state accounting system improvement team issued in April 1995 identified the multitude of accounting systems as a primary problem for the state. The report discussed the possibility of a single, common, statewide accounting system and recommended that the state should observe the experience of other states and monitor changes in technology that would affect the decision.

Some states have implemented common accounting and personnel information systems. We spoke with officials in Maryland, Michigan, and Colorado, three of the states that have implemented common systems. Officials cited benefits of the systems:

- Cost savings.
- Improved access to information.
- Improved agency cooperation and coordination.
- Improved communication through use of common vocabulary.
- Elimination of keying and other manual processes.
- Faster processing of transactions.
- Improved controls.

Officials in the other states cautioned that implementation of common administrative systems is complicated. Training needs are extensive, and it takes time for agencies to accept the new system.

B&CB officials stated that once data center consolidation has been accomplished, South Carolina will move toward integrated administrative systems. Increased central oversight and monitoring of IT investments could help the state maximize its return on investment in administrative systems (see p. 24).

Recommendations

15. If the General Assembly establishes a chief information officer position, the CIO should study the experience of other states and consider implementation of common accounting and personnel systems in South Carolina. If there is no CIO, the Budget and Control Board should carry out this recommendation.

16. If the General Assembly establishes a chief information officer position, the CIO should implement a process to ensure that agencies share their systems and experience whenever possible and do not invest in restrictive or duplicative information systems for accounting and personnel management. If there is no CIO, the Budget and Control Board should implement this process through its monitoring of IT investments.

IT Training and Staff

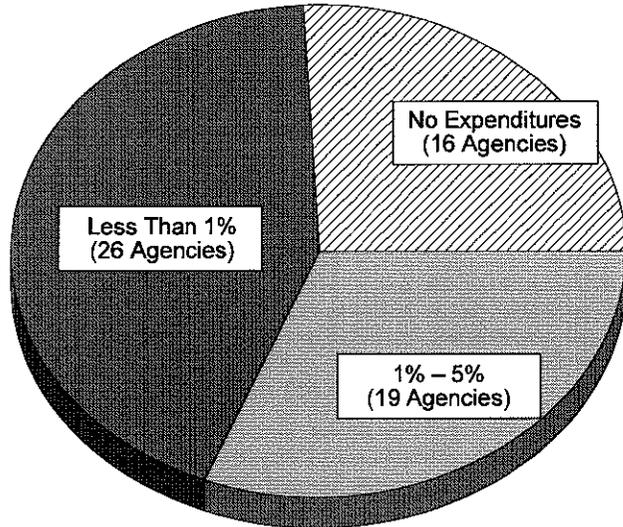
Evidence indicates that agencies are not doing enough to ensure that staff have appropriate IT training. Also, the state does not coordinate training or offer centralized information about training opportunities. By coordinating training efforts, the state could make more efficient use of its training hours and funds.

Agency Expenditures for Training

We asked the 61 executive branch agencies how much they spent for IT training for FY 95-96. Agencies reported spending a total of \$1,078,314 for IT training. We found that agencies did not always include all expenditures for training, such as salaries of in-house trainers. Sixteen (26%) of the 61 agencies surveyed reported no expenditures for training. When comparing the expenditures for IT training with the total expenditures for IT, we found that no agency allocated more than 5% of its annual IT expenditures to training. Graph 3.1 shows the number of agencies that reported no expenditures for training, the number with less than 1%, and the number between 1% and 5%.

According to a Syracuse University analysis of the use of information technology in county governments nationwide, inadequate resources are devoted to training. The county governments spent 13 percent of their IT budgets on training. On average, the agencies we surveyed reported spending one-half of one percent of total IT expenditures on IT training.

Graph 3.1: Agencies' IT Training Expenditures as a Percent of IT Expenditures — FY 95-96



Need for Training

An information technology consulting firm, the Gartner Group, estimated that 80% of PC users cannot integrate PCs into their jobs effectively. The cost associated with undertraining can be three times as much as that of training. As the state's investment in technology has increased (see p. 1), the need for training on new technology has also increased. If the state seeks a maximum return on its IT investments, the state must invest in training employees in the new technology. Some agencies try to meet this need through in-house training while others use the office of information resources or private vendors. The state does not coordinate training or provide information about sources of training.

One barrier to training offered by the state is the lack of standardization in the technology used by agencies (see p. 28). If there were standard programs, the state could offer training more efficiently. However, even without standardization, the state could provide information about training opportunities offered by both the state and the private sector. The state could coordinate training among agencies that use the same systems, such as database programs. The state could also contract with private vendors to provide training.

The Training & Learning Center

The state does provide one source of IT training. OIR has operated the Training & Learning Center (TLC) since September 1993. The TLC offers personal computer training courses to state and local government employees. Through March 1997, the TLC has trained users from 90 different state and local entities. Table 3.3 shows the number of users trained and the amount of revenue generated by the TLC.

Table 3.3: Users Trained and Revenue Generated from the TLC

	FY 94-95	FY 95-96	07/96-03/97
Number of Users Trained	1,062	1,184	1,501
Revenue Generated	\$64,017	\$65,175	\$77,986

Source: Budget and Control Board.

OIR determines the classes offered by the TLC based on the systems OIR uses and customer demand. According to a TLC official, they would like to expand their facility to offer more classes. TLC facilities may also be used by agencies who are conducting training not offered by the TLC.

Recommendations

17. If the General Assembly creates the position of chief information officer for the state, the CIO should be responsible for reviewing the state's role in IT training. If there is no CIO, the Budget and Control Board should assume this responsibility.
18. Agencies should review their IT training programs and ensure that users have the training needed for productive use of their information systems.

IT Staff

The problem of hiring and retaining qualified IT staff has been recognized in this state and other states. The IT advisory committee and other states have identified the existence of inappropriate job classifications and the inability to reward good performance as factors contributing to this problem. According to OHR, the turnover rate for data processing positions has been

consistently in the 8% to 9% range for the past seven years. In contrast, the turnover rate for all state employees has been from 11% to 14% for the same time period. Pursuant to proviso 17A.4 of the FY 96-97 appropriation act, an interagency committee appointed by the B&CB is studying the difficulty in recruiting and retaining IT personnel. According to officials, the report will be released in June 1997.

Privatization of Information Technology Functions

Privatization involves the transferring of public operations to the private sector. South Carolina's IT privatization efforts have been limited. State officials should consider privatization when evaluating how best to manage the state's IT functions.

In a 1996 National Association of State Information Resource Executives (NASIRE) publication summarizing states' privatization activities, South Carolina did not report extensive privatization. In addition, the state reported that it did not have any formal guidelines for evaluating IT functions to determine if they could be privatized. In our survey of South Carolina state agencies, 28 (46%) of the 61 agencies reported having contracted with another entity for some IT functions. Among the functions privatized were software development and maintenance. In addition, agencies have privatized other functions. The Medical University of South Carolina (MUSC) has privatized the operation of its IT function while maintaining ownership of the hardware and facilities. The State Law Enforcement Division (SLED) is currently leasing one of its two mainframe computers.

Governments are increasingly privatizing IT services. A NASIRE survey found that 29 states had privatized one or more IT functions within the last five years. Connecticut is soliciting proposals that would result in the privatization of all its IT functions. The federal government has passed legislation (P.L. 104-106) that requires all federal agencies prior to investing in a new information system to examine whether or not the function could be performed by the private sector.

A wide variety of IT functions have been privatized by various states. Examples include data entry, software development, maintenance, and training. According to a report by the G2 consulting group, the most common function to be privatized is the management of mainframe data centers. The large number of private vendors and the ease of entry into the market makes data center privatization one of the most cost competitive markets. The G2

report also states that privatization of data centers can result in cost savings for states, particularly in the areas of facility and hardware expenses, software licenses and personnel.

The G2 report estimates that data center privatization will grow from \$420 million in 1996 to \$961 million in 2001, with much of this growth expected at the state level. South Carolina plans to consolidate 11 mainframe data centers into one facility which will continue to be run by the state (see p. 39). According to South Carolina officials, they did not consider privatization of the data centers during the recent data center consolidation study.

Evaluating the Privatization Option

A 1996 NASIRE report states that privatization can result in improved service and lower costs. Other benefits cited include:

- An influx of funds to the state generated by the sale of IT assets.
- Greater flexibility in regards to personnel, both in compensation and in hiring and firing.
- Ability to more quickly adopt emerging technologies.

Among the disadvantages that have been cited are:

- The loss of government control over its information.
- The difficulty in writing and managing an IT contract.

While noting the potential benefits of privatization, the 1996 NASIRE report further states that in order for privatization to be successful, certain conditions must be met. Among these are:

- A thorough evaluation process.
- Modification of certain legal constraints (i.e., confidentiality).
- Development and maintenance of permanent privatization expertise within government.
- Active participation of agencies whose functions are being privatized.

In evaluating whether or not to privatize an IT function, officials should consider certain factors. Among these is whether or not the function to be privatized is a “mission critical” function. It has been recommended that agencies not privatize functions that are considered critical to the agency’s basic mission. In addition, states should perform a comprehensive cost-benefit analysis of the function to be privatized. Also, states need to approach privatization as a partnership between the private and public sectors.

According to G2 Research, states’ chief information officers or equivalent, with their comprehensive view of the state’s IT operations, can evaluate privatization on a statewide scale and thereby increase the potential for cost savings and standardization.

Insourcing

Many states use insourcing as an alternative to privatization. Insourcing occurs when one state agency provides IT services to other state agencies. In its 1996 report, NASIRE found 23 states were using insourcing as an alternative to privatization. Typical IT functions insourced included mainframe data centers, programming, and training. South Carolina should evaluate insourcing using a process similar to that used to evaluate privatization (see above).

In South Carolina the B&CB office of information resources acts as an insourcer by providing mainframe computer services to other state agencies. OIR also provides telecommunications, networking, and training to other state agencies. OIR is wholly supported by the revenues it generates by billing other state agencies for its services.

Recommendations

19. If the General Assembly creates the position of chief information officer, the CIO should develop a formal method for evaluating IT functions to determine if they should be privatized or insourced.
20. The CIO should examine statewide IT functions to determine areas in which it may be beneficial to privatize or insource.
21. Using the evaluation method developed by the CIO, state agencies should examine their agencies’ IT functions to determine if any should be privatized or insourced to another state agency.

22. If the CIO position is not established, the Budget and Control Board should develop a method to evaluate statewide IT functions for privatization or insourcing.

OIR's Rate Structure

We examined rates charged by OIR and found that the rates have not been consistently based on the cost of services. According to B&CB officials, the B&CB intends to revise the rates, particularly as the result of the planned data center consolidation.

In FY 95-96, the four largest users of OIR's mainframe paid a flat rate that did not cover the full cost of OIR's services. These agencies received reductions of between 33% and 81% from the amounts they would have been charged based on actual usage. Table 3.4 shows the amount the agencies would have been billed under a usage rate, the flat rate amount, and the percentage the agency's bill was reduced.

Table 3.4: Rates Charged to Largest Users of OIR's Mainframe — FY 95-96

Agency	Amount Billable Under Usage System	Flat Rate Charged	Percent Bill Reduced
Department of Revenue	\$10,470,443	\$2,136,006	80%
Department of Corrections	\$6,918,887	\$1,345,263	81%
Budget and Control Board ¹	\$1,905,806	\$1,269,056	33%
Department of Education	\$1,098,089	\$406,130	63%
Total	\$20,393,225	\$5,156,455	75%

¹ This figure represents only those six offices of the B&CB that pay on a flat rate. The remaining pay based on usage.

Source: Budget and Control Board.

The remaining 26 state agencies paid based on their actual usage. As a result, the usage-based agencies subsidized the flat rate agencies. According to B&CB officials, the flat rate agencies received a reduction in charges because their high volume allows OIR to achieve better economies of scale.

Each year OIR officials meet with officials from the departments of corrections and revenue and negotiate new rates. As a result, the discount in these agencies' rates varies. For example, between FY 93-94 and FY 95-96 the Department of Corrections' usage increased approximately 59% while its total charges decreased 6%. However, during the same period the Department of Revenue's usage increased only 4% while its total charges rose 9%.

The B&CB operates two mainframes, one of which is the financial data systems (FDS) mainframe. FDS also has not charged consistent rates to all its users. FDS is appropriated funds to provide services to agencies, such as the Comptroller General and State Treasurer. Other agencies, such as the Second Injury Fund and the State Retirement System are billed for FDS' services. A 1996 review by an outside consultant found that FDS' rate structure could result in FDS using its appropriated funds to subsidize other agencies.

OIR's current rate structure results in some agencies subsidizing others. Separate studies done by the Department of Corrections and Department of Revenue found that, if the subsidies were eliminated and these agencies paid on usage rather than at a flat rate, it would be less expensive for them to have their own data centers than to use OIR's.

Rates that are consistently based on usage could help agencies in planning. Also usage based rates are more defensible if challenged. For example, a consultant's report stated that the current rate structure in which some agencies are subsidized by others could result in the state having to reimburse the federal government for charges paid using federal funds. Very few of OIR's current users pay with federal funds. However, once the data center consolidation is complete, the impact of an inconsistent and inequitable rate structure will be more significant.

Recommendation

23. The Budget and Control Board should revise the rates it charges agencies to more accurately reflect actual usage and costs.

Maintenance Contracts for PCs

The agencies we surveyed reported spending more than \$10 million for annual maintenance contracts for their IT equipment and software. Agencies could realize savings from reevaluating the need for some of these contracts. Specifically, agencies should reconsider the costs and benefits of having onsite maintenance contracts for their PC workstations. Some agencies report substantial savings from providing maintenance for this equipment in other ways.

When agencies purchase PCs, they usually have warranties that cover maintenance for one to three years. Vendors offer contracts for various types of ongoing maintenance. They offer onsite maintenance (where a technician comes to the agency to make the repair) with varying response time parameters, such as within 4, 8, or 24 hours. They also offer, for a lesser price, "depot" maintenance, where the agency takes the item needing repair to the vendor's facility to be repaired. Vendors also furnish maintenance service without an ongoing contract on a time and materials basis. There is no state term contract for PC maintenance. Agencies may choose to carry maintenance with the vendor from whom they purchase their equipment or they may competitively procure their maintenance.

We noted that the agencies in our survey provide maintenance for PCs in a variety of ways. Some agencies cover virtually all their equipment with onsite maintenance contracts. See Table 3.5 for the annual maintenance contract cost for PC maintenance reported by some agencies. These contracts cover personal computers and, in some cases, other items such as terminals and other peripherals. The Department of Probation, Parole and Pardon adds equipment to its maintenance contract as it is purchased, while it is still under warranty. According to the director of IT services, the warranty just provides for depot maintenance, and they carry an onsite maintenance contract.

