I C A P P

Intellectual Capital Partnership Program

Electronic Commerce and the State of Georgia: Analyses and Recommendations

Ephraim R. McLean, Ph.D.
Georgia State University

David S. McDonald, Ph.D.
Georgia State University

Thomas L. Case, Ph.D.
Georgia Southern University

With the assistance of
Janet Adams
Ralph Johnson
Robert Marsh

October 1999

Prepared by
the Department of Computer Information System
and the Electronic Commerce Institute
Georgia State University
Atlanta, Georgia

Table of Contents

ELECTRONIC COMMERCE
AND THE
STATE OF GEORGIA

Executive Summary

What exactly *is* "electronic commerce"? For some, it is an extension of the earlier electronic data interchange (EDI), where firms forged proprietary computer networks among trading their partners. For others, it is simply doing business over the Internet and, by extension, intranets and extranets. Although presently dominated by business-to-business transactions, the success of such companies as Amazon.com has given rise to business-to-consumer and even consumer-to-consumer (e.g., e-Bay) activities. Some e-commerce products have become entirely digital — there is no "physical" product. An example of this is music in the new MP3 format.

Some claim that e-commerce is merely "old wine in new bottles," a new name for a number of computer-based applications that have been around for some time. Although this is maybe true, it misses the point. The magnitude and the variety of these e-commerce innovations do violence to the word "merely." Estimates of the total volume of e-commerce activities vary widely. The U.S. Government Working Group on Electronic Commerce estimates next year's e-commerce volume at over $300 billion in the U.S. alone. Forrester Research estimates annual revenues of $1.3 trillion by the following year. Already Cisco Systems is doing a billion dollars of business *every month* over the Internet.

The growth of e-commerce, and information technology (IT) more broadly, has had a corresponding effect on employment, both good and bad. In 1997 (the most recent figures), workers employed in IT-producing industries earned $53,000 per year compared with the economy-wide average of $30,000. This huge difference is caused mainly by the shortage of skilled IT workers, which has bid up salaries, a condition which is not likely to improve for some time. By one estimate, there are currently over a third of a million unfilled IT jobs in the nation, and nearly twenty thousand in Georgia alone.

The IT industry, which plays a central role in the development and conduct of e-commerce, presently accounts for about eight percent of the U.S. GDP, while contributing 53 percent of the nation's real economic growth. Rapidly falling prices for all types of information technology have lowered the overall rate of inflation in the nation by an average of 0.7 percentage points a year.

However, as the growth of e-commerce accelerates, some are being left behind. A "digital divide" between the haves and the have-nots in e-commerce is occurring. Rural and inner city areas are lagging in comparison to major metropolitan areas like Atlanta. White households are more than twice as likely to have home Internet access than African-Americans or Hispanic Americans. This digital divide is troubling and must be addressed.

Against this backdrop, how does the State of Georgia stand, both nationally and in the South and Southeast region? In terms of total IT workers, Georgia stands fourth in the region (after Texas, Virginia, and Florida) and ninth nationally. It is projected to have the highest growth rate in the region and second nationally in the period 1996-2006. In terms of numbers of jobs (again 1996-2006), with a projection of 5,560 new IT jobs annually, Georgia ranks third in the region (after Texas and Virginia) and fifth nationally. Finally, in terms of IT worker intensity (i.e., share of the total state labor market), Georgia ranks second regionally and ninth nationally. As for cities, Atlanta ranks second regionally and eighth nationally as the most "wired" city (i.e., percentage of e-commerce penetration).

But the news is not all good. Statewide penetration of households with telephone and computers is in the bottom third nationally and in the bottom half for Internet access. While Atlanta is among the nation's leaders, the rest of the State is lagging behind. This is another example of the digital divide mentioned above. The growth of IT jobs is also problematic. While an estimated 5,560 new jobs are being created annually, less than 2,000 IT graduates are being produced annually by the entire University System of Georgia. A continuation of this shortfall will cause e-commerce jobs to be lost to other states — or even other countries.

What then should the State do? In Chapter 4 of this report, the strengths and weaknesses and opportunities and threats (SWOT) of the State with regards to e-commerce are analyzed, and specific policy recommendations made. Briefly, they fall into two categories: e-commerce-based activities that will enable State Government to function more effectively and thereby serve the State in a more cost-efficient manner, and Government initiatives that would encourage the private sector to locate and/or expand their e-commerce activities within the State.

In support of the first set of recommendations, it is argued that the State Government should act as a showcase for advanced e-commerce activities. Not only would such undertakings improve the functioning of state agencies, but they would serve as a highly visible indication of the importance which the State places on e-commerce activity.

As for the private sector, in addition to incentives for firms to locate and expand their operations here, there is a critical need to expand the production of IT-trained workers. Both the Department of Technical and Adult Education (DTAE) and the University System of Georgia (USG) need to gear up with both more faculty and expanded facilities to meet this demand. Legislative and administrative initiatives will be required to address these challenges.

CHAPTER 1
WHAT *IS* ELECTRONIC COMMERCE?

The *Webster's New World Dictionary* defines *commerce* as "the buying and selling of goods…" and *electronic* as "operating, produced, or done by the actions of electrons or by devices dependent on such action." These definitions provide a rudimentary understanding of what electronic commerce is, but there is much greater complexity to electronic commerce that prevents a concise definition upon which everyone can agree. This first chapter examines some of the definitions and classifications of electronic commerce and their implementation.

1.1 INTRODUCTION

Until the commercialization of the Internet in the early half of this decade, electronic commerce and electronic data interchange (EDI) were considered to be the same by most people familiar with the technology. EDI involved the interchange of data in standard formats between predefined trading partners using value added networks (VANs) established specifically for this purpose (Zwass, 1996).

After the Internet was opened up in the early 1990s to businesses and individuals, electronic commerce evolved to include a number of capabilities offered by this new communications medium. It became possible for unformatted communications to take place between businesses, and between businesses and consumers. Today, many managers think of electronic commerce as simply "the buying and selling of goods on the Internet" (Kalakota & Robinson, 1999; Riggins & Rhee, 1998), specifically the actual transaction that occurs "during" the sale, as shown in Figure 1-1 (Mougayar, 1998). This narrow definition might limit managers' abilities to see the strategic significance of electronic commerce (Riggins & Rhee, 1998).