**Table 3.5: Examples of Personal
Computer Maintenance
Contracts FY 96-97**

Agency	Annual Cost
Department of Health and Environmental Control	\$366,673
Department of Corrections	\$180,494
Department of Probation, Parole and Pardon	\$92,366
Department of Social Services	\$90,398
Department of Disabilities and Special Needs	\$81,242

Source: LAC IT survey and agencies listed.

Because of variations in the equipment covered and the terms of the contracts, we could not easily determine or compare prices. We found that some agencies were paying from \$100 to \$200 per year per PC; one pays 12% of the purchase price of its equipment.

Other agencies, including the Budget and Control Board and the Department of Health and Human Services, stated they do not carry maintenance contracts on their PCs because it is not a good value. Some agencies that formerly had PC maintenance contracts said they had canceled them or cut back and continued the contracts only for mission-critical equipment.

A Department of Transportation (DOT) official stated that his agency had investigated the prices of onsite maintenance contracts for the agency's more than 2,000 PCs. It would have cost about \$100 per year for each PC (about \$200,000). Instead of obtaining contracts, they decided to budget \$50,000 for PC repairs and evaluate their experience. According to the DOT official, they have never needed the allotted amount. For FY 95-96, DOT spent \$27,000 for PC repairs. A similar experience was reported by a smaller agency, Patriot's Point Development Authority. The agency canceled its PC maintenance contracts, budgeted a portion of the savings for PC repairs, and has not needed the budgeted amount. Another official indicated that the profit margin on PC maintenance contracts is very high. He estimated that for every \$150,000 in maintenance contracts, just \$15,000 or \$20,000 is needed for repairs.

Some officials pointed out that PCs are composed of interchangeable parts and many repairs do not require high levels of expertise. Also, when an agency has several workstations, if one is temporarily out of order, an employee can easily shift to another. Further, with rapid changes in technology, a PC's life cycle may not be significantly longer than a warranty period. Reevaluating the costs and benefits of maintenance contracts, especially for PCs, could yield cost savings for state agencies.

Recommendation

24. Agencies should reevaluate their systems for providing maintenance for PCs and other equipment. They should use cost-benefit analysis to determine whether necessary equipment is being maintained in the most cost-effective way.

IT Procurement

It is widely recognized that traditional governmental procurement procedures do not work well for IT purchases. According to a 1997 report issued by the National Association of State Purchasing Officials (NASPO) and the National Association of State Information Resource Executives (NASIRE):

. . . many of the procurement processes and policies used by state governments today—competitive bids, pre-specification of requirements, manual systems for bids and proposals . . . work poorly, or not at all, with the fast-paced, complex field of information technology.

The B&CB's IT procurement office purchases IT items above agencies' procurement limits. We reviewed purchases that IT procurement made through the invitation for bid (IFB) and request for proposal (RFP) processes for FY 95-96. Examples of the 96 IT purchases made using IFBs included software programs, imaging and scanning equipment, and maintenance. Among the 21 purchases made using RFPs were a mainframe computer and programming services. Table 3.6 shows the average length of time and the average purchase amount for the two methods. This data does not include time spent by the agencies in designing specifications and initiating the request.

Table 3.6: Average Time and Purchase Amount for IT Procurement's Purchases FY 95-96

Purchase Type	Average	
	Number of Days ¹	Amount
Invitation for Bid	41	\$952,992
Request for Proposal	98	\$2,252,194

1 Number of days from receipt of request from agency to procurement award.

As the table shows, the higher the cost, the longer it took to process the purchase. Given the laws and regulations that govern the procurement process, we did not find the length of time to complete the procurements unreasonable. However, the speed of change in IT is so great that officials should consider changes in the process that could make IT purchasing more timely.

The IT procurement office is implementing or planning some changes that could make the purchasing of IT goods and services more efficient. In addition, proposed amendments to the state's consolidated procurement code, if enacted, would also increase flexibility in making IT purchases.

Open-Ended Procurement

According to IT procurement officials, agencies can now hire temporary IT employees, such as programmers, through an open-ended procurement. With this process, the state issues a request for proposal and creates a list of companies that responded to the solicitation and met the RFP requirements. When an agency is ready to contract for temporary staff, the process takes only 2 to 3 weeks, rather than the 8 to 12 weeks previously required.

Online Procurement System

The state is also developing a new online procurement system which officials expect to have implemented by July 1997. Objectives in obtaining this system include issuing solicitations and accepting bids through the Internet. According to a B&CB official, if all procurement documents were transmitted electronically, rather than by paper, 8 to 12 days could be cut from the existing procurement process. Mailing costs could also be reduced.

In addition, the new procurement software will allow IT procurement to better track purchases and identify different agencies that have purchased the same hardware or software. This might result in larger volume discounts. With the existing procurement system, it is difficult to determine if the state has included all the users of a product in determining volume discounts. Also, according to an IT procurement official, the state is aiming to accept online requisitions for supplies from the state's supply warehouse by the end of the year.

The South Carolina Business Gateway, a public/private partnership staffed by the B&CB, has developed software to allow agencies to advertise their procurement opportunities online to small businesses. A B&CB official stated this will improve efficiency and likely result in more cost-effective procurement for agencies.

Changes to the Procurement Code

A procurement reform committee, chaired by the director of the B&CB's office of general services, proposed revisions to the state's procurement code. A bill that was introduced incorporating these amendments was passed by the House and, as of May 8, was in the Senate Finance Committee. The revisions would increase flexibility in the purchase of information technology. They include best value bids and expanded use of requests for qualifications.

The previously cited national procurement report, based on the experience of a number of states, recommended best value procurements. Currently, purchase price is the only consideration in awarding a bid. However, best value bids provide a mechanism for the state to consider other factors, such as life cycle costs, availability of maintenance, and past performance of the vendor. Without best value bids, if a South Carolina agency wants to consider factors other than price, it must use the slower and more expensive RFP process. IT procurement expects that best value bids, if available, would be used for most purchases.

Requests for qualifications (RFQs) allow the state to identify interested and qualified vendors prior to sending out the solicitation for a particular project. RFQs are used in the RFP process, but not in the bid process. According to an IT procurement official, if the use of RFQs were extended to the state's bid process, the state might save time and effort by evaluating bids from qualified vendors only.

IT procurement officials stated that these and other changes proposed to the procurement code will improve the efficiency and flexibility of the state's procurement process.

Recommendation

25. The General Assembly may wish to consider adopting changes to the procurement code to allow best value bidding, increased use of the request for qualifications process, and other changes that will improve the efficiency and flexibility of the procurement process.

Use of Emerging Technologies

The use of technology in government agencies is changing rapidly. This chapter reviews several leading edge information technologies. These range from “electronic commerce” applications such as procurement cards and electronic benefits transfer, to multi-media kiosks and geographic information systems (GIS). We discuss the use of these emerging technologies in South Carolina and in other state and federal governmental entities, and review their possible benefits and drawbacks.

Electronic Commerce

“Electronic commerce” is the use of computers and telecommunications to conduct business transactions. Electronic commerce makes it possible to replace paper forms and documents with electronic documents. The term includes governmental procurement cards, electronic data interchange (EDI), electronic funds transfer (EFT) and electronic benefits transfer (EBT). The state could achieve cost savings through increased use of electronic commerce.

Governmental Procurement Credit Cards

South Carolina state agencies make purchases using a very paper-intensive and slow process, as represented below.

- | HOW TO MAKE SMALL PURCHASES IN SC STATE GOVERNMENT |
|---|
| 1. Agency obtains price information from vendor. |
| 2. Agency completes purchase order/requisition form (in triplicate). |
| 3. Agency obtains internal signature approval(s). |
| 4. Agency places order by faxing or mailing copy of purchase order to vendor. |
| 5. Vendor delivers goods and sends invoice to agency. |
| 6. Agency completes disbursement voucher. |
| 7. Agency transmits disbursement voucher to comptroller general (CG) by electronic media. |
| 8. Agency sends copy of paper voucher and invoice to CG. |
| 9. CG assigns warrant number, if not done by agency. |
| 10. CG audits transaction paperwork. |
| 11. CG debits funds from agency's account. |
| 12. CG transmits data to state treasurer. |
| 13. State treasurer writes check. |
| 14. Agency signs for and picks up check from state treasurer. |
| 15. Agency attaches check to invoice and mails to vendor. |

State agencies could reduce costs and improve service if they used governmental procurement cards (credit cards), rather than purchase orders, for small purchases. With the use of electronic commerce, governmental purchasing is moving away from a highly centralized system towards a streamlined, electronic procurement process. However, with the exception of Clemson University, South Carolina has moved slowly in incorporating electronic commerce into its procurement process.

Procurement cards are credit cards issued to authorized state employees but billed directly to state agencies. They function like consumer credit cards. Regardless of the numbers of vendors or number of purchases made, the state would receive one bill per agency per month from the credit card company.

One of the major benefits of using governmental procurement cards is reduced paperwork, and therefore reduced costs, for the purchaser. Other benefits could include more accurate information about each procurement, quicker delivery of goods, and a potentially wider range of vendors to purchase from. Several studies found, however, that benefits were lower than anticipated if the organization using procurement cards did not also examine and redesign its work processes when adopting the cards. We discuss the experience of Clemson and other entities below. We did not verify the methodologies or cost savings reported by the agencies described in this section.

Clemson University

Clemson University has had a procurement card for staff and faculty since 1993, with a limit of \$1,500 per transaction. Use of the procurement card is still limited, although increasing. Clemson calculates its savings at \$5.00 per transaction. Actual savings between July 1994 and January 1997 were \$113,500. However, if 85% of eligible purchases had been made with the card, Clemson could have realized savings of \$429,000 in FY 94-95 alone. According to Clemson officials, fraud has not been a problem because of the penalties available against employees who abuse the card.

Federal Government

In August 1996, the General Accounting Office (GAO) issued a report that cited benefits of procurement card use in the federal government. The report reviewed the cost savings and increased efficiency from card use. A

December 1994 federal regulation made procurement cards the “preferred method of making micropurchases.” By 1995, procurement cards were used for over 4 million purchases worth more than \$1.6 billion.

The GAO reported that the procurement card often reduced costs by half compared to paper-based purchase orders. Eight of the 17 organizations cited by the GAO reduced their procurement costs by over 50%. Another seven reduced costs by at least one-third. Savings ranged from \$1.42 to more than \$142 per transaction, and averaged \$54. Since the average value of a purchase card transaction in 1995 was \$375, the savings of \$54 per transaction represent a high percentage of the total purchase dollar.

The GAO noted that agencies could achieve additional benefit from the cards by redesigning procurement processes, eliminating additional paperwork, and removing limitations on use of the card. The GAO also found that fraud and abuse in procurement did not increase with use of the procurement card.

State of Colorado

The Office of the State Auditor in Colorado recommended in 1989 and again in 1994 that the state adopt a procurement card for small purchases. The office estimated that for “. . . [f]iscal Year 1993 alone the cost to state government for making small purchases was at least \$3.4 million more than it should have been.” The auditor’s office reviewed data from other states, federal agencies, and the private sector. They found that “. . . savings range from a low of about 75 percent of the costs for manually preparing and processing purchase orders to a high of over 90 percent.” The highest estimated reduction was \$129 per purchase order.

Other Studies

The state of California has reported savings of \$25 per transaction with its procurement card. However, a study of Fortune 500 companies cautioned that the benefits of using procurement cards were less than expected because only 10% of the corporations using the card had redesigned (re-engineered) their processes. On the other hand, the same study concluded that corporate procurement cards “offer companies the greatest cost saving opportunity of any major business process re-engineering initiative and one of the fastest to implement.”

Status of SC Procurement Card Project

South Carolina has moved slowly in incorporating electronic commerce into its procurement process. In April 1995, a multi-agency task force recommended that the state seek proposals for a state procurement card to reduce the cost and paperwork required to purchase supplies and equipment. A request for proposal (RFP) for a state procurement card was drafted in October 1995 but then withdrawn. It was subsequently reissued as a one-year pilot project with two one-year extensions. The first year of the pilot includes only 12 agencies. The award of the new RFP was approved in December 1996. A team consisting of officials from the CG's office, the treasurer's office, and the materials management office of the B&CB is in charge of the project. As of July 1, 1997, cards had not yet been issued to the participating agencies.

Under the terms of the winning bid, the agencies will pay no annual fee and no per-transaction fee for using the procurement cards. In addition, the state can earn a percentage rebate if the volume of transactions is high enough. For the pilot project, only supplies can be purchased with the card. If the pilot is successful, the program might be expanded to include equipment. The dollar limit of the pilot project is \$1,500 per transaction.

Estimated Potential Cost Savings in SC

Table 4.1 shows the potential savings from using a procurement card to buy supplies and equipment costing less than \$1,500 per transaction (the limit of the pilot project), and less than \$2,500, the federal government micropurchase limit. The projected savings are based on the savings achieved by the Clemson University, the state of California, and the federal government procurement card projects discussed above.

As the table shows, the three projects show vastly different cost savings potential. The California and federal savings estimates may be more representative of potential savings from a statewide procurement card because they are averages from many different agencies. However, even using the lower Clemson estimate, the state could save over \$850,000 annually from using a procurement card for small purchases. Savings would be less if the card is used for only a small proportion of eligible transactions.

Table 4.1: Projected Savings From SC Procurement Card Based on FY 95-96 Data¹

Parameters of Procurement Card Use	Number of Transactions	Estimated Savings		
		\$5 Per Transaction (Clemson)	\$25 Per Transaction (California)	\$54 Per Transaction (Federal Government)
Supplies < \$1,500	170,024	\$850,120	\$4,250,600	\$9,181,296
Supplies < \$2,500	175,862	\$879,310	\$4,396,550	\$9,496,548
Supplies and Equipment < \$1,500	177,422	\$887,110	\$4,435,550	\$9,580,788
Supplies and Equipment < \$2500	184,678	\$923,390	\$4,616,950	\$9,972,612

¹ The Comptroller General's office provided information on the number of purchases of supplies and equipment made by all agencies whose invoices are processed through the central state accounting system.

Recommendations

26. The procurement card implementation team should establish performance measures for evaluating the procurement card pilot, complete the pilot, document savings achieved, and evaluate results.
27. During the pilot, the agencies should examine their work flow for purchasing to ensure that savings are maximized.
28. If the pilot project is successful, the Budget and Control Board should develop a timetable for rapid statewide implementation. If the General Assembly creates the position of chief information officer, the CIO should facilitate this effort.