The following table (see Table 1-1) lists some open-ended issues and activities associated with electronic commerce which provide a better feeling for the breadth of the subject. The narrowly focused list is typical of the press coverage of electronic commerce, and further serves to limit understanding of the topic (Mougayar, 1998). This report will look at the broader definitions of electronic commerce in an attempt to prevent this mistake.

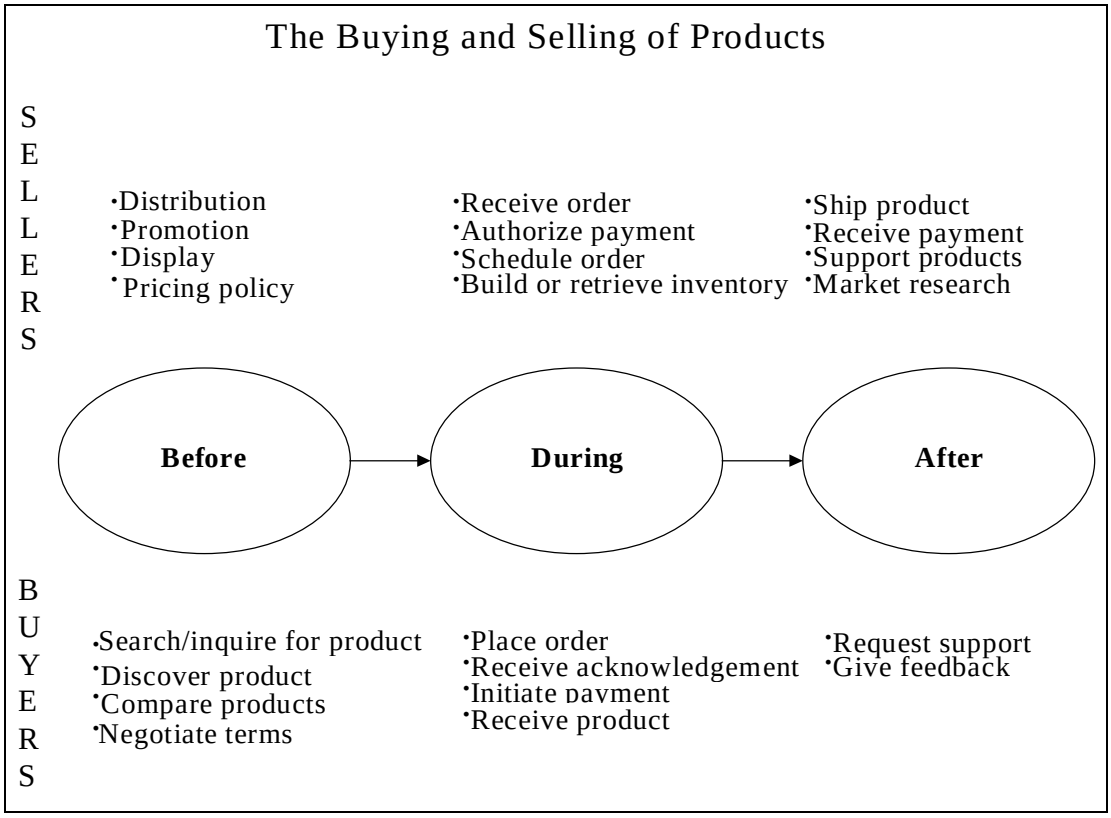

Figure 1-1 The Buying and Selling of Products (Source: Mougayar, 1998)

Narrowly Focused	Open-Ended
• Selling in cyberspace • Electronic shopping • EDI • Secure payment transactions • Home banking • Electronic publishing • Interactive marketing • Electronic catalogs	• Exchange of information and services • Creation of an open (global) marketplace • Spontaneous interaction among members of a value chain • Empowerment of customers • Platform for relationship management

Table 1-1: Issues Associated with Electronic Commerce (Source: Mougayar, 1998)

1.2 THE BROAD PICTURE

Electronic commerce can be more broadly defined as "doing business supported by the exchange of information in an electronic way" (Bons, Lee, & Wagenaar, 1998). Electronic commerce is made up of two subsets — Internet commerce and digital commerce. Internet commerce involves the use of Internet technologies (which can include intranets and extranets as well as the public Internet), while digital commerce is defined as transactions between computers using an "explicit syntax and semantics"

(Kimbrough & Lee, 1997). Most forms of electronic commerce fall into one or both of these categories.

Figure 1-2 provides an idea of some of the technologies that are — and are not — considered to be part of electronic commerce. Electronic data interchange (EDI), electronic funds transfer (EFT), and the file transfer protocol (FTP) are considered to be examples of digital commerce since they use formatted exchanges between two computer systems. E-mail, FTP, Internet-based videoconferencing, Web-based transactions, and Web-based multimedia applications are all classified under Internet commerce since they can be delivered over the Internet. Traditional videoconferencing is an example of electronic commerce that is not part of the Internet nor digital commerce subsets. Fax and telephone sales are generally not considered to be examples of electronic commerce, though they are included if they are used to process a transaction that was initiated through a standard electronic commerce technology. Mail order and television transactions are not included in any commonly accepted definitions of electronic commerce (Cameron, 1997).