Electronic Data Interchange (EDI)

Electronic data interchange (EDI) is a technology for conducting electronic commerce. With EDI, electronic versions of forms such as procurement documents, tax returns, or health care claims forms are sent from one computer to another, without the creation of a paper document or check. Another version of EDI is electronic funds transfer (EFT) where funds are transmitted by computer without writing and mailing checks. Electronic benefits transfer (EBT) is a type of electronic funds transfer. It can provide governmental benefits such as social security or food stamps to recipients electronically. Nationally accepted standards have been developed for the electronic exchange of many types of data.

South Carolina has been at the forefront of using electronic commerce for tax filing and for delivering food stamp benefits. But the state has lagged in electronic purchasing. For the state to realize benefits from inter-agency EDI functions, leadership and coordination are needed at the state level.

Benefits from Using EDI

Electronic commerce has reduced paperwork and improved the speed and accuracy of many processes in state and federal government. The leading governmental applications of electronic commerce include payments (EFT and EBT), electronic filings, information access, procurement, and licensing. A Minnesota pilot study demonstrated a \$20 per purchase order savings from EDI (without the use of a procurement card) coupled with work process redesign. The number of steps in processing a purchase order was reduced from 37 to 12 as a result of the Minnesota EDI project.

Virginia is an extensive user of EDI. Since a pilot project began in 1994, the state's use of EDI has grown beyond expectations. By February 1997, the program included 2,320 active electronic participants including state agencies, commercial vendors, and local governments. The state has spent a total of \$20 billion electronically. Approximately 60% of the state budget is now expended electronically. Virginia estimates a cost savings of 31% to 80% compared to paper checks.

Massachusetts has used EDI for some types of purchasing since 1994. Approximately 140 agencies use the system. EDI is used for blanket contracts for supplies and for computer hardware, software, and services. Compared to the previous paper-based system, the EDI system in Massachusetts is estimated to save at least \$14 per transaction.

The federal government is also actively promoting EDI. In 1993, all federal executive departments and agencies were told to implement electronic commerce for federal procurements. Federal payments made by check cost 42¢ each. In contrast, electronic payments cost only 2¢ each. An amendment to 31 U.S.C. §3332 requires everyone who does business with the federal government or receives benefits from it to accept payments electronically, rather than by paper check, by January 1999. The treasury is considering issuing debit cards for benefit recipients who do not have bank accounts.

South Carolina's Use of EDI

EDI for Purchasing

South Carolina has not yet taken advantage of EDI for purchasing. Purchasing is a transaction where EDI offers great benefits. It has a large volume of recurring transactions; it is a paper-intensive process; transactions need to be processed in a timely fashion; and many vendors in the private sector are able to transact business electronically.

As shown on page 57, South Carolina's purchasing and payment processing systems are primarily paper-based systems. The system does not provide the capability for agencies to process vendor invoices and payments through EDI or EFT. The paperwork involved in the present system is costly and the state has incurred late payment charges.

The use of a state procurement card, as recommended on page 61, will not eliminate all paperwork connected with purchasing. The procurement cards will not be used for large purchases. In addition, procurement cards, without electronic bill payment, will only improve part of the paper-intensive process described in the previous section. However, other EDI applications, such as online purchase orders (see p. 55) or consolidation of bills, could be used to help automate large procurement transactions.

In April 1995, a multi-agency accounting system improvement team recommended establishment of a pilot project to consolidate the state's 810 Bell South telephone accounts and pay the bills electronically. A similar recommendation in Kentucky is expected to net that state savings of \$1,100,000 annually in phone bill processing costs. As of April 1997, South Carolina had not implemented the phone bill consolidation recommendation.

Electronic Benefits Transfer

South Carolina was one of the earliest states to implement an electronic system for delivering food stamp benefits. In December 1995, the Department of Social Services (DSS) implemented a debit card for food stamp recipients. This card replaced paper food stamp coupons that were mailed to recipients every month. Based on DSS calculations of savings per recipient, the debit card saves approximately \$3,000,000 per year. The debit card has also reduced losses from fraud and theft. DSS is considering expanding the debit card to cover aid to families with dependent children (AFDC) benefits. Savings from this use would not be as high because AFDC benefits are not as costly to deliver. It may also be possible to use an electronic card for

DHEC's women, infants, and children (WIC) benefits. Some states also use electronic cards to determine eligibility for Medicaid benefits. A multi-agency committee of health and human services agencies has recommended that South Carolina consider a common identifying number and electronic card for all recipients of government services.

EDI for Tax Processing

South Carolina was the first state to pilot an online tax filing system. The Department of Revenue now has four ways that income tax returns can be filed electronically. Two of them are used only by tax preparers. The other two electronic methods are used by taxpayers themselves. They include filing by telephone and from home PCs. The Department of Revenue estimates that it costs 55¢ to process a paper return, but only 3¢ to 5¢ to process an electronic return. In addition, electronic filing increases customer service through reducing processing time. Error rates are also lower with electronic filing because computers calculate the returns and the returns do not need to be re-keyed. According to the department, the error rate of paper returns is 11% to 13%, while the error rate for electronic returns is only 0.2%.

Recommendations

29. If the General Assembly creates the position of chief information officer, the CIO should implement the consolidated phone bill project. If the phone bill pilot is successful, this effort should be expanded to other utilities and other vendors. In the absence of a CIO, the Budget and Control Board should implement this project.
30. If the General Assembly creates the position of CIO, the CIO should coordinate implementation of EDI for purchasing. In the absence of a CIO, the Budget and Control Board should coordinate this effort.
31. If the General Assembly creates the position of CIO, the CIO should consider the feasibility of consolidating social service benefits on one card. If this idea is found to be feasible, the CIO should coordinate the implementation of it. In the absence of a CIO, the Budget and Control Board should implement this project.

Other Information Technologies

We reviewed state government applications of five other technologies: geographic information systems (GIS), multimedia kiosks, imaging, advanced telephone features, and compressed video. We found that kiosks may not offer the cost savings of electronic commerce because of the high cost of this technology. Benefits from the other four technologies may depend not so much on the merits of the particular technology, but more on how the technologies are implemented. Most of the systems described have been installed so recently in state agencies that their benefits have not been thoroughly determined.

Geographic Information Systems (GIS)

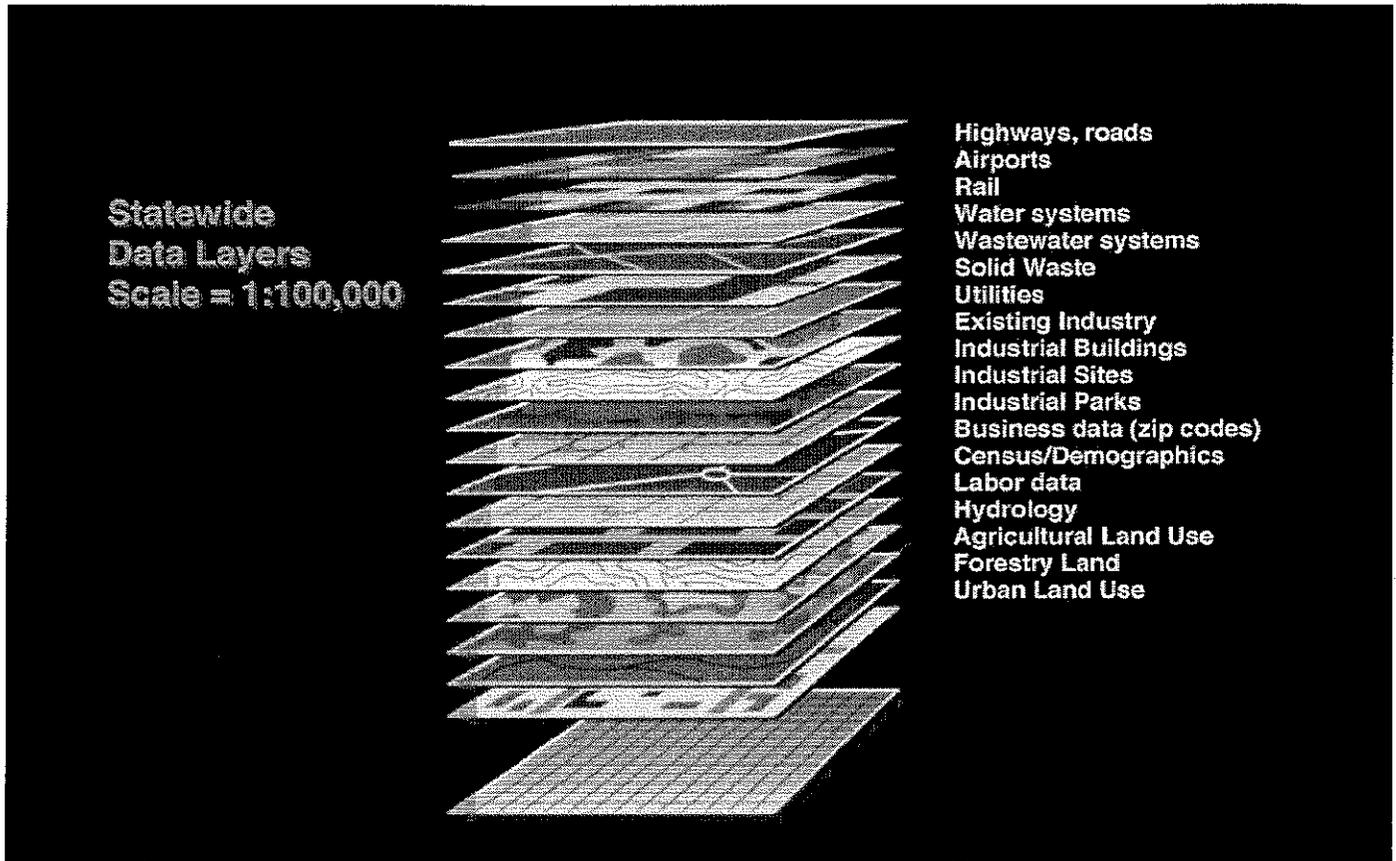
What is GIS?

GIS is a database system which maps data by geographical location. Each “layer” of the GIS system contains a different type of information such as topographic features and location of industrial buildings, sewer lines and water mains. Data layers can be superimposed on each other by computer. New layers can be added or information updated without redrawing the map or reentering the data (see Chart 4.1).

GIS systems have many potential uses at the state and local level. Because each bit of information in a GIS system is precisely located physically, the user can search for correlations between many different factors, such as crime statistics and location of liquor stores, or location of electrical transformers and incidence of cancer. GIS systems can also be used to map the optimal route for emergency vehicles, school buses, or garbage trucks and to locate sites for economic development. In addition, they can be used to track environmental disasters, endangered species habitats, or epidemic patterns.

Although potential uses of GIS systems are almost unlimited, collecting the data and entering it into the system is very expensive. However, according to a USC specialist in GIS systems, if the data is used in two or more applications, the benefits of the system far outweigh the costs of collecting and entering the data.

Chart 4.1: Geographic Information System Data Layers from the South Carolina Department of Commerce



Source: Department of Natural Resources.

South Carolina GIS Systems

The GIS systems at the Department of Commerce and the water resources division of the Department of Natural Resources (DNR) represent two different approaches to implementing new technologies. Both systems are nationally recognized. Commerce acquired a GIS system primarily to meet its customers' needs; DNR's philosophy was to obtain the hardware and software first, and then develop its applications.

Commerce receives information requests from industries interested in locating in South Carolina. Previously, in order to provide this information, agency staff had to photocopy maps and draw in additional features of interest to the client. As the information requests became more sophisticated, the department often found that it could not provide adequate answers from its printed maps and manual database.

Commerce's GIS system contains detailed information such as census data, location of sewer lines, water mains, highways, rail transportation, utilities, county tax information, and location of other industries. It also contains photos of available industrial buildings. Commerce produces the economic development data in its system; other data is provided by the federal government, other state agencies, and the private sector. New layers of information are being added to the system. For example, the Department of Education is starting to supply commerce with educational data. The Department of Parks, Recreation and Tourism (PRT) is developing a cultural inventory of the state; it will also be included in commerce's system.

The Department of Commerce uses the system primarily for industrial recruiting and site selection, while the regional councils of government (COGs) and local planners and developers use it more for planning. The GIS system enables the users to provide industrial clients with better information more quickly.

The water resources division of DNR has a sophisticated GIS system, acquired primarily with federal funds available for mapping the Edisto River basin. The GIS mapping of the Edisto River basin includes information such as flood zones, geology, water use, water quality, soil types, environmental permits, threatened and endangered species, and archeological sites. Much of the data was developed jointly with the federal government. According to DNR, the results of this project are being used by local governments to address development issues.

According to an official at the water resources division, commerce is "way ahead" of DNR in developing applications for its GIS system. Water resources is working to develop applications. The agency may use GIS data on plant and animal species, habitats, and public lands to support a wetlands mitigation project. Because water resources' applications are in their infancy, the agency cannot yet determine if its system is resulting in cost savings or better customer service.

Coordination of GIS Systems

South Carolina needs better coordination of its GIS systems. According to the USC specialist, most states have a GIS coordinator and a policy council, which South Carolina is lacking. In addition to commerce and the water resources division of DNR, other state entities with GIS systems include the land resources division of DNR, DHEC, the Department of Transportation, and the office of research and statistics of the B&CB. Local governments, such as Berkeley County, also use GIS systems.

GIS systems require a high degree of coordination and cooperation among different levels of government for the systems to achieve their greatest benefits. The same data or closely linked types of data are sometimes managed by different entities. Without coordination and oversight at the state level, an agency could expend resources to map data that another agency has already included in its GIS system. Also, without state-level coordination, it might be difficult to share data between systems because of differences in scale and resolution.

State officials have recognized the need for greater coordination of South Carolina's GIS resources. A study requested by the Governor recommended increased coordination. And, in its initial meeting, the Information Resources Council established a standing GIS committee.

Recommendation

32. If the General Assembly creates the position of chief information officer for the state, the function of statewide geographic information system coordination and oversight should be included within the role of CIO.
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Multimedia Kiosks

Multimedia kiosks are one method governments use to provide information or services to the public. A kiosk is a booth or other structure containing a computer which is often activated by touching a screen. Kiosks can include videos and sound in addition to text and pictures. They can allow users to obtain information and/or conduct transactions, such as making hotel reservations or purchasing fishing licenses.