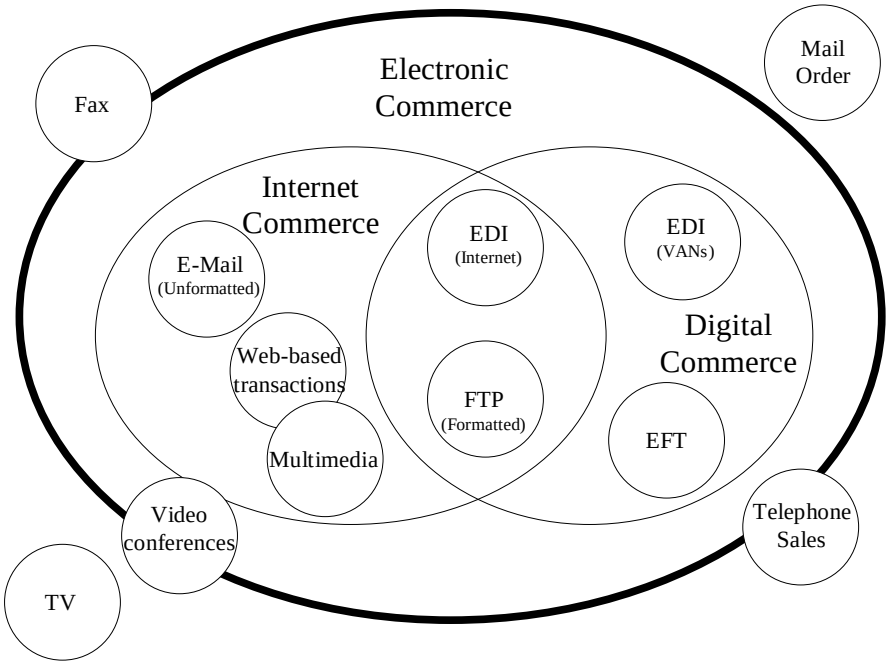

Figure 1-2: Pictorial definition of electronic commerce
(Sources: Cameron, 1997; Kalakota et al., 1997, Maddox, 1998; Kimbrough et al., 1997; and Riggins et al., 1998)

1.3 THE ELECTRONIC COMMERCE FRAMEWORK

Electronic commerce can be thought of as being built on three distinct layers (see Figure 1-3). First, there is the basic infrastructure that is required to conduct electronic commerce. The network or telecommunications infrastructure supports communications and includes phone, cable, wireless, and Internet services. The content infrastructure provides tools such as hypertext markup language (HTML), JAVA, and the World Wide Web which are used to provide network publishing and multimedia content.

The next layer is the services layer. It provides common services that are needed for conducting business activities electronically. These services include electronic payment, digital libraries, security, authentication, and other enabling services, and secure messaging services such as e-mail, electronic data interchange (EDI), and the hypertext transfer protocol (HTTP).

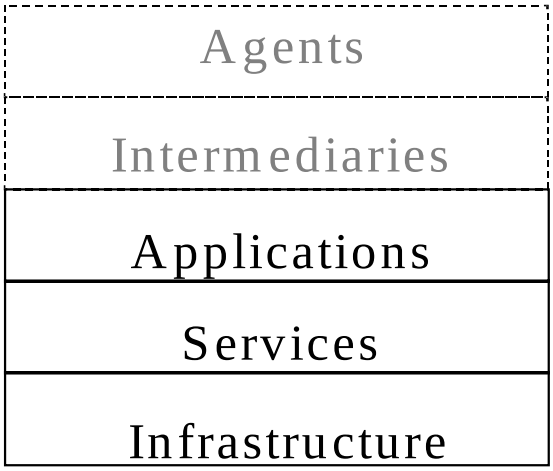

Figure 1-3: Electronic Commerce Infrastructure

Building on the first two layers, the third layer — electronic commerce applications — becomes possible. Applications can include home shopping, online advertising and marketing, purchasing and procurement, information and entertainment on demand, banking, supply chain management, and intranet-based collaboration (Kalakota & Whinston, 1997; Zwass, 1996).

Mougayar (1998) discusses two additional layers. The first is intermediaries, which represents new businesses or methods that differ from those that exist in the physical marketplace. Some examples include electronic auctions, online support and software delivery, and brokers for financial transactions and products or services. Another example is “infomediaries,” which provide third-party information and advice to buyers, who are often overwhelmed by the tremendous amount of information on the Web and are wary of the potentially biased information provided by sellers (*Economist*, 1999).

The second additional layer is for agents who utilize the services of the lower layers to handle specific tasks, such as finding information on a particular product that is available for sale. Agents can find and organize relevant information for the user, thus preventing the user from having to “surf” through a number of Web sites. Agents also have enough understanding of context to prevent the return of irrelevant information that often occurs with search engines (Mougayar, 1998).

1.4 INFRASTRUCTURE DISTINCTIONS BLUR

For people who focus on the infrastructure layer to define electronic commerce, two schools of thought exist regarding what constitutes electronic commerce (see Figure 1-4). Many recent practitioners focus on services that are available externally to consumers over the Internet. However, many researchers take a broader view which includes services used inside the company over intranets (Riggins & Rhee, 1998). As the "operational boundaries" between organizations have become more blurred, it has become less meaningful to "separate interorganizational and intraorganizational business processes" (Zwass, 1996). Also, as internal networks (intranets) are opened up to external customers, suppliers, and partners (extranets) — often using the Internet to provide this access — any perceived distinctions between internal and external services with regards to the definition of electronic commerce are rapidly disappearing (Hapgood, 1999). Over time, a single, unified view of electronic commerce should emerge as existing distinctions become less meaningful (Riggins & Rhee, 1998).

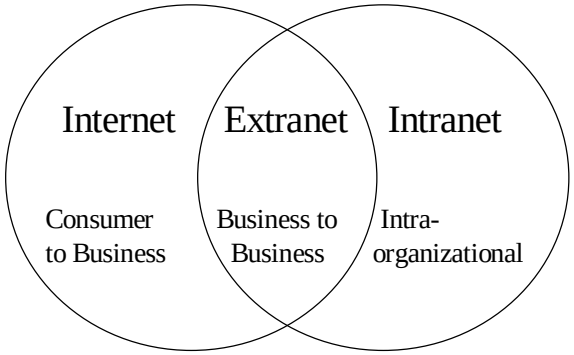

Figure 5: Extranets allow controlled access to internal resources

This expansion of the extranet is so critical that McCreary (1999) declares that "1999 stands as the year of the customer-care extranet." Worldwide, thousands of organizations have used extranets to provide order information, technical support, application sharing, collaboration for marketing and design work, and directory or catalog maintenance (Hapgood, 1999). Extranets, which "combine the privacy and security of an intranet with the global reach of the Internet," (Szuprowicz, 1998) are expected to be used for the vast majority of business-to-business electronic commerce by 2001.

1.5 STRATEGIC USE OF ELECTRONIC COMMERCE

Companies have "created enormous value for themselves and for their customers by making complex underlying business processes appear to be simple — and making themselves easier to do business with" (McCreary & Horgan, 1999). The ability to create this value is dependent on how well integrated systems are with data sources and business processes.

Dell Computer is an excellent example of the success that can be achieved from this integration. The company sells more than $15 million of computers over the Internet *every day*. Its suppliers are connected to Dell's corporate extranet; thus they are able to ensure delivery of required components since they have real-time information on the orders placed by Dell's customers. Dell also provides its customers with information on its Web site, which permits them to find the current status of their order, thus eliminating the cost of providing this information with human intervention. Dell's use of the Web, built on existing efficiencies, has created a "fully integrated value chain" (*Economist*, 1999).

The Dell example shows that "electronic commerce is about a global electronic marketplace that enables all members of a value chain to interact spontaneously for mutual benefits" (Mougayar, 1998). To realize this value, companies must strive not merely to conduct business electronically, but to become electronic businesses. This means realigning all the core business processes around the Internet (*Economist*, 1999). Companies must find leaders "with an eye for the entire business," rather than just technologists, if they expect to successfully exploit electronic commerce's potential (Kalin, 1999).

1.6 TYPES OF ELECTRONIC COMMERCE ACTIVITY

Electronic commerce can also be categorized based on the entities using it (Bollier, 1998) (see Figure 1-5). Business-to-business electronic commerce has been occurring for a number of years in certain industries where major players — such as General Motors or Wal-Mart — mandated the use of electronic data interchange with their suppliers. More recently, business-to-consumer electronic commerce has received extensive coverage as the World Wide Web (www) has made it possible for consumers to shop online with new companies such as Amazon.com and existing companies such as L.L. Bean. Despite the media focus on business-to-consumer electronic commerce, the business-to-business sector is still ten times bigger than the consumer market (Szuprowicz, 1998).

The more expansive definition of electronic commerce that is beginning to gain wider acceptance includes internal use of technologies such as e-mail and collaborative systems such as Lotus Notes, which enhance the sharing of knowledge and improve business communications (Romm & Sudweeks, 1998). Romm also proposes a distinct category for consumer-to-consumer commerce which is facilitated by an electronic broker, such as stock sales through E*Trade or the auctioning of goods through e-Bay. This represents a hybrid of the e-broker and auction models proposed by Jutla (1999). Note that the examples provided for consumer-to-consumer electronic commerce could also represent consumer-to-business or business-to-business activities, depending on who the participants are.

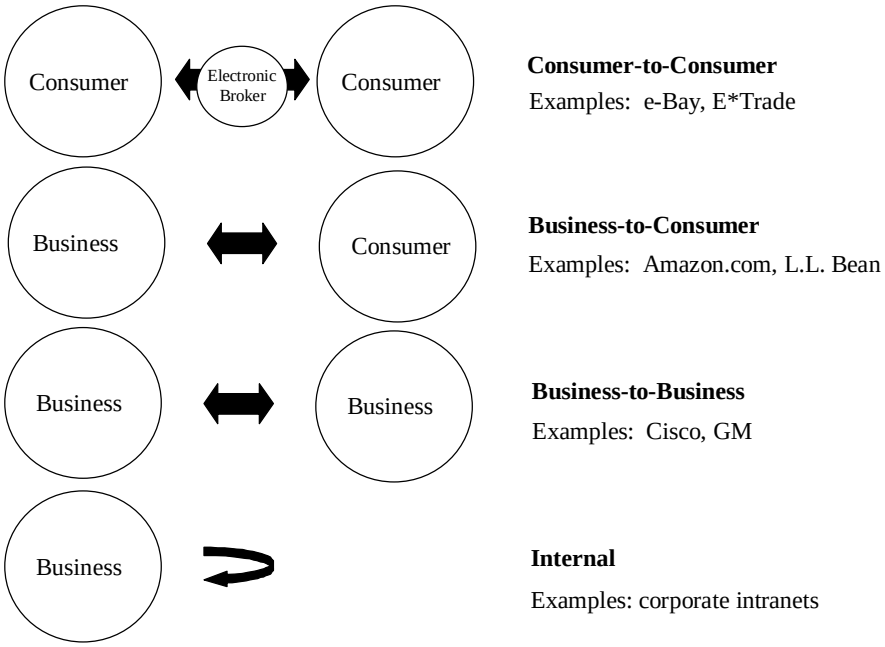

Figure 1-5: Classification of electronic commerce activity
(Source: Szuprowicz, 1998, with the addition of the concept of consumer-to-consumer)

Table 1-2 outlines the main characteristics for each of the four types of electronic commerce. Business-to-business relationships have traditionally been fairly rigid, requiring agreements and other preliminary work before business can be transacted electronically. Conversely, online retailers need to be able to serve any customer without a preexisting relationship, so credit cards are typically used in place of the purchase orders and requisitions used in transactions between businesses (Cameron, 1997).

Category	Major Characteristics
Business-to-Business	• Extranet based • Restricted to business partners • Firewall, encryption, and authorization levels • Payments by predetermined credit terms
Business-to-Consumer	• Internet based • Unrestricted access • Verified credit card payments
Consumer-to-Consumer	• Internet based • Unrestricted access • Credit card or cash equivalent payments • Facilitated by electronic broker
Internal	• Intranet based • Restricted to employees and customers • Firewall security, passwords, and authorization • Intracompany charge payments

Table 1-2: Characteristics of electronic commerce activity
(Source: Szuprowicz, 1998, with addition of the concept of Consumer-to-Consumer)

1.7 NEW VALUE CREATED BY ELECTRONIC COMMERCE

The widespread implementation of electronic commerce is a major revolution because it represents a drastic change from the way business is conducted in traditional commerce. In the electronic realm, the product or service itself, the entity conducting business, or the process through which the product or service is selected, produced, ordered, delivered, or consumed can be digital rather than physical. Figure 1-6 shows that any or all of these three components can be digital.

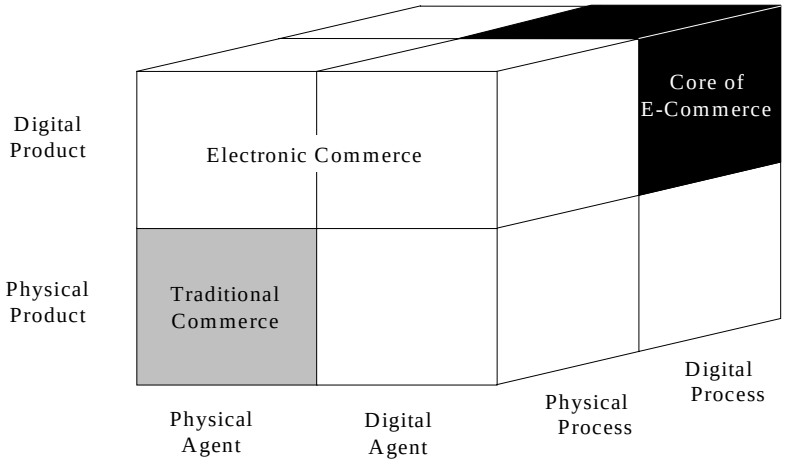

Figure 1-6 The Relationship between Physical and Digital Products and Processes (Source: Choi et al., 1997)

A shopper in a department store is an example of a physical agent, while an online shopper in a Web store is a digital example. A printed magazine is an example of a physical product, while an online copy of that same magazine would be a digital product.