Kiosks may not offer the cost benefits of other information technologies, such as procurement cards and electronic funds transfer. The experience in other states suggests that the benefits of kiosks may come at a high price. Well publicized, award-winning kiosks in Hawaii and California have been abandoned because of their cost. According to one source, kiosks “. . . were prohibitively expensive to implement and maintain beyond the pilot-project stage.” Some governments have found that establishing and maintaining a “home page” on the Internet is a less costly alternative to a kiosk.

Access and acceptance by the public could be a problem both for kiosks and Internet home pages. Some people may not use these technologies because they are unfamiliar with computers. In addition, unless kiosks are placed in a variety of convenient locations, they might offer the user little benefit over visiting a government agency. A government home page is available to any user with a computer and Internet access. However, while Internet home pages are cost-effective, only a minority of people currently have access to the Internet. Some governments, to reach the largest number of users, provide both kiosks and Internet sites.

Kiosks in South Carolina

In FY 96-97, the Department of Parks, Recreation and Tourism installed kiosks for tourist information and hotel reservations in nine of the state’s ten welcome centers. The kiosks utilized by PRT are marketing tools. Placement in welcome centers reaches the “captive audience” of drivers who stop at the state line to obtain travel information. However, PRT’s tourism kiosks, unlike Kentucky’s, are available only from 9:00 a.m. to 5:30 p.m. when the welcome centers are open. They cannot serve travelers who arrive in South Carolina at night.

PRT’s 20 kiosk units cost a total of \$427,000. Additional units would cost less because the software development is completed. Annual ongoing costs for PRT’s kiosks, including information updates and system upgrades, are expected to be about \$70,000. Since the kiosks are not connected in a network, information updates and system upgrades must be made one kiosk at a time.

DHEC has installed two kiosks in discount stores and one at a DSS office. They provide information to women who may be eligible for the WIC benefits program.

Recommendation

33. Because of the high cost of establishing and maintaining kiosks, state agencies should carefully evaluate if they are the most appropriate method of providing information or services to the public.
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Imaging

Imaging, also called scanning, creates pictures of paper documents which can then be stored and retrieved on a computer. Governments are using imaging for applications as varied as tax processing, access to fingerprint files, insurance claims, child abuse case files, and driver and motor vehicle records. In its simplest form, imaging is an electronic file cabinet, saving an agency space and retrieval time. When documents are no longer needed, imaged documents can be destroyed more efficiently than paper documents.

Imaging coupled with other techniques mentioned below, such as redesigning work processes, or obtaining optical character recognition (OCR) or work flow software, can help agencies obtain greater productivity benefits. However, because of the restructuring that sometimes accompanies the introduction of imaging systems, staff can feel threatened by it. In addition, critics point out that imaging is expensive and might be an interim technology. If information were exchanged electronically, there would be no paper document to image. The imaging systems discussed below represent different approaches to implementing new technologies.

State Retirement Systems

State Retirement Systems, an office of the Budget and Control Board (B&CB), implemented imaging technology in conjunction with redesigning its work process and installing an advanced telephone system. The imaging system cost \$970,000.

The retirement system has established current and long-range performance goals. One goal is to put a retiree's documents into an electronic folder that customer service representatives can access on their computer screens. One of the agency's goals is to answer 90% of phone call questions without transferring the caller or calling back. However, because the imaging system is less than a year old, its full potential has not yet been realized. New documents are imaged as soon as they are received, but existing paper and microfilm documents will be scanned over several years.

The next phase of the process will be to obtain work flow software which will automatically route documents and move them through the system faster. In addition, the retirement system is redesigning all its forms to be bar-coded or OCR-readable.¹ OCR or bar-coding reduces data entry errors because documents in this form do not need to be keyed in.

Office of Insurance Services (OIS)

In 1994, OIS, another office of the B&CB, implemented an imaging system which is used as an electronic file cabinet. The system cost approximately \$800,000. The goal in obtaining the system was to reduce overcrowding of the file room and retrieve documents more quickly. However, in implementing the imaging system, OIS did not change its work flow. The document is imaged at the time the paper form would have been filed. Some of the information is keyed into the computer twice. OIS is considering redesigning its work process, which might result in imaging documents when they are received. If documents were imaged earlier in the work process, OIS employees could respond more quickly to questions because the information “wouldn’t be stuck in a pile of papers.”

State Election Commission

Imaging is also used by the State Election Commission to scan records of who voted in particular elections. Creating the voter records used to be a labor-intensive manual process. Temporary employees were hired for two or three months to key in the information. Scanning voter lists now takes only two weeks. The results are more accurate because manual keying is significantly reduced. In addition, no temporary employees are hired to enter data.

1. An imaged document is just a picture to the computer; the information can be read on the screen by the employee, but cannot be manipulated by the computer. In contrast, OCR or barcoding converts a scanned image into data that can be “read”, sorted, and searched by the computer.

Advanced Telephone (Voice) Features

Advanced telephone features are widely used in state government and offer benefits to agencies. OIR advises South Carolina agencies about these systems. Voice mail boxes, also called “automated attendant systems,” are similar to home answering machines which allow callers to leave detailed messages without a human operator. They also enable agencies to store frequently requested information, such as hours of operation or directions to a facility, in mailboxes that the caller can access. In addition, the systems provide the capability for tracking the number of calls received, calls transferred, calls disconnected, and the number of busy signals received by callers. Voice mail systems have been installed at more than 35 agencies.

Another advanced telephone feature is an interactive voice response system (IVR) which connects the caller to a computer database and retrieves information without a human operator. Callers to an IVR identify themselves by entering their social security numbers or other unique identifier. Then the system retrieves information specific to a particular caller, for example, the date an income tax refund will be deposited, or information on whether members of a profession have fulfilled their mandatory continuing education requirements. OIR has recently installed IVR systems at several agencies including the Real Estate Commission and the Department of Corrections.

According to an OIR official, any agency which gives out repetitive information by telephone would be a candidate for an advanced telephone system. Possible applications for interactive voice response systems suggested by OIR include requests to public safety for driver records, requests to DSS for status of child support checks, and requests for DHEC vital statistics. In addition to reducing staff time spent answering requests for repetitive information, voice mail and IVR systems provide 24-hour-a-day access to information. They also improve customer service by reducing busy signals and the number of times a caller is put on hold. However, these systems have the potential to confuse and frustrate members of the public who call to obtain information from an agency. Agencies should ensure that the IVR menu options are easily understood by users and the information provided by the system is up-to-date.

Video

Several agencies are implementing video technology applications. OIR offers advice and services to state agencies considering the use of video technology. Video systems provide agencies with the potential to reduce costs by conducting hearings, meetings, training, or academic courses for participants at multiple, remote locations. The three applications described below are compressed video systems that use telephone lines as the primary way to transmit video images to distant locations. We did not review ETV's satellite-based video system.

Department of Corrections

The Department of Corrections is implementing a system that will allow video-conferencing of parole hearings. In the past, all parole hearings were held in Columbia. Regardless of where prisoners were incarcerated, they were transported to Columbia, under guard, for their parole hearings. When the video system is fully implemented, prisoners will be able to remain where they are incarcerated. This will reduce the time spent transporting prisoners to parole hearings and reduce the personnel required to guard them.

Corrections has collected data and developed a methodology that will enable the agency to measure cost savings achieved from video parole hearings. The first video hearing took place in June 1997. Four regional video centers are expected to be online by summer 1997, with other centers phased in over time. Other potential video applications at the department include conducting psychiatric evaluations prior to transporting prisoners, teaching courses simultaneously to inmates at more than one facility, offering continuing education for correctional officers, and holding monthly prison directors' meetings.

Board of Technical and Comprehensive Education

The Board of Technical and Comprehensive Education conducted a systematic study before obtaining its video system. The system is located in each of the technical colleges and also at the board's offices. The board's priorities for use of video are college courses, continuing education, professional development for faculty and staff, and tele-meetings. In the fall semester of 1996, 10 college courses were offered by video; in the spring semester of 1997, the number had increased to 20. According to the board, savings of at least \$50,000 a year are anticipated.

Clemson University

Clemson University recently built a state-of-the-art video-conferencing facility in its conference center after a needs assessment pointed to the lack of video facilities in the upstate. The center has been in operation for approximately one year. The teleconferencing facility has been used primarily by industries for training. According to officials of the center, it provides an alternative for businesses that may not be able to afford their own teleconference equipment. The center is designed to cover its cost with rental fees. It has not been in existence long enough to have reached its anticipated level of use.

Recommendation

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34. In adopting new technologies, agencies should analyze their work processes to ensure that their existing procedures do not limit the potential benefits of the new technologies.

Appendices

Audit Objectives, Scope, and Methodology

Audit Objectives

This audit was requested by the State Reorganization Commission pursuant to the sunset law (§1-20-10 *et seq.* of the South Carolina Code of Laws). The Reorganization Commission asked the Legislative Audit Council to conduct a review of the efficiency and effectiveness of information technology systems throughout state government. The sunset law sets forth eight issues for the LAC to review. As requested, this review focused on sunset issue (4), as defined by law, the efficiency and effectiveness of the programs under review. We did not specifically review the other sunset issues, although the report also addresses the statutory sunset issues of cost, duplication, and compliance with the law.

We met with reorganization commission members and conducted an audit survey to determine more specific audit objectives that are listed below.

- Determine whether the state has ensured that benefits from investments in information technology are greater than the costs (see p. 21).
- Determine how the state's information technology systems could be better integrated (see pp. 28, 39, 40).
- Determine whether the state's organizational structure for managing information technology is adequate (see p. 11).
- Identify emerging technologies with potential to provide cost savings and improved customer service (see p. 57).
- Determine the advantages and disadvantages of privatizing information technology functions (see p. 47).
- Determine how the state accomplishes training for effective use of information technology and whether improvement is needed (see p. 44).
- Determine whether changes in the state's procurement of information technology are needed to ensure efficient and effective procurements (see p. 54).
- Obtain information about the current status of the information technology resources of state government (see p. 1).

Scope and Methodology

We reviewed the management and use of information technology (IT) in executive agencies of state government and generally excluded review of higher education and the legislative and judicial departments. We did review some uses of IT in higher education as relevant to our objectives. Our review of information technology focused on data processing, with lesser emphasis on telecommunications. We did not review printing or other duplicating or copying technologies. Our primary period of review was FY 95-96; however, we obtained information on IT expenditures from FY 91-92 through FY 95-96.

We surveyed 61 executive state agencies about their information technology management and resources (see Appendix B). We also obtained information about IT expenditures from the comptroller general, IT salaries from the Budget and Control Board's office of human resources, and procurements from the B&CB's office of IT procurement. We conducted interviews with officials from state agencies, other states, and the private sector. We reviewed agency administrative records relating to information technology investments. We also reviewed reports and publications from other states, the federal government, and the private sector. We reviewed state and federal law and regulations that govern information technology procurement, management, and use.

We performed limited judgmental sampling of agencies' IT investments, maintenance contracts, and use of emerging technologies. We reviewed management controls over IT investments, both by the state as a whole and by individual agencies. We did not verify the computer-generated information we obtained from the comptroller general, the office of human resources, or the IT procurement office. With the exception of limited clarification and verification of information reported for specific issues, we did not verify information on agencies' surveys or information agencies reported about their IT investments. However, in most cases the reliability of computer-generated data or other data reported to us was not central to our audit objectives. Also, when all evidence is viewed in context, we believe the opinions, conclusions, and recommendations in this report are valid.

This audit was conducted in accordance with generally accepted government auditing standards.

Methodology Note on Expenditure Information

To estimate agencies' total expenditures for IT, we obtained information from the comptroller general's office for FY 91-92 through FY 95-96 on expenditures for IT goods and services. We also obtained information from the office of human resources about the salaries of IT personnel as of June 30 for each of the five fiscal years. We used this information as an estimate of personnel expenditures. We calculated a conservative fringe benefit estimate that we added to the salary estimate.

Some agencies were restructured during the period from FY 91-92 through FY 95-96. We reported the expenditures of agencies that existed in FY 95-96. For five-year totals, we added expenditures for agencies that no longer existed in FY 95-96 to the totals for the agency into which they were restructured or moved. In some cases, where only parts of an agency were moved, or an agency was divided between two agencies, we moved the entire expenditures, based on judgement and general knowledge about the restructuring. Our totals, then, for individual agencies were approximate.

Appendix A
Audit Objectives, Scope, and Methodology

Information Technology Agency Questionnaire

Please attach additional paper if you need more space than provided. We define “information technology” to include data processing and telecommunications. However, we are excluding copying, duplicating, and print shops; you do **not** need to provide information about these technologies in your responses below. Provide all information as of November 1996.

General Information/Policy

1. Please provide an agency organizational chart that shows the placement of the information technology staff within your agency and in relationship to the top agency official.
2. Indicate whether your agency has written policies for the following information resource management areas. Please furnish a copy of these *and any other* information technology policies.

Written Policy	No Written Policy	N/A		Effective Date
			Purchase of IT Items	
			System Security	
			Back-up and Off-site Storage	
			Disaster Planning	
			Assignment of Cellular Phones and/or Pagers	
			LAN Administration	
			Internet Use	
			IT Training	
			Licensing Software	

3. Yes / No (circle one) Does your agency have written technical standards for its information technology equipment/software? (Examples could include TCP/IP for data communications, or SMTP or GroupWise for E-mail.) If yes, please furnish a copy of the standards.
4. Yes / No (circle one) Does your agency have written technical standards for data elements used within your agency? (An example could include client identifying information.) If yes, please furnish a copy of the standards.
5. Yes / No (circle one) Has your agency contracted out (privatized) any information technology function? (Examples could include software or systems design or Medicaid claims processing.) If yes, describe below.

Description of Service(s) Provided	Provider	Contract Period	Annual Cost

**Appendix B
Information Technology Agency Questionnaire**

6. Identify how your agency provides for information technology maintenance and repairs. (circle one)

In-house Personnel Vendors/Contractors Combination of Both

If your agency has hardware or software maintenance contracts, please list.

Type of Hardware/Software Maintenance Contract(s)	Provider	Annual Cost

7. Yes / No (circle one) Has your agency assessed the impact of the "Year 2000" computer problem on your information systems? If yes, describe below or provide a copy of the assessment including projected costs.