Traditional commerce is purely physical — none of the three market components is digital. Conversely, "fully digital business" has no physical market components. This is called the "core" of electronic commerce, and everything from production to payment, delivery, and consumption occurs digitally online (Choi, Stahl, & Whinston, 1997). Information, entertainment, and software are just a few examples of digital products that can be purchased and delivered on the Web (Cameron, 1997)). "Conventional" electronic commerce covers all the remaining combinations, where each combination has some digital market components and some physical (Choi et al., 1997).

Information Online Consumers Aren't Comfortable Providing	
Credit Card	73%
Financial	73%
Personal	70%

Table 1-3: Consumer concerns (Source: Louis Harris/NCL)

However, not all consumers are comfortable in doing business on the Web (see Table 1-3). According to a study

conducted by Louis Harris and Associates for the National Consumer League, six million online consumers have been victims of credit card-related fraud or unauthorized use on the Web (http://Cyberatlas.internet.com/markets/retailing/article/ 0,1323,6061_ 153631, 00.html). "This survey shows that Web-era consumers are every bit as vulnerable as those who were around before the Internet changed the way that more of us do things," said National Consumer League President Linda Golodner. "While the Web can empower consumers with information, it also leaves the unwary exposed to new variations on old fraud and abuse schemes. We now have a much better sense of how consumer groups can use new technologies to meet the evolving needs of Americans in the information age."

The six million Web users who reported deception or misuse of their credit card represent seven percent of online consumers. "While the seven percent accounts for a still relatively small share of online users, the underlying number of 6,000,000 Americans marks this as a major consumer issue for the new century," said Louis Harris executive vice president David Krane. Despite the high number of fraud cases reported in the *Consumers in the 21st Century*, most Americans remain open to technology-related advances. More than three-quarters of Americans look optimistically to the future with the belief that new technology will make life easier and more convenient.

For instance, the survey found that almost two-thirds (63 percent) expect that by the year 2020, wires will not be needed in homes to operate computers and phones. Furthermore, the survey found that consumers expect banking to be affected most by technology advances. Two-thirds believe that it is likely that by the year 2020 all banking will be done online. The public is evenly divided on whether or not we will still be using paper money at that time, but three-quarters are secure with the idea of banking using ATMs and electronic fund transfers. More than half (57 percent) of adults believe that by 2020 they will be shopping online more than they are today, and one-third feel they will be shopping more by telephone by 2020. Interestingly, the majority of consumers predict that the use of shopping malls will be unchanged in the future.

What People Shop for Online (but don't necessarily buy)	
Category	**Shoppers (millions)**
Cars and car parts	18.2
Books	12.6
Computers	12.4
Clothing	11.6
CDs/Videos	11.4

Table 1-4: Shopping Preferences
(Source: Nielsen/Commerce Net)

Books (12.6 million shoppers), computers (12.4 million shoppers), clothing (11.6 million shoppers) and CDs and videos (11.4 million shoppers) top the list of items shopped for online, but they are all distant seconds to cars and car parts, with 18.2 million shoppers online as of April 1999 (see Table 1-4). "The Web is changing consumers' shopping habits both at home and in the workplace," said CommerceNet's Loel McPhee. "Companies have made it easier to get product

information and make purchases via the Web, and people are responding. To take full advantage of the Internet as a commercial vehicle going forward, companies must continue to shift their strategies to meet the needs of these new customers" (http://cyberatlas/internet.com/big_picture/demographics/article/0,1323,5901_150211,00.html).

Privacy concerns still top the list of issues affecting e-commerce according to a nationwide study, but many online consumers have put their fears aside (see Table 1-5). A national poll of 1,000 Americans found that only 13 percent of those polled indicated they have no fears about electronic commerce. The most popular concern was "privacy and security," which was cited by 53 percent of the sample. Twenty percent stated it was the inability to inspect products closely over the Internet, 6.4 percent said they didn't know how to shop online or it was too complicated, and 3 percent don't like to wait for delivery. Market Facts, Inc. for NetZero, a free Internet service provider, did the poll. The sample was taken from the general population, and was not limited to Internet users. "While consumers may have concerns about shopping online, these concerns have not affected their shopping habits," said NetZero CEO Ronald Burr. "The value and convenience that shopping with mouse and modem provides far out weigh any security downside." NetZero's study also found that women are more likely than men (56 percent to 49 percent) to have apprehensions about privacy and security issues related to shopping the Internet. Married people are more likely than single people to have privacy concerns (57 percent to 47 percent). The larger an individual's income, the more he or she is concerned with security issues. For people making less than $15,000 per year, 34 percent are concerned with privacy. For those making $50,000 or more, 63 percent are concerned with privacy.

Top Online Shopping Concerns	
Privacy and Security	53%
Can't inspect product	20%
Don't know how/Too complicated	6.4%
Wait for delivery	3%
Education and Privacy Concerns	
Education	**Concerned with privacy/security**
High school or less	42%
College	59%
Post Graduate	65%
Geography and Privacy Concerns	
Region	**Concerned with privacy/security**
West	47%
Midwest	54%
South	54%
Northeast	56%

Table 1-5 Security and Privacy Concerns (Source: NetZero)

Age, education, and geography also play a part in the privacy concerns of e-commerce. Respondents in the 35-44 age group were more inclined to have privacy and security concerns. Those in the 65 and over age group had the least amount of privacy concerns (23 percent), but they are also the least likely group to shop online. The more education a consumer has, the more likely they are to have security and privacy concerns, NetZero found (see Table 1-5). Americans in the West were least likely to be concerned with

privacy and security, the East were most likely (see Table 1-5). The number of men that cited waiting for delivery as a concern for e-commerce (4 percent) was double the amount of women (2 percent).