Hardware Issues

- 8. Please furnish information on the number of personal computers *owned* by your agency. Include the type of processor (386, 486, 586, etc.) and manufacturer.
- 9. Please furnish information on the number of "dumb terminals" *owned* by your agency. Include the manufacturer.
- 10. Please furnish information on the number of printers *owned* by your agency. Include number of each type (dot matrix, ink jet, laser, etc.).
- 11. Please furnish information on information technology equipment *leased* by your agency. Include the type of equipment and provider.
- 12. Identify in-house processor(s), excluding personal computers, used by your agency.

In-house Processor(s)	Make	Model

13. Yes / No (circle one) Does your agency use a remote host? If yes, identify below.

Remote Host(s)

**Appendix B
Information Technology Agency Questionnaire**

14. Yes / No (circle one) Does your agency own scanners, OCR equipment, or imaging systems? If yes, describe below.

Type(s) of Equipment or Systems

15. Indicate how many of the following information technology items your agency has.

Number	
	Modems
	Fax Machines
	Cellular Phones
	Pagers

16. Does your agency currently use any of the following technologies?

Yes	No	
		Computer Card Technology
		Customer Service Kiosks
		Interactive Voice Response
		Video Conferencing

17. Identify (describe briefly) any specific applications of information technology that have resulted in demonstrated improvements in delivery of government services.

Network Issues

18. Yes / No (circle one) Does your agency use a wide-area network (WAN)? If yes, describe below.

Wide-Area Network(s) Used

19. Indicate how many local area networks (LAN) your agency has.

Number	Description (Novell, NT, LANtastic, etc.)	Name of LAN Administrator(s)

Software Issues

20. Please furnish a list of current software licenses owned by your agency.

21. For each category of personal computer software below, indicate which application program(s) are used by your agency and the approximate number of users for each.

Category	Application Program(s)	Number of Users
Operating System		
Word Processing		
Spreadsheet		
Database		
Graphics		
GIS		
LAN-based E-mail		

22. Describe the personnel and accounting (financial) computer system(s) or software your agency uses.

Category	System or Application Program	Source (In-house or Supplier/Developer)	Type of Computer Used
Personnel			
Accounting			

23. Yes / No (circle one) Does your agency have Internet access? If yes, describe below.

Service Provider	Number of Workstations with Access	Number of E-Mail Addresses	Do you have a Home Page?

24. Yes / No (circle one) Does your agency use voice mail? If yes, describe below.

Service Provider	Number of Voice Mail Boxes

25. Describe how your agency communicates electronically (for example, EDI or inter-agency E-mail) with other agencies.

**Appendix B
Information Technology Agency Questionnaire**

Training

26. Name the official who is responsible for IT training at your agency.

27. Provide agency expenditures for IT training for FY 95-96.

Purchased IT Training	Associated Travel Costs	Estimated Cost for In-house Training	Percent of IT Training	
			IT Professionals	End Users

28. Yes / No (circle one) Does your agency maintain written evaluations of IT training that agency staff attend at other entities or of training conducted by your agency?

Personnel

We consider the following state personnel classifications (used in FY 95-96) as information technology:

All 2800s 2961-2974 3002-3017 3824-3840

29. Provide information on staff who do *not* have one of the above-listed classifications, but who *do* have information technology duties.

Number of Non-IT Staff with IT Duties	Total FTE Equivalent

Additional Comments

Please provide any additional information or comments that might be relevant to our review.

Please furnish the following information for an official at your agency we can contact for questions or follow-up.

Agency	
Contact Person	
Telephone Number	

Appendix B
Information Technology Agency Questionnaire

Glossary

<i>Back-up:</i>	To make a copy of important data.
<i>Beeper:</i>	A portable electronic device that “beeps” when it receives a special radio signal allowing the person carrying it to be paged. (See also Pager.)
<i>Cellular Telephone:</i>	A wireless telephone that transmits messages using radio signals.
<i>Chief Information Officer (CIO):</i>	The top ranking individual within a state or agency responsible for determining IT requirements.
<i>Client Server:</i>	A computer network where each “client” has a personal computer which processes information and which is attached through a network to a “server” computer or computers that provide(s) central services, such as database management.
<i>Communications Protocol:</i>	A set of hardware and software standards for transmitting data between computers.
<i>Compressed Video:</i>	The compression of a video signal in order to transmit it over a telephone line, as opposed to satellite or fiber optic cable.
<i>Data Center:</i>	A facility that houses a mainframe computer system.
<i>Data Processing:</i>	The capturing, storing, updating and retrieving of data and information.
<i>Debit Card:</i>	A computer card with a magnetic stripe which is commonly used for the electronic transfer of benefits, such as food stamps.
<i>Disaster Plan:</i>	A plan for resuming full or partial computer operations after a disaster has disabled or destroyed a computer system.
<i>Dumb Terminal:</i>	A device consisting of a monitor and keyboard which has no processing capabilities of its own but which is connected to a centralized processor.
<i>Electronic Benefits Transfer (EBT):</i>	A form of electronic data interchange (EDI) in which governmental benefits are provided to recipients electronically.
<i>Electronic Commerce:</i>	The use of computers and telecommunications to conduct business transactions.
<i>Electronic Data Interchange (EDI):</i>	The electronic exchange of business documents between businesses and/or governmental agencies.
<i>Electronic Funds Transfer (EFT):</i>	A form of electronic data interchange in which funds are transferred between parties without writing checks.

<i>Electronic Mail (e-mail):</i>	Messages sent electronically between users on a network. The message may have other files attached to it.
<i>Fax Machine:</i>	A machine used to transfer documents electronically from one place to another.
<i>Geographic Information System (GIS):</i>	A system which is used to map data by geographical location which can then be represented in two or three dimensions.
<i>Hardware:</i>	The physical components of a computer.
<i>High-Risk Project:</i>	A project which has a high probability of failure and would cause major consequences to the agency and/or the state if it were to fail.
<i>Home Page:</i>	The top-level page of an organization's or individual's Internet site.
<i>Imaging:</i>	Technology through which paper documents are converted to electronic documents which can then be stored by or retrieved from a computer. (See also Scanning.)
<i>Insourcing:</i>	Using a separate agency to perform IT functions for other agencies.
<i>Interactive Voice Response (IVR):</i>	A system which allows a caller to connect to a computer database and access information without the help of a human operator.
<i>Internet:</i>	A worldwide system linking various computer networks which allows users to access and share information and use services such as electronic mail and file transfer.
<i>Kiosks:</i>	A booth or other structure containing a computer and placed in a public location to provide information or services to the general population.
<i>Local Area Networks (LANs):</i>	A network used to connect computers across a limited area, often a single building or floor.
<i>Mainframe:</i>	A large, centralized computer system usually requiring a separate computer room, and staff. A mainframe system typically performs all processing and provides output to "dumb" terminals via a network.
<i>Modem:</i>	A device used for transmitting computer data over telephone lines.
<i>Network:</i>	The hardware and software used to connect computers or other devices to one another to allow them to communicate.
<i>Networking:</i>	A method for distributing data processing functions using communications facilities.

<i>Optical Character Recognition (OCR):</i>	The process by which paper documents that have been scanned into a computer can be converted into information that can be manipulated by the computer.
<i>Off-site Storage:</i>	Storage of agency records or data at a different location outside the agency.
<i>Pager:</i>	A portable electronic device that “beeps” when it receives a special radio signal allowing the person carrying it to be paged. (See also Beeper.)
<i>Peripherals:</i>	Devices connected to a computer which provide additional functions, such as printers or scanners.
<i>Personal Computers (PCs):</i>	Computers used to provide processing power to a single user but which can also be connected through a network.
<i>Procurement Cards:</i>	Credit cards issued to government employees which are used to make purchases of goods and services which are then billed to the state.
<i>Protocol:</i>	A collection of rules that controls the exchange of information.
<i>Scanning:</i>	Technology in which paper documents are converted to electronic documents which can then be stored by or retrieved from a computer. (See also Imaging.)
<i>Server:</i>	A computer which performs certain functions for other computers connected to it through a network.
<i>Simple Mail Transfer Protocol (SMTP):</i>	An electronic mail protocol used in TCP/IP networks.
<i>Software:</i>	Instructions for a computer.
<i>Telecommunications:</i>	A set of processes, equipment, and facilities used to transport signals from a data processing device at one location to another device at another location.
<i>Transmission Control Protocol/ Internet Protocol (TCP/IP):</i>	The basic protocols that allow the communication and transport of data across the Internet.
<i>Voice Mail (Auto Attendant System):</i>	A system similar to an answering machine that allows callers to leave detailed messages on a machine which can then be retrieved by the user.
<i>Wide Area Network (WAN):</i>	A network which uses common carrier lines to connect computers or other networks which are spread over a large geographic area.
<i>Workstation:</i>	In a local area network, a personal computer that serves a single user in contrast to a file server that serves all the users in the network.

Agency Comments

The following agencies reviewed portions of the report and submitted comments for publication.

Budget and Control Board	91
Department of Health and Environmental Control	108
Department of Natural Resources	110
Department of Social Services	113

The following agencies reviewed portions of the report and elected not to submit comments for publication.

- Arts Commission
- Department of Commerce
- Office of the Comptroller General
- Department of Corrections
- Department of Disabilities and Special Needs
- Office of the Governor
- Department of Juvenile Justice
- Department of Mental Health
- Museum Commission
- Department of Parks, Recreation and Tourism
- Department of Probation, Parole and Pardon
- Department of Revenue
- Office of the State Treasurer

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STATE OF SOUTH CAROLINA
State Budget and Control Board
OFFICE OF THE EXECUTIVE DIRECTOR



DAVID M. BEASLEY, CHAIRMAN
GOVERNOR

RICHARD A. ECKSTROM
STATE TREASURER

EARLE E. MORRIS, JR.
COMPTROLLER GENERAL

JOHN DRUMMOND
CHAIRMAN, SENATE FINANCE COMMITTEE

HENRY E. BROWN, JR.
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July 24, 1997

Mr. George L. Schroeder, Director
Legislative Audit Council
400 Gervais Street
Columbia, South Carolina 29201

Dear Mr. Schroeder:

We appreciate this opportunity to respond to the Legislative Audit Council report "Improving South Carolina's Management and Use of Information Technology." The report addresses a number of issues of long-standing concern to the Budget and Control Board and fundamental to the management of information technology in the state of South Carolina.

The Board's technology operations have been guided by the management principles of decentralization, coordination, and communicability. These principles are consistent with modern management theory in general, and, in particular, with the tenets of Total Quality Management. While the report acknowledges the validity of this management approach, that endorsement would appear to be somewhat superficial. Having stated the need for "an appropriate balance between centralization, control, and standardization on the one hand, and decentralization and agency autonomy on the other" (p. v), the report fails to follow through with recommendations which would achieve that balance. Instead, the recommendations of the LAC study are premised almost exclusively on the principles of centralization, control, and standardization, contending that greater regulatory control is necessary to achieve optimum efficiency and cost-effectiveness. In taking this position, we believe that the LAC recommendations stand in sharp contrast to the management approach prescribed by the General Assembly and endorsed by the Governor for South Carolina state government and are biased toward massive and dysfunctional regulatory control rather than constructive regulatory reform.

Two fundamental policy issues are raised by the report's call for greater centralization and control in IT management. The first is the appropriate approach to IT decision-making. The Board's position is that centralized control of decision-making is undesirable when management decisions can best be made at the agency level. In the early 1990s, the Budget and Control Board embraced deregulation and regulatory relief collaboratively with the General Assembly to give agencies greater flexibility with accountability. As a result, the Board has moved from a regulatory and control func-

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tion to one of consultation and service orientation in IT management, procurement, and human resources. In short, the Board has chosen to lead and facilitate rather than compel in regard to IT management. This does not imply that efforts to promote efficiencies and effectiveness have decreased but that greater user input is involved for coordinated decisions regarding what best serves agency needs.

The General Assembly has repeatedly endorsed, and reinforced, this policy position through the Restructuring Act, the Government Accountability Act, and most specifically, through deliberate changes--both additions and deletions--to provisos in the appropriations process governing the functioning of IT management. As the report states, in the 1980s legislation was created calling for greater control of emerging information and communications technology. What the report does not recognize is that the environment of technology has changed radically since the 1980s and continues to change at a rapid pace. This is perhaps best reflected in two statistics drawn from the report itself. The first is that expenditures on mainframe data centers now account for only 13 percent of total IT spending. The second is that, while expenditures on IT goods and services over the last five years increased by 69 percent, spending on IT personnel increased by only 20 percent. The first statistic is evidence of the extent to which we have moved from a mainframe computing environment to an environment of decentralized, distributed information processing. The centralized regulatory approach endorsed by the LAC report is simply not appropriate in this new environment and could prevent us from realizing the benefits of the flexibility and responsiveness of a decentralized system. The second consideration--the disproportionate increase in spending on IT goods and service relative to personnel costs--reflects the increasingly "user-friendly" nature of computer technology and the higher level of sophistication of both equipment purchasers and users. Stated simply, more people can use the technology with less assistance than was previously required. These changes mean that agency managers have become viable partners in decision-making.

We would contend that decentralization and empowerment do not reduce control and accountability in the system. Instead decentralization shifts the locus of control to the level at which it can be most effectively exercised, and empowerment permits the flexibility and adaptability necessary to keep abreast of emerging developments in technology and provide greater responsiveness to customer expectations. This is not to deny the importance of the Budget and Control Board in matters related to information technology. However, it does suggest that the role of the Board should be one of guidance, consultation, and coordination coupled with strong performance expectations rather than centralized control and regulation. The General Assembly and the Board have endorsed this position, and Board staff believe that they have fulfilled their responsibilities by adopting this approach.

A second policy issue regards the organizational structure of the Board. We would first object to the report's contention that the location of technology functions within an agency structure diminishes their role. The report offers no evidence that the placement specifically of IT Management hinders it in the performance of its functions. We would note that other offices similarly situated have

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exercised leadership effectively as does IT Management, although in a consultative rather than directive manner.

Second and more importantly, the LAC report ignores the crucial issue of "checks and balances." While the report appears critical of the fact that three different offices within the Board are involved with IT, it does not discuss the reasons for this organizational design. There are three separate functions performed by various offices of the Budget and Control Board. The Office of Information Resources (OIR) is responsible for a significant portion of the state's computer operations. Information Technology Management under the Office of Research and Statistical Services provides direction to the planning and coordination of IT, both at the agency level and statewide. The third function of IT management deals with information technology procurement and is a part of the overall state procurement process. Materials Management under the Board's Office of General Services has personnel with specialized expertise in IT procurement. They stand ready to respond to individual agency needs as well as statewide critical issues.

Having the functions located separately provides a consciously planned balance among three functions and serves as a check against potential conflicts of interest in performing those functions. Separation of the budget and analysis function from operations is necessary not only because the two functions focus on different issues in the IT world, but also because the systems management and applications development function is a revenue-based function. The separation of these two offices minimizes the potential for conflicts of interest between Information Technology Management's recommendations for computer services and the provision of services by Information Resources. Separating both planning and operations from procurement provides further safeguards against potential conflicts of interest between those who recommend and provide services and those who purchase equipment in support of those services. Moreover, it is logical and cost-effective for technology procurement to be a part of the state's overall procurement process. To argue otherwise would be advocating placing procurement functions in each programmatic area, a proposed action in conflict with the South Carolina Consolidated Procurement Code passed by the General Assembly. (South Carolina Code of Laws, 1976, as amended, Section 11-35-10 *et seq.*) This division of responsibilities is common among central state government organizations across the fifty states.

We realize that centralization, control, and standardization on the one hand and decentralization, coordination, and communicability on the other are competing sets of principles and that neither provide an absolute remedy. Our task is to strike appropriate balances among these principles in a manner which will best serve the people of South Carolina. The problem is not so much to choose between the sets of principles as it is to decide when, and/or under what conditions, a particular principle is most applicable and in what measure. Thus, the question is not simply whether to centralize or decentralize, but which functions are best centralized and which decentralized. The new technology affords the ability to do both simultaneously. Similarly, the question is not so much whether to standardize, but what to standardize and how much. These are complex questions which may require situational responses. They are critical questions. They are questions that the Board has

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attempted to address as evidenced, for instance, in the computer consolidation initiative and the formation of the Information Resources Council. Our concern is that the LAC report gives too much weight to the principles of centralization, control, and standardization and is overly simplistic in its response to these complex questions. More particularly, we believe that the recommendations to move the three functions of information technology under one entity, namely a Chief Information Officer, and to develop common IT standards for all of state government are politically, administratively, and technically naive.

Chief Information Officer: pp. 18-19

We disagree that the Chief Information Officer (CIO) position *as specifically described* in the LAC report should be established. The LAC preference for centralization and control is nowhere more apparent than in this recommendation. We would concur that some of the functions recommended to be performed by the CIO may be desirable. However, the Board feels that the performance of these functions does not require the creation of the position of CIO. Moreover, it is unrealistic to expect a single individual to be able to perform these functions without a substantial investment in staff and resources. (See Exhibit # 1)

The Board bases its position on a number of reasons, including the following:

- By definition, the CIO must be able to align government's technology deployment strategy with its business strategy and be responsible for ensuring that the systems work on a day-to-day basis. Because each agency has its own mission, its own constituency, and its own business strategy, a decentralized process is generally more reasonable. When appropriate and advantageous to the state, centralization is the approach that is recommended, as in the case of the consolidation of data centers and the implementation of the SCiNET project.
- The magnitude and complexity of technology and the multiple constituency that a CIO position must satisfy make it virtually impossible to find a single person capable of filling all roles. Because the CIO's job is becoming more and more sophisticated and complex, many businesses and governments have divided information systems management into two or more jobs. To quote Larry Singer of Harvard University's John F. Kennedy School of Government, "the CIO cannot be responsible for all things technical as technology becomes ubiquitous. The CIO role that focuses on the technology issues of running government is already a role so broad that there are few executives capable of performing it well." (*Government Technology Magazine*, January 1997)
- Accountability for IT functions should remain at the agency level. The General Assembly, through the annual performance accountability process, mandates agency accountability in all areas of operations, including information technology. It is more important to ensure competency at the agency level than to create a false sense of security by creating a CIO posi-

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tion. Furthermore, agencies are in the best position to determine which, if any, of their systems should be privatized or insourced, not the CIO as the LAC report suggests.

- The state serves a wide variety of constituencies. No one understands its constituencies better than the agency which serves it. In many instances, computer systems are developed and used to serve specific needs of unique constituencies.
- Developing standards and processes for accountability in information technology requires consensus building among the myriad of state agencies. This certainly demands coordination, but it does not necessitate realigning the organizational structure of the Budget and Control Board. The Board purposely has divided responsibility for the management of the state's information resources among separate entities, a decision which has been encouraged and supported by the General Assembly.
- It bears repeating that the Board's organizational structure provides checks and balances in all aspects of information technology. The Board specifically has worked for the past several years to establish a collaborative spirit and partnership with agencies as opposed to a strict regulatory relationship. For example, the data center consolidation encourages input and cooperation from those agencies that are affected. To change philosophical direction now purely to satisfy the report's call for a CIO would not only violate the spirit of cooperation fostered by the Board but would also contradict recent legislative changes.

The LAC auditors have proposed explicit duties for the CIO. They have repeatedly recommended a fallback position if the General Assembly does not choose to establish a CIO: the Budget and Control Board should assume the assorted job duties suggested for the CIO. The report further states that the Budget and Control Board should provide support for the CIO with its existing FTE's, the inference being that the Board's other projects are either over-staffed or under-worked. It does not offer any analysis of the Board's work force or its existing projects but presumes, nonetheless, that the Board can somehow absorb yet another responsibility without additional resources. The impracticality of this suggestion becomes apparent when one understands that most of the Board's IT positions are revenue-based. This means that these positions are used in support of the critically needed services that the Board provides on a statewide, centrally managed basis. The reality is that if the Board were to redirect its manpower to address these items that have been given priority by LAC staff, it would become necessary for the Board to abandon certain core business competencies and in effect force agencies to seek support in the private sector at a potentially increased cost. In addition, OIR employees re-deployed in support of the CIO would not be generating revenue; consequently, there would no longer be any funds with which to pay them.

Currently, the responsibilities outlined for the CIO in the report fall to various organizations, all of which draw their authority from either statute or executive order. We contend that the responsibilities that are proposed for either one individual or the Budget and Control Board in a cen-

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tralized, regulatory environment are much better served under the current decentralized system. Any changes which may occur in the future will be derived from recommendations proposed by the duly constituted Information Resources Council and through a consensus approach throughout state government. Procedures are already in place which will provide the end results proposed by the LAC report. However, the means to achieving those ends are in conformance with the objectives of regulatory reform as mandated by the General Assembly and the Governor.

Information Resources Council: p. 13

In addition to its failure to address reasonable philosophical differences in the structure of IT management, the LAC auditors also chose to discount the creation, credibility, and recent actions undertaken by the Information Resources Council (IRC). Taking a myopic approach, the report suggests that the IRC's role will be very limited, the implication being that its advisory status will render it ineffective despite the role of the Governor in establishing its mission. In reaching its conclusions, auditors evidently dismissed discussions with Board staff regarding the relevancy of the IRC as well as the legitimacy of Executive Order 96-05, an interpretation which fails to recognize an executive order as a fundamental tenet of administrative law.

Since Governor David Beasley has been in office, he has emphasized to his staff as well as to agency leadership that he desires and expects improved coordination of all information technology initiatives statewide. Toward that goal, Budget and Control Board staff researched extensively throughout the United States regarding initiatives which would bring about the desired cross-government cooperation and coordination. It was determined that the executive initiative was appropriate for South Carolina. The research demonstrates that most states have similar entities such as the IRC whose purpose is the development and implementation of a strategic information resources management planning process. It is generally acknowledged that this is not a task to be accomplished by one organization. Instead, it must be a broad cooperative effort across agency lines, focusing on the sharing of resources and applications, elimination and reduction of duplication, development of standards, and development of a strategic vision with specific coordinated initiatives.

While the IRC is not seen as a panacea for immediately improving all management of IT resources, it can bring about a significant improvement in across-agency cooperation through the use of a consensus process. By sharing scarce resources and information, it can improve communications and provide opportunity for the development of integrated information systems. Ultimately, the IRC, through its standing committees, will have a major impact on IT management, including all the areas referenced in this LAC report. Consequently, its dismissal as a catalyst for bringing about technological change is inappropriate and shortsighted. (See Exhibit # 2)

The LAC report has made a number of recommendations which would require action on the part of the Budget and Control Board. Bearing in mind that many of these recommendations are closely associated with the creation of a Chief Information Officer or the report's limited vision of the poten-

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tial effectiveness of the Information Resource Council, we offer the following information regarding these recommendations.

Year 2000: pp. 16-17

We concur with the report's conclusion that resolving the Year 2000 conversion problem is a mammoth and expensive undertaking. However, the report's general characterization of Budget and Control Board officials as uncaring and uninvolved in the effort to move the state toward a solution is totally without foundation. In point of fact, the Board's efforts toward addressing this problem include the following:

- In early 1996, the Office of Information Resources began a comprehensive review of Year 2000 coordination efforts underway nationally.
- OIR initiated discussions with agencies relative to the status of their plans for assessments and corrective actions. Agencies reported that it was their intention to address the problem. An initial Year 2000 presentation was made to the IT Advisory Committee on April 26, 1996, to heighten an awareness of the problem. In at least four subsequent meetings of the IT Advisory Committee, Board employees have encouraged cooperation in this effort.
- At its annual technical conference in the summer of 1996, OIR staff conducted a Year 2000 presentation to participants.
- The Board's Executive Director transmitted a letter to all agency heads and institutions on November 7, 1996, to reinforce the urgency of the Year 2000 problem. We strongly encouraged agency leadership to ask their IT staff to conduct an Inventory and Impact Assessment and to consult with the offices of OIR and Information Technology Management regarding this matter.
- OIR addressed the issue of the Year 2000 date change in its technology presentations to the Telecommunications Users Group in the fall of 1996 and at the Agency Directors Organization meeting in November 1996.
- An OIR representative attended the National Association of State Information Resource Executives Year 2000 Symposium in December 1996.
- OIR organized a Year 2000 Users Group which began regular monthly meetings in March 1997. Through the constant encouragement of OIR staff, the number of participating agencies has been increasing. This Users Group provides a forum for sharing knowledge and experience concerning various tools available to agency technical staff for use in converting software. OIR has also secured the tools which the Users Group requested for testing and

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has loaded the software onto one of its mainframes. Many participating agencies are using these tools either to help assess the extent of their Year 2000 problem and/or to expedite the actual coding conversion.

- The Budget and Control Board assisted Ways and Means Committee staff in drafting a proviso to require agencies to participate in a Year 2000 assessment. That proviso (17A.7) is effective with the 1997-98 Appropriation Act, and the Board will move forward with the assessment and other aspects of the proviso, including a report to the General Assembly on the matter in January 1998. (See Exhibit # 3)
- Prior to initiation of the Year 2000 proviso by the General Assembly, OIR began developing a Request for Proposal to establish a contract for agencies to use for acquiring consulting services for assessment and implementation of the required changes to accommodate the Year 2000 date change. The issuance of that RFP was temporarily delayed pending passage of the aforementioned proviso, and OIR is now moving forward in the development of the solicitation.

In addition to being proactive in regard to coordinating agency efforts, the Board has been forward thinking in its attempts to modify systems for which it has responsibility. The following actions have been undertaken or are underway to ensure that the systems are Year 2000 compliant:

- In early 1996, OIR's Information Processing Center staff began a review of the impact of Year 2000 problem on the GAFRS accounting system which is used by the Budget and Control Board, Department of Health and Human Services, and the Department of Social Services. Subsequently, a Request for Proposal was issued and a vendor selected to make the changes in the GAFRS system. The project is scheduled to be completed this fall.
- As early as 1988, Board technical staff began planning for the modification of the systems that they support. As of this date, 18 systems for which the Board has responsibility have been reprogrammed or are being reprogrammed to make them Year 2000 complaint. They include such systems as the Comprehensive Insurance Benefits System, State Election Commission Voter Registration System, Human Resources Information System, State Permanent Improvement Reporting System, State Budget System, MMO Procurement System, and DSS Voter Registration Inquiry System.

One final point needs to be made. The LAC's recommendation concerning the Year 2000 problem suggests that the Board should monitor the implementation of agency modifications to their systems. However, we believe that the Board has neither statutory authorization nor an executive mandate to monitor implementation. By proviso and without benefit of additional appropriations, the Board is authorized by the General Assembly only "to coordinate the assessment . . . and to develop a plan of action to ensure that all elements of state government are in full century date com-

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pliance." The proviso also authorizes the Board to establish a contract which agencies can use to address their individual Year 2000 needs. It stands to reason that agency modifications are best handled by the individual agencies that have direct and comprehensive knowledge of their systems and the processes involved in coding and testing for the Year 2000 date change.

Innovation Sharing: p. 15

We concur with the LAC report's recommendation that the Board develop a systematic method of sharing IT innovations among agencies. Indeed, the Board has already made inroads toward sharing IT innovations. In cooperation with the Executive Institute, OIR has sponsored two conferences (1994, 1997) which dealt with management and technology. Aimed at informing state executives about developments in information and communication technology, both conferences were well-attended and drew strong, positive evaluations. OIR has also supported technology exhibits at the State Fair for the past two years, and several OIR staff members have made presentations at the Agency Directors Organization regarding IT innovations.

These efforts, though fairly extensive, can be improved upon and that is certainly the goal of Board staff. We expect that the formation of the Information Resources Council will serve as a catalyst for the development of systemic ways of sharing information on new technology and will facilitate the implementation of technological innovations across state agencies.

In addition to providing staff for the Information Resources Council, OIR has undertaken two other initiatives designed in part to address the problem of diffusion of innovations. The first is a proposal to establish a Center for Applied Technology. This center would be responsible for developing and demonstrating prototypes of new applications of information and communications technology. State agencies would be involved in determining areas in which applications would be developed, would work with the center and providers in developing those applications, and would be involved in the demonstrations. This proposal is based on a similar facility in New York which received Harvard's Innovation in Government award last year.

The second initiative is the implementation of a learning organization perspective in OIR. A major thrust of this initiative is to apprise OIR staff of developments in information and communication technology; it will also be shared with interested parties and will be useful for strategic planning purposes. It is hoped that this approach can be extended to other agencies to identify broader communities of interest and encourage them to incorporate this strategic information in their own decision-making processes.

Evaluation/Monitoring: pp. 24-28

The LAC report has chosen to characterize the effectiveness of Information Technology Management as being inadequate in terms of evaluating and monitoring agencies' IT projects. We

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Mr. George L. Schroeder
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believe this conclusion is derived from a failure to understand and appreciate the change that occurred at IT Management because of regulatory reform.