1.8 EMERGING VISIONS AND BUSINESS MODELS

The most successful e-commerce ventures start with a solid infrastructure that effectively integrates all or most business processes into its framework, extending online transaction processes to encompass internal and external enterprise systems.

The trend today is for e-commerce to incorporate almost every aspect of the enterprise. From its origins, where most efforts focused on engaging customer transactions on the Internet, e-commerce now includes the full value chain of a modern enterprise. For example, an e-commerce site can automate internal procurement and supply-chain management, as well as billing and payment procedures, and offer online customer relationship management.

James R. Borck says the first step to effective e-commerce is an accurate, thorough needs assessment (Borck, J., 1999). This is a four-to-six week process that determines how departments should be integrated into the firm's Web site. On a higher level, this process includes what systems the departments are using; whether the systems chosen can be easily integrated into the Web infrastructure; and which systems need to be rebuilt. Similar to any successful information system implementation, quality e-commerce efforts involve key management personnel taken from different departments. This is done to have a better understanding of the business rules and needs of each department. When completed, the needs assessment should be well documented for analysis and referral.

However, the trend for many companies is to outsource their IT needs. Thus, they may believe that it is not necessary to do a needs assessment or, for that matter, any e-commerce development internally. Although many small and midsize companies may need to outsource to keep staffing costs low and to minimize capital investments, larger enterprises require a responsiveness and level of security afforded only by centralized management of key elements of the firm's infrastructure. A higher level of control allows prompt detection and response to network outages and security breaches. Higher control also ensures the safeguarding of customer data as well as the capability to respond rapidly to changes in a competitive environment.

When building an e-commerce solution, other traditional information system factors, such as a secure networking architecture with high availability, load-balancing, and fault tolerance, must be considered. Also, the use of open standards will allow for greater flexibility when dealing with an uncertain future. Open standards also ensure the greatest likelihood of communicating with the broadest range of trading partners.

Similarly, the choice of the correct operating system may be crucial. Although Windows NT systems are initially less expensive to deploy and easier to learn, very few of

machines operated by NT run today's mission-critical systems. On the other hand, UNIX (and Linux) provides a more stable computing environment for enterprise systems, with fewer crashes and bugs when compared with NT. Unix also provides greater scalability and is less complicated to manage in large-scale environments when compared with NT.

Again, as with traditional information systems, when connecting an e-commerce site to existing enterprise resource planning and legacy data systems, there must be a decision whether to handle customization in-house or to buy off-the-shelf products. Doing the work in-house will initially impose higher labor costs, but reusable code provides greater flexibility for future expansions and doing the coding yourself ensures that specific strategic and technical requirements are met. Custom programming can present some stumbling blocks, however, particularly when integrating notoriously complex applications such as those from enterprise resource planning companies (ERP) such as PeopleSoft. The decision should be based on the internal staff's skill set and an assessment of the firm's capability. In addition, calling in a consultant experienced in integrating legacy systems to e-commerce systems can be more expeditious and, in the long run, affordable.

Finally, most Web development takes at least six months and $500,000 in budgetary commitments (Borck, 1999). Furthermore, according to IBM, whatever solutions that are implemented today will usually need to be updated within the next 18 months to 24 months. However, the benefits of a flexible, extensible e-commerce architecture can far outweigh the investments made in time, resources, and money. In fact, by most accounts, the switch to an e-commerce paradigm is not really a choice. To remain competitive, today's firms can ill-afford not to make the switch.

1.9 WHERE THE PRIVATE SECTOR STANDS

In a recent issue of *InfoWorld* magazine, a survey of 98 readers found that almost 81 percent were already involved with electronic commerce to some extent (Dugan, 1999). The most common electronic commerce applications centered on a company's core business, those goods and services that are essential to the organization's functioning.

Fifty-seven percent of respondents indicated they were currently engaged in the direct sale of their company's core product to another business, the classic business-to-business electronic commerce scenario. Fifty-three percent indicated they were buyers, having set up an electronic commerce system for purchasing the raw materials and goods needed to create their company's sellable product. Just shy of half of all respondents indicated they were selling goods and services directly to consumers via the Web.

Business-to-business electronic commerce cuts across all industries and is steadily increasing. In the *InfoWorld* survey, 48 percent of respondents said they were using electronic commerce to improve their day-to-day business operations with procurement systems for buying goods that are not put directly into a finished product, including such

products as staplers, office supplies, and even the PCs that make up the business infrastructure. Sixty-one percent of those surveyed indicated that they planned to upgrade or implement a new e-commerce system within the next 18 months.

It should be noted that these companies are relatively conservative. Only eight percent thought of themselves as early adopters of technology. The largest segment, almost 47 percent, considered themselves part of the early majority, while 39 percent indicated they were part of the late majority, or those who only adopted a technology once it had stabilized and had shown itself to be worthwhile. Moreover, respondents lamented technology standards, or the lack thereof, with half of all those surveyed saying a lack of standards was a significant roadblock to their electronic commerce projects.

Companies are spending millions of dollars on their e-commerce solutions, as well as planning for a large number of staff hours. On one particular type of e-commerce activity, the procurement of non-production goods, respondents to the *Infoworld* survey indicated they had invested an average of $419,000. When asked about their total spending plans in e-commerce for the next 18 months, respondents said they had budgeted $2.38 million on average. Five percent of those surveyed indicated they had allocated $10 million or more for new e-commerce systems in the next 18 months.

System development time was also found to be an important consideration. Most firms expected that it would take 12 months of IT time to get their e-commerce projects into full production. Additionally, respondents said the biggest impediment to implementing e-commerce initiatives was that their over-worked information system personnel had little time to take on new projects.

Lastly, most electronic commerce initiatives are driven by departments that may not understand the technology issues. More than two-thirds of those surveyed indicated that e-commerce plans were driven by business units within a company other than the IS department. Customer-service, marketing, and sales departments were most frequently cited as being the driving force for electronic commerce. However, a third of all respondents to the survey said a significant barrier to implementation was a lack of consensus among business units. A quarter of the respondents said a significant barrier was the lack of management buy-in to the electronic commerce concept.

In summary, this *InfoWorld* survey indicates that U.S. businesses are further along in implementing electronic commerce projects than most of us believe. Many prior studies have indicated that the benefits of electronic commerce will be realized at some date in the future. However, this *InfoWorld* survey indicates that most companies are well on their way to putting in the necessary infrastructure today.

1.10 COMPUTERS IN THE HOME

Table 1-6 shows the results of a study by the Consumer Electronics Manufacturers Association (CEMA) indicating that Internet sales of traditional consumer technologies to online households should reach at least $14 billion by 2002, representing 13 percent of total industry volume. CEMA's consumer research found that interest in buying consumer technologies should expand by at least 135 percent in the next two years. The survey was conducted through the use of e-mail with 2,725 online households in the US responding. "Whether consumers make the purchase online or not, the industry will see a tremendous increase in the use of the Internet as a research tool," said Todd Thibodeaux, VP of market research at CEMA. "On average, more than 75 percent of consumers who likely will make a consumer technology buy in the next two years will use the Internet to research their purchase."

Percentage of Cyber Shoppers Shopping and Purchasing Products Online		
Product	**Shopped Online**	**Bought Online**
Computer hardware & software	29%	37%
Home Office Products	18%	5%
VCR, DVD, or camcorder	12%	2%
Videogame/hardware/software	11%	5%
Cellular phones or pagers	11%	0%

Table 1-6: Products Purchased Online
(Source: CEMA)

More than two-thirds of the survey's respondents had shopped for or purchased a piece of computer hardware, a software item, or computer accessory using the Internet. Computer products are far and away the leaders of the pack when it comes to online electronic purchases. Other home-office products, such as phones and fax machines, are second with 23 percent of online shoppers using the Internet to help them make such purchases. However, traditional consumer technology categories such as home and portable stereos, color televisions, VCRs, and camcorders are starting to be impacted.

The survey also found that the rate of Internet shopping doubles (relatively) among those who use the Internet in combination with brick-and-mortar retailers to make traditional consumer technology purchases. The overall Internet shopping rate for color TVs was six percent. The shopping rate rose to 12 percent among people who regularly use the Internet as part of their shopping process. Other categories show similar increases according to CEMA. The VCR, DVD, or camcorder shopping rate rises from 12 percent to 18 percent. For home stereos, not only does the Internet shopping rate increase from 10 percent to 19 percent, but Internet purchases more than doubles to four percent when consumers use the Internet and traditional retailers to make a purchase. "The Internet and traditional retailing are working together in consumers' views," Thibodeaux said. "They don't see them as separate realms."

According to the CEMA survey, the typical consumer technology Internet shopper is most likely male (85 percent). Men are more than three times as likely to use the Internet to shop for consumer technology goods than women. The Internet customers are also

younger. Someone who uses the Internet to shop for a color TV or a home stereo product is more than twice as likely (proportionally) to be a Gen-Xer or a Baby Boomer, even after accounting for the lower overall home stereo purchase rates for the senior citizen. For instance, only five percent of senior citizens have used the Internet to shop for a home stereo product versus 12 percent and 11 percent for Gen X-ers and Baby Boomers. Online consumer-technology shoppers are also more likely to use the Internet regularly to become a more educated shopper and to buy at lower prices. The shopper is more likely to browse the Internet frequently in the buying process, rather than just going directly to a site to find what he or she wants.

1.11 THE USE OF THE PERSONAL COMPUTER FOR ELECTRONIC COMMERCE

According to research by Ziff-Davis' InfoBeads, more than 37 million PCs have been used for e-commerce and associated activities as of January 1999 (see Table 1-7). The activities varied from purchasing products and services to financial transactions and shopping. The results came from InfoBeads' latest *Technology User Profile* and shows a 41 percent increase from the estimated 26.4 million PCs used for e-commerce last year. The number of PCs actually used to make purchases exceeded 20 million, up 72 percent from last year's 11.6 million. When financial transactions, such as banking and stock trading are included, the figure increases to 26.0 million versus 16.3 million last year.

PCs Used for E-Commerce			
Activity	**January 1999**	**January 1998**	**Percent Increase**
	(number of PCs in millions)		
E-commerce purchases	20.1	11.6	72%
Electronic commerce activities	26.0	16.3	60%
Shopping activities only	29.7	21.8	36%
Electronic Commerce and activities (including shopping)	37.2	26.4	41%

Table 1-7: Personal Computer Penetration in Electronic Commerce
(Source: InfoBeads)

"While e-commerce may not have reached critical mass yet, 1998 was an important year," said InfoBeads analyst Miran Chun. "Last year, the e-commerce hype gave way to real purchases and lured curious shoppers to at least browse the Web for goods." The largest category of online purchases was consumer products and services.

According to InfoBeads, 16 million PCs were used to buy books, flowers, and travel services, among other things. The home segment made up more than half of the total market in each activity, except for the purchase of PCs and printers. The number of PCs used to hunt for products and services to purchase either online or offline increased from 21.8 million last year to 29.7 million this year, according to InfoBeads. "The growth in buyers is outpacing shoppers as more shoppers take the plunge and make purchases

online," Chun said. "Still, the top e-commerce activity was learning about products for offline purchase. When these users get comfortable completing the entire purchase cycle online, instead of just collecting information, the number of buyers will surge tremendously." The *Technology User Profile* is an annual survey of more than 11,000 US PC users.

1.12 E-COMMERCE SOFTWARE SOLUTIONS

Table 1-8 indicates that, by the end of 2002, $2.8 billion will have been spent worldwide on e-commerce software. In addition to this, Datamonitor found that 78 percent of this total would be derived from investment in distribution channel management, online procurement, and supply chain management (business-to-business e-commerce solutions). Business-to-consumer e-commerce, which in 1997 made up 41 percent of e-commerce software revenues, will in 2002 account for just 22 percent. According to Datamonitor, the Internet has pioneered new ways of dealing with traditional business processes such as procurement and distribution channel management, that did not exist with electronic data interchange, the predecessor to e-commerce. Despite the general disappointment with the use of the Web for revenue generation, companies will continue to invest in the business-to-consumer area, Datamonitor found.