Currently, no permanent provisos give the Board continuing responsibility and/or authority for the information technology activities of state agencies. However, there are two provisos in the 1996-97 Appropriation Act which hold the Budget and Control Board responsible for the specific IT functions. The first deals with computer consolidation (# 17A.5), and the second directs the Division of Budget and Analyses to identify all requested increases for information technology, compile the requests into one report, and evaluate and forward the requests to the Governor, the Chairman of the Senate Finance Committee, and the Chairman of the House Ways and Means Committee (# 72.37). All other IT provisos which previously were included in past appropriation acts have been deleted. Listed below is a historical summary of the major provisos affecting information technology during the past eight years. The first five of these provisos have been eliminated by the General Assembly. (For a complete listing of IT provisos with their effective dates, see Exhibit # 4)

- Coordinate sale or trade of surplus IT property (deleted after FY 94-95)
- Approve IT requests outside annual prioritization process (deleted after FY 94-95)
- Prescribe format for state agencies to follow in submitting annual IT inventory to the Board (deleted after FY 94-95)
- Complete Phase II of Computer Infrastructure Study (deleted after FY 94-95)
- Evaluate and prioritize requests and recommend funding levels (deleted after FY 95-96)
- Identify and evaluate requested IT increases and forward evaluations (added in FY 96-97)
- Consolidation of computer services (added in FY 96-97)

In addition to the provisos, regulations in the South Carolina Consolidated Procurement Code have also been changed. Previously, Regulation 19-445.2000 B(4) directed IT Management to establish procedures and be the approving authority for IT planning as well as develop a State Master Plan and state standards for the planning and use of information technology. However, regulatory reform resulted in the deletion of that regulation from the Consolidated Procurement Code, effective with FY 1994-95. (See Exhibit # 5)

In a general sense, this change has resulted in the resolving of differences through a discussion of alternatives as opposed to official mandate. The annual planning process still takes place but under a less rigid structure. In the area of information technology requests and plans, IT Management has for some time been shifting its role from an evaluation process for procurement approval to a more consultative role, having redefined the IT planning process to bring about a greater degree of involvement with agencies in the analysis and evaluation of their IT needs. As this shift was taking place, the State Accounting System Improvement Team in a report entitled *Systems Analysis of State Government Accounting and Other Financial Systems* (April 1995) recommended essentially the same course of action--that IT Management redirect its focus from an evaluation process to a consultative and coordinating role. (See Exhibit # 6)

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IT Management now uses a more general approach in reviewing IT initiatives, placing greater emphasis on the agency's overall analysis of its "business case" for the technology rather than the details of quantities and costs. In recent years, IT requests from agencies have reflected a much higher degree of planning and analysis than in previous times, and it has become clear that a rigorous review is no longer needed. Plans are still carefully examined but with greater attention paid to overall appropriateness, cost, value, and benefit and less attention to technical and accounting details. This redirection has reduced considerably the amount of time IT Management has had to spend on the examination of small IT purchases, allowing staff to expend the majority of their energy consulting with agencies on major IT projects and developing long-term strategies involving multiple agencies.

The return of responsibility to the agencies has also been reflected in earlier decisions regarding the exemption threshold for IT Management approval of IT procurement. In 1993, the exemption threshold was raised from \$2,500 to \$10,000; in 1994 it increased to \$25,000. This of course made it unnecessary for agencies to submit many of their small requests to IT Management for formal approval; as a result the number of IT requests requiring formal approval has dropped, i.e., from an average of 2,865 per year (1992-93) to 1,730 requests annually (1994-95). These changes in exemption thresholds along with IT Management's shift from a regulatory role allows staff to be on the front end of the planning process, thereby serving as an advocate rather than an adversary who reviews plans after agencies have formulated their needs. (See Exhibit # 7)

As the state's IT community generally has grown increasingly more proficient in the acquisition and use of IT resources, the Board's role in evaluating and monitoring agency projects has diminished. Prior to 1980, there was a need to guide agencies through complicated systems development, pointing out problems and pitfalls. However, that has not been the case for several years. Instead, today's IT professionals and agency managers are sufficiently competent to manage their own projects without constant oversight by IT Management. This change was recognized by the State Accounting System Improvement Team and by the General Assembly, the former with its report recommendations and the latter with a course of action which resulted in the deletion of the aforementioned provisos which previously provided more stringent oversight by IT Management.

One final note--Board staff is unclear as to the specific intent of the LAC report recommendation regarding IT Management's role in the evaluation and monitoring of information technology. Is it the report's recommendation that the General Assembly re-legislate these deleted provisos or that the Board exercise *ultra vires* authority contrary to a clear expression of legislative will?

Standards: pp. 28-34

We agree with the report's conclusion that IT standards *properly conceived and applied* can, in many instances, prove beneficial to the state's IT community. However, we have learned from years of experience that rigid standards strictly applied in the dynamic world of information technology often do more harm than good. South Carolina state government is not a single entity with a uniform

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IT structure but rather a variety of such entities, each with its own set of needs and circumstances. While many of these entities may have enough in common to make proper use of an IT standard, to suggest that a single standard in any area of IT can be applied universally is at best naive.

Based on this understanding, the Board has developed guidelines or preferred standards, rather than inflexible mandates, which are aimed primarily at simplifying communications among the agencies. Preferred standards presently in place address such areas as data communications (TCP/IP) and two-way radio communications (800 MHZ). Defacto standards are also in effect in the form of the Metronet wide area network and PC software. We believe that it should also be noted that the LAC auditors erred in their conclusions that electronic mail has been allowed to flourish in state government without oversight and that the different e-mail systems presently in use within state government are incompatible and, therefore, unable to communicate. Neither of these conclusions is true. Preferred standards in the form of guidelines do exist for e-mail, and the present systems can and do communicate with one another. (See Exhibit # 8)

Many states--including South Carolina--have determined that the most appropriate way to establish IT standards and provide better coordination of IT resources is through an executive directive such as the Information Resources Council. This type of mechanism provides the broadest representation of agencies and the private sector in the development of a strategic information resource management plan for state government, including the development and adoption of appropriate IT standards. The State of New York is a prime example of this type of effort. In South Carolina, the IRC's Standing Committee on Information Infrastructure is charged with coordinating the development of a statewide strategic information resource management plan as well as making recommendations for adopting preferred IT standards through state government. This standards initiative will be conducted by the IT Advisory Committee and will involve a broad representation of agencies, institutions, and the private sector.

Accounting System: pp. 40-41, 43-44

The LAC report also recommended that common accounting systems in South Carolina be implemented and that the Board be responsible for implementation. We concur with the suggestion that every effort be made to ensure that agencies share accounting management systems. In fact, the Data Center Consolidation Study anticipated this suggestion when it specified the Board's intention to "address the matter of the logical consolidation of agency systems. This will entail consideration of the ways in which agencies' applications . . . might be unified to reduce to the maximum extent possible the costly duplication that now exists among these separate systems." (p. 24)

Furthermore, the Board in reality has been working towards adoption of a common accounting system, GAFRS, for a number of years. DSS is the latest agency to migrate successfully to GAFRS as of July 1997. Any request by state agencies to procure new accounting systems will be closely scrutinized for a justification as to why GAFRS cannot be utilized.

Budget and Control Board (Entire Report)

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Training: pp. 44-46

In regard to the recommendation for the Board to review the state's role in IT training, we want to assure the LAC that the Board recognizes the importance of IT training and shares its concern that it be appropriately managed. In recognition of that, the Board has long taken the lead in providing IT training to its own employees and to personnel in other state agencies. OIR spends more than \$100,000 annually on training to keep its employees abreast of current IT development and operates its training program at full capacity given current resources.

We also agree that more needs to be done in the area of training and that the Board can play an important role. We have already taken a number of steps in that direction. Discussions are currently underway among several Board offices to explore the possibility of developing computer-assisted training, either as a supplement to classroom training or as an alternative for those who cannot be accommodated in the classroom setting. We are also considering a variety of delivery systems--video-conferencing, satellite communications, CD-ROM technology, Internet, and Intranet--all designed to allow us to expand the number of people we can accommodate. Our ultimate goal is to increase our outreach to as many additional agencies as possible.

We would hope to expand the content of our training programs to include management applications of computer technology. The Board has a particular concern with closing the gap between IT managers and general managers in the knowledge and use of technology in a management setting. In cooperation with the Executive Institute, OIR has sponsored two conferences which dealt with management applications of technology and outlined some "best practices" among state agencies. The topic of management and technology has become a continuing part of the Institute's curriculum. The proposed Center for Applied Technology would also play a role in the development of prototype technology applications and educational activities associated therewith.

The Board concurs with the recommendation that the state's role in IT training programs be reviewed. Our studies indicate that there is little statewide coordinated activity in most states regarding agency training efforts. It make sense that some significant economies of scale would probably be realized if joint efforts were developed by which training activities could be directed at larger audiences. We endorse the recommendation that agencies review their own training programs to ensure that users have appropriate training. However, in endorsing this recommendation, we recognize the importance of an agency making the determination of need in a setting which provides centralized coordination without imposing centralized control.

Privatization/Insourcing: pp. 47-50

The LAC report has recommended that the Board develop a method to evaluate IT functions for privatization or insourcing. The Board has never shied away from consideration of privatization as evidenced by its recent studies involving school bus transportation and the state fleet. In terms of IT,

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Mr. George L. Schroeder
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the state has been insourcing for years. Consider the fact that there are 54 individual entities currently on the OIR computer system and 10 individual entities on the Financial Data Systems computer. The state is also presently engaged in a major consolidation effort of its 11 data centers which will no doubt lead to additional insourcing. There is also the example of MUSC's outsourcing of its IT functions. It is the Board's objective to make our own in-house systems as efficient and cost-effective as those of the private sector. Rather than to develop standard methodology, we believe that the decision regarding privatization or insourcing is best left to each agency based on their individual needs and responsibilities.

Rate Structure: pp. 50-51

The LAC auditors have recommended OIR revise its rates to be based on usage. We agree that usage is a desirable basis for billing for mainframe utilization, and as a result of data center consolidation, this approach is now practical. However, there are several points which have been overlooked or misconstrued in the LAC report documentation. These facts explain why such an inflexible philosophy was not practical in the past and why OIR chose to use fixed fees in some cases.

First, the LAC study ignores the fact that most large state agencies historically operated their own data centers. Use of the state data center has not been mandatory. The LAC report is incorrect in its assertion that OIR did not have to compete in its provision of data center services. It is precisely because of the need to compete that some fixed fees have been necessary. In order to encourage large agencies to participate in a shared computing environment and thereby achieve the critical mass of customers needed to offer economies of scale, OIR had to provide the most competitive prices to large agencies. To have tried to operate a state data center without voluntary participation by at least a few of the large agencies would have resulted in extremely high prices for the many small agencies that needed computer support.

Second, the LAC study misconstrues the level of contributions received from the fixed fee agencies and portrays the arrangement as a 75 percent discount and a "subsidy." During FY 96, OIR's data center collected approximately \$8 million *in total*. However, the LAC study suggests that the true usage bill for the four fixed fee agencies *alone* should have been more than \$20 million. Recognizing that the OIR data center operates on a cost basis and that \$8 million covered all of its costs in FY 96, it is difficult to understand how the LAC auditors could have come to the conclusions that they did. The reality is that the four fixed fee agencies contributed almost 60 percent of the \$8 million collected by OIR for mainframe usage. Furthermore, it is incorrect for the auditors to have asserted that these four agencies could have operated their own data centers less expensively. This conclusion is premised on the suggestion that OIR would actually have billed \$20 million to these four agencies. Such a suggestion is without merit and has no basis in fact.

Finally, the LAC report fails to mention that OIR's policy for granting fixed fee rates was a response to legitimate demands by large customers that they benefit from the scale of business that

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Mr. George L. Schroeder
July 24, 1997
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was associated with their accounts. Logic would suggest that the greater usage by the large agencies supports pricing incentives.

In summary, we acknowledge the practicality of utilizing a usage-only rate in the new consolidated data center environment but only because large agency participation is now assured. It should also be noted that under consolidation, OIR will test the usage rates against national base line industry standards and will stand ready to defend the rates as reasonable, prudent, and competitive. All of our customers have had data processing alternatives in the past. The fact that they have chosen to remain with our systems clearly indicates that we are meeting their needs in a cost-effective manner.

Emerging Technologies: pp. 55, 57-64

The LAC report makes several recommendations regarding the Budget and Control Board's role with emerging technologies. In light of these recommendations, we would like to re-appraise the LAC of the current status of the Board's efforts in these areas. The first recommendation suggests that the Board implement the consolidated phone bill project. This is a project about which OIR has had ongoing discussions with BellSouth for several years. Discussion has centered around the economic and technical feasibility of implementing Electronic Data Interchange (EDI) for delivery of vendor telephone invoices via EDI. Initially, the software conversion costs to the state were prohibitive and precluded any practical consideration. However, recently discussions with BellSouth have been reestablished regarding electronic invoicing and payment of telephone bills. OIR is currently working with BellSouth and will involve the appropriate state government entities to determine the feasibility of implementing the pilot project.

Two recommendations deal with Electronic Commerce initiatives. For the past two years, the Board's Offices of General Services and Information Resources have been pursuing two major Electronic Commerce procurement initiatives, one of which was ignored and the other mentioned only in passing. The initiative that was ignored is the development of a new Client Server-based procurement system for General Services to facilitate Electronic Commerce procurement within state government and provide access to the vendor community. The second initiative is the Business Gateway project jointly developed by OIR, General Services, Enterprise Development, Inc. (a non-profit organization created to facilitate economic development efforts in conjunction with the U.S. Department of Commerce), and a funding grant from the U.S. Department of Commerce. Its goal is to encourage computer-to-computer procurement opportunities for small and minority businesses.

These two initiatives represent a substantial commitment of the Budget and Control Board to implement Electronic Commerce for government procurement functions. They are also consistent with the Electronic Commerce initiatives that have been established at the Departments of Revenue and Social Services in terms of the application of Electronic Data Interchange (EDI) and Electronic Benefits Transfer (EBT) technology.

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Furthermore, it should be noted that the role of the Information Resources Council is expected to be very significant in bringing about cross-government sharing of initiatives. It will be facilitated by the establishment of an Electronic Commerce Committee under the Standing Committee for Citizen Access to Government Information and Services. The Electronic Commerce Committee will build upon the Electronic Commerce initiatives that have been developed by various state agencies, including the Budget and Control Board, Department of Revenue, and Department of Social Services as well as other states and the federal government. An example of this would be the development of legislation to provide for digitized signatures for authorized use in South Carolina. We envision the role of the Electronic Commerce Committee, through its standing committee, to be the vehicle for the development of recommendations regarding appropriate legislation, policies, and regulatory and legal issues relative to Electronic Commerce applications in state government. Investigation of the feasibility of consolidating Social Services benefits is another potential Electronic Commerce application which this committee will pursue.

Methodology

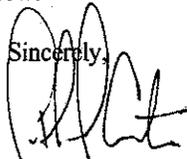
In closing, another point needs to be raised concerning the LAC report and that is the methodology used by the auditors. Judging by the use of terms such as "trends," the frequent citation of unnamed sources, and the paucity of references, we believe that it is clear that the auditors struggled with the scope of the audit from the beginning. We understand the difficult nature of an audit dealing with a subject matter as extensive and complicated as this. However, we have concerns that in a number of instances the auditors used simplified assumptions and jumped to conclusions which were inappropriate given the complexity of the issues in an enormously sophisticated environment.

The audit provided no cost benefit analysis for the recommendations and yet criticized the Board for not providing such analysis on a number of issues. A prime example is the recommendation that a CIO be appointed and that staffing for the CIO office be taken from FTE's in other technology offices of the Budget and Control Board. The report gives us no indication of the size of staff required, the cost of that staff, or the positions which could be taken from other offices without damage to the accomplishment of their respective missions. Absent this information, it is difficult to determine whether the proposed action is defensible. We strongly object to the repeated failure of the LAC report to avoid associating a cost with their recommendations in regard to the additional responsibilities they have recommended for the Board and consider it a disservice to the General Assembly. Also, the report referenced a few other states but they were only episodically mentioned; no detail data were provided and the report was selective in the information cited. We would have hoped that some of the issues raised in our initial response to the draft report would have afforded the audit more precision and enhanced its value to the General Assembly.

**Budget and Control Board
(Entire Report)**

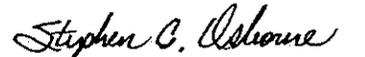
Mr. George L. Schroeder
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Page 17

Given that statutory responsibilities for the issues raised in the scope of this audit reside with the Budget and Control Board generally and with the Divisions of Operations and Budget and Analyses specifically, this response is submitted by the Executive Director with the concurrence of the Directors of the two Divisions which have specific statutory responsibilities. Accordingly, all three directors have affixed their signatures below.

Sincerely,


Luther F. Carter
Executive Director


Richard W. Kelly
Director of Operations


Stephen C. Osborne
Director of Budget and Analyses

Enclosures

NOTE: Due to the Legislative Audit Council's space restrictions, it is not possible to publish the exhibits referred to in the Budget and Control Board's response. The Budget and Control Board will make these exhibits available to interested parties.

Department of Health and Environmental Control
(pp. 21-23, 28-34, 35-37, 40-43, 52-53)



Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman
William M. Hull, Jr., MD, Vice Chairman
Roger Leaks, Jr., Secretary

Promoting Health, Protecting the Environment

Richard E. Jabbour, DDS
Cyndi C. Mosteller
Brian K. Smith
Rodney L. Grandy

July 24, 1997

George L. Schroeder
Director
Legislative Audit Council
400 Gervais Street
Columbia, SC 29201

Dear Mr. Schroeder:

Listed below is one comment on the final draft report entitled "Improving South Carolina's Management and Use of Information Technology", that was issued to DHEC on Friday, July 11, 1997.

Page 41, paragraph 2, last sentence: "DHEC's license for the new system does not allow it to be shared with other agencies."

Comment: DHEC's contract with Oracle allows 'agents' from other agencies to use the software licensed by DHEC, within the user/device limits specified in the contract. (Attachment II to comments submitted to LAC on June 19, 1997; Oracle Contract, Page 4, Number 5, Agents)

Thank you for providing us with the opportunity to respond. Please call Mary Fuhrman at 935-7560, if you need additional information.

Sincerely,

Douglas E. Bryant
Commissioner

cc: Dr. Lisa Waddell, Assistant Commissioner
Ben Lee, Deputy Commissioner for Administrative Services
Buddy Hudson, Director, PHSIS
Tommy Watson, Director, Finance
James Ferguson, Deputy Director, PHSIS
Ken Knight, Commissioner Office Systems, PHSIS
Cissy Stoertz, Office of Information Services, Administrative Services
Mary Fuhrman, Director, Office of Internal Audits

**Department of Health and Environmental Control
(pp. 21–23, 28–34, 35–37, 40–43, 52–53)**

production release as of the Effective Date specified below for use on the Designated Systems. The Acceptance Period for each of the Programs and all subsequent copies shall commence on delivery of the Master Copy of the Programs, and all subsequent copies shall be deemed accepted upon acceptance of the Master Copy. Customer shall be responsible for copying the software media for the Programs and installing the Programs for use in the United States in accordance with the terms specified herein. Customer may make additional copies of Documentation from bound and/or CD-ROM Documentation, up to one copy of Documentation for each licensed User/Device of the Programs. The license fees specified above shall be noncancelable and the sum paid nonrefundable. Customer agrees to pay applicable sales tax, media and shipping charges. Oracle may refer to Customer as a customer in sales presentations, marketing vehicles and activities.

C. OTHER

1. Payment Terms. Invoices for payment of license fees shall be payable 30 days from receipt of invoice.
2. Additional Programs. For a period of six months from the Effective Date and provided that Customer is current on its Technical Support payments, Customer may add the Programs listed below to the Network provided that such Programs are available in production release and are listed on Oracle's U.S. Price List for installation on the Designated Systems as of the date Customer elects to add the Programs to the Network. Customer acknowledges that the Programs may not be currently available. Customer agrees that it has not relied on the availability of such Programs in executing this Order Form and that the availability of such Programs will not affect Customer's payment obligations hereunder. Oracle is under no obligation to make available any Programs. The license fee for such Programs shall be at the specified discounts off Oracle's standard list license fees in effect when an order is placed. Customer may acquire Technical Support from Oracle for such Programs under Oracle's Technical Support fees and policies in effect when the services are ordered.

<u>Program License Type</u>	<u>Discount off Oracle's List License Fees %</u>
Full Use Database Programs	50%
Deployment Database Programs	65%
Full Use Development Tools	30%
Oracle Applications	20%

Programs for each listed category are set forth in Exhibit One, attached hereto and incorporated herein.

3. Credit for Terminated Licenses and Technical Support. In consideration for terminating Customer's Program licenses and Technical Support under Customer Support Identification (CSI) numbers: 668733, 668750, 1037740, 1037744, 1038072, 1039571, and 526007, as of the Effective Date, Customer shall receive a credit in the amount of \$2,304,705 toward the license fees due pursuant to this Order Form. A credit memo shall be issued to Customer for the unused portion of their Technical Support, if applicable.
4. Training Units. In consideration for the payment to Oracle of \$165,015 within 30 days of the Effective Date, Customer shall receive 579 Oracle standard Training Units which are valid for one year from the Effective Date of this Order Form. Each Training Unit may be used to acquire one day of instruction for one Customer employee at an Oracle Education Center in the U.S., exclusive of expenses. Additionally, 8 Training Units may be used to acquire one day of instruction for up to 15 Customer employees, at a Customer site in the U.S., exclusive of expenses.
5. Agents. Customer shall have the right to allow Customer's third party agents, which may include other employees of the State of South Carolina, ("Agents") to use the Programs for Customer's internal use purposes so long as Customer ensures that Agents use the Programs in accordance with the terms of this Agreement and Agents are subject at all times to the license limits provided hereunder.

Department of Natural Resources
(pp. 65–68)

South Carolina Department of
Natural Resources



July 18, 1997

Paul A. Sandifer, Ph.D.
Director

Alfred H. Vang
Deputy Director for
**Water Resources,
Land Resources &
Conservation Districts**
and
Geological Survey

Mr. George L. Schroeder
Director
Legislative Audit Council
400 Gervais Street
Columbia, SC 29201

Re: SCLAC Report "Improving South Carolina's Management and Use of Information Technology"

Dear Mr. Schroeder:

Thank you for the opportunity to review and comment on the final draft of the above-referenced report. We still have several conceptual problems with the report which are discussed below.

The commentary (page 67) on the Water Resources Division seems to suggest a program with no direction and no applications. This certainly is not the case. The statement on page 67, last paragraph, that "...commerce is 'way ahead' of DNR in developing applications for its GIS system." is misleading. The Commerce Department has done an excellent job with its program and it should be recognized. However, the data needs and the applications requirements of the Commerce Department and the Department of Natural Resources are entirely different.

The Commerce Department has been able to develop "turn key" applications approaches to industrial site selection because of the repetitive nature of the process. They use standardized data and client-specific criteria for site selection that is programmed into user-friendly decision support system types of applications. They are also fortunate that a high degree of positional accuracy is not required for their projects because they deal more with relative positions, i.e., ½ mile from an interstate, 50 miles from an airport, etc. As a result, existing 1:100,000-scale U.S. Geological Survey and U.S. Bureau of Census data are suitable for their applications. The only data they had to develop in order to become operational was the water and sewer infrastructure data which used the U.S. Geological Survey data files as their base map and the facilities data base which they maintain.

On the other hand, the Department of Natural Resources needs soils, wetlands, and other data at 1:24,000-scale which requires an exponential increase in data development efforts. More than 560 maps are required to cover South Carolina at this scale; whereas, 21 maps will cover the state at 1:100,000-scale. These data did not exist for South Carolina before the Water Resources

**Department of Natural Resources
(pp. 65–68)**

Mr. George L. Schroeder
July 18, 1997
Page two

Division initiated this program. As a result, the Department of Natural Resources through grants and cooperative funding projects has invested approximately \$6 million to build natural resource data that can be used by other state agencies. All data were cost-shared by federal mapping agencies which reduced the cost to the State and, most importantly, all data have been developed in accordance with Federal Geographic Data Committee and National Map Accuracy Standards.

It also is misleading to imply that the Department of Natural Resources has not used its system for applications development. We have completed a landscape-level resource evaluation and planning project for the Edisto River basin that required a high degree of iterative criteria application and data processing. The results of this project currently are being used by regional and local governments in the basin to address sustainable development issues.

The Department of Natural Resources also has initiated a statewide wetlands mitigation project, a GAP analysis project to identify habitat critical for maintaining biodiversity, a statewide reservoir siting model, and a coastal sediment model. Our agency is legislatively mandated to provide real-time data and response recommendations about various environmental hazards including floods, hurricanes, tornados, and earthquakes, and the mapping programs of the Water Resources Division contribute significantly to this process.

On page 68, under *Coordination of GIS Systems*, while no GIS professionals in South Carolina would argue against better coordination, the implied duplication of effort is overstated. In fact, few agencies are involved in data base development. Most use available base maps from federal mapping agencies such as the U.S. Geological Survey or the U.S. Bureau of Census. The primary goal of coordination should be the adherence to established data standards and promotion of data sharing mechanisms that allow users to access and apply data in their respective resource management domains.

Currently, through organizations such as the State Mapping Advisory Committee (SMAC), agencies are appraised of the data bases under development and their availability. Coordination and cooperation is being facilitated by the advent of the Internet. The Water Resources Division launched the SCDNR GIS Data Clearinghouse in May 1997 to make available all 1:24,000-scale digital natural resources data. This clearinghouse includes soils, wetlands/land use, elevation contours, stream networks, transportation networks, and administrative boundaries. It also includes digital raster graphics for all 566 topographic quadrangles in South Carolina which were developed by the Department of Commerce and soils data that were developed with funds from the Department of Health and Environmental Control. In the two months of service, more than 600 digital map files were downloaded by a wide variety of users from academic institutions, private consultants, State and federal agencies, conservation organizations, and private citizens.

**Department of Natural Resources
(pp. 65–68)**

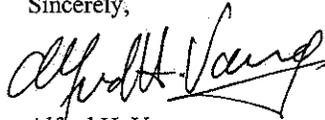
Mr. George L. Schroeder
July 18, 1997
Page three

And, finally, on page 68, the last paragraph of the "Coordination" section of the report indicates that the Governor's office created an Information Resources Council which in turn established a GIS committee presumably to oversee and coordinate GIS activities. In the Recommendation section, the LAC concludes that coordination and oversight of GIS should fall to the Chief Information Officer should one be established by the General Assembly. Clearly, the State does not need two such authorities. Additionally, oversight and coordination of GIS activities in the state should result from an independent committee that represents all users of the technology.

While this procedure is in place and negates your recommendation, it should be noted that existing law (The South Carolina Coordinate Act, §27-2-90) states that the S.C. Geodetic Survey shall, among other things, ensure the quality, accuracy, and compatibility of mapping products and shall serve as the focal point for federal, state, and local mapping programs and activities in South Carolina.

Again, thank you for the opportunity to provide these comments. I look forward to your response to my concerns.

Sincerely,



Alfred H. Vang
Deputy Director

AHV:kan

cc: Dill B. Blackwell

**Department of Social Services
(pp. 21-23, 52-53, 61-64)**



SOUTH CAROLINA DEPARTMENT OF SOCIAL SERVICES

James T. Clark, State Director, P.O. Box 1520, Columbia, S.C. 29202-1520

July 22, 1997

Mr. George L. Schroeder, Director
Legislative Audit Council
400 Gervais Street
Columbia, SC 29201

Dear Mr. Schroeder:

The South Carolina Department of Social Services herewith submits its comments to the final draft of the Legislative Audit Council's report to the General Assembly on "Improving South Carolina's Management and Use of Information Technology". We appreciate the opportunity to review this report. Please contact me should you require further information. Thank you.

Sincerely,


James T. Clark
State Director

JTC:dw

Enclosure

**Department of Social Services
(pp. 21–23, 52–53, 61–64)**

South Carolina Department of Social Services
Comments on Information Technology Audit (SUN 97)
Legislative Audit Council

For the past fourteen years the South Carolina Department of Social Services has utilized an automated tracking system to track, time, costs and direct charges of staff dedicated to all information technology projects. We consider the tracking and accountability of accurate system development costs critical to the measurement and reporting of information technology investment and cost benefit. It is also necessary to manage, track and report system development costs, to include staff time and direct charges, to meet Federal regulations and accurately draw down Federal matching funds for information technology projects.

The DSS Child Support Enforcement System reviewed by the Legislative Audit Council was developed and implemented in the 1984 -1989 time frame. All system costs, to include staff time and direct charges, were tracked and reported during this period for this system development. Specific information on staff time used for this project could not be provided to the Legislative Audit Council because this information had long since been purged from the system having served its purpose to track and aggregate system development costs. A review of current system development activities and projects would demonstrate that staff time and direct charges continue to be tracked and reported for all DSS information technology staff activities.

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