E-Commerce Software Market		
	1997	**2002**
Global	$167M	$2,800M
Europe	23%	34%
Applications		
Supply	12%	30%
Distribution	36%	30%
Procurement	11%	18%
Business to Consumer	41%	22%

Table 1-8: Past and Projected Dollars and Percent Spent on E-Commerce Software (Source: Datamonitor)

Business-to-business e-commerce concentrates not so much on revenue generating as increasing competence of business processes, and how smaller and medium-sized enterprises can benefit through increased competence and disintermediation of the supply chain. The savings are then recognized at an internal level. According to Datamonitor, the true value of business-to-business e-commerce comes when other businesses undertake such solutions. When suppliers and buyers using e-commerce establish relationships, both can reduce their costs. Datamonitor analyst Jonathan Tikochinsky said, "If external business processes are to be automated, relationships with business partners will be vital." He goes on to conclude that "Companies will only invest if there are enough other enterprises investing, otherwise the technology will be of no use. This brings a need for 'trading communities.' These trading communities link businesses together so they can inter-operate and make e-commerce a reality."

* * *

From the information provided in this chapter, it is clear that e-commerce is not a passing fad. It is here to stay, and its influence is growing. In the next chapter, the status of e-commerce at the federal and state levels will be explored, with Chapter 3 giving particular attention to activities in the State of Georgia. Finally, in Chapter 4 a SWOT analysis — strengths and weaknesses, opportunities and threats — of Georgia's readiness for e-commerce will be examined, concluding with specific policy recommendations.

CHAPTER 2

WHAT IS HAPPENING WITH ELECTRONIC COMMERCE AROUND THE NATION?

2.1 THE FEDERAL LEVEL

2.1.1 U.S. EXECUTIVE BRANCH INITIATIVES

The Clinton Administration has maintained a keen interest in e-commerce and has established a number of initiatives designed to facilitate its evolution. It is important to note that, chronologically, many of the administrative initiatives summarized in this chapter of this report started after Congress enacted the Telecommunications Act of 1996.

As discussed below, the Telecommunications Act of 1996 has played an important role in promoting e-commerce by promoting a pro-competitive deregulatory national policy framework and opening telecommunications markets to competition. This Act, however, it is just one step in establishing a national agenda for electronic commerce. The Administrative Branch of the Federal Government has released several key reports focusing on, or directly related to, the continued growth of e-commerce. These either mention or briefly summarize a much larger number of more focused federal, state, and private sector initiatives that should facilitate the expansion of e-commerce in the U.S. and globally. Therefore, the reports cited in this chapter may be viewed as key resources for State policymakers interested in identifying models for State-level programs aimed at expanding e-commerce at the State level.

The Federal publications whose content is briefly summarized in this chapter are as follows:

- *A Framework for Global Electronic Commerce* (The White House, July 1, 1997)
- *U.S. Government Working Group on Electronic Commerce: First Annual Report* (November, 1998)
- *The Emerging Digital Economy II* (Department of Commerce, June 1999)
- *Falling Through the Net: Defining the Digital Divide* (U.S. Dept. of Commerce, July 1999)

- *The Digital Workforce: Building Infotech Skills at the Speed of Innovation* (U.S. Dept. of Commerce, June 1999)

A wealth of links to other federal documents on e-commerce is available through the following Web site: http://www.ecommerce.gov/governme.htm.

2.1.1.1 *A Framework for Global Electronic Commerce*

A Framework for Global Electronic Commerce was released by the Clinton Administration in July 1997. It outlines several overall guiding principles for e-commerce planners and strategists as well as key issues that must be addressed for e-commerce to flourish within the U.S. This document establishes a number of guidelines that can be valuable to state leaders and policymakers involved in developing state-level environments that are conducive for e-commerce.

The guiding principles recommended by the Clinton administration are summarized in Table 2-1. Key issues related to e-commerce policymakers are in Table 2-2.

• The private sector should lead.
• Governments should avoid undue restrictions on electronic commerce.
• Where government involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent, and simple legal environment for commerce.
• Governments should recognize the unique qualities of the Internet.
• Electronic commerce over the Internet should be facilitated on a global basis.

Table 2-1: Guiding Principles for E-Commerce from *A Framework for Global Electronic Commerce*

Table 2-1 conveys the Clinton Administration's belief that it governments should generally take a "hands-off" approach to electronic commerce at this time in order for it to gain a solid foothold from which it can grow and expand. Related issues that governments should address to facilitate the evolution of e-commerce are summarized in Table 2-2.

Customs and taxation
'Universal Commercial Code' for e-commerce
Privacy
Security
Telecommunications Infrastructure & IT
Technical standards
Electronic Payment Systems
Intellectual Property Protection
Content

Table 2-2: Key Issues for E-Commerce
(Source: *A Framework for Global Electronic Commerce*, http://www.ecommerce.gov/framewrk.htm)

In this report, the Clinton Administration recognizes the profound effect that the Internet is having on global trade and its ability to revolutionize business-to-business and business-to-consumer commerce across a vast array of industries. It also recognizes that to facilitate the realization of its potential, governments (including state governments) must adopt a non-regulatory, market-oriented

approach to electronic commerce. This approach should:

- respect the unique nature of the Internet;
- enable widespread competition and increased consumer choice as the defining features of the new digital marketplace; and
- facilitate the emergence of a transparent and predictable legal environment to support global business and commerce.

As noted in this report, governments can facilitate e-commerce by:

- encouraging governmental recognition, acceptance, and facilitation of electronic communications (i.e., contracts, notarized documents, etc.);
- encouraging consistent international rules to support the acceptance of electronic signatures and other authentication procedures; and
- promoting the development of adequate, efficient, and effective alternate dispute resolution mechanisms for global commercial transactions.

State governments can assist in promoting e-commerce by appropriately addressing these issues and ensuring that state e-commerce legislation and regulations are not in conflict with federal and/or international e-commerce laws, regulations, and agreements.

A Framework for Global Electronic Commerce notes that the continued growth in electronic commerce is dependent on the development of an appropriate telecommunications infrastructure and the evolution of the computers and information appliances that connect to it. Because of this, government policy should:

- encourage private sector investment in appropriate telecommunication infrastructures;
- promote and preserve competition by introducing competition to monopoly phone markets, ensuring interconnection at fair prices, opening markets to foreign investment, and enforcing anti-trust safeguards;
- guarantee open access to networks on a non-discriminatory basis, so that *all* users have access to the broadest range of information and services; and
- implement an independent regulatory agency charged with developing pro-competitive and flexible regulation that keeps pace with technological development.

Once again, state governments can play an important role in such efforts through legislation, regulatory policies, and state-level initiatives that are consistent with this report's overall policy recommendations.

This report also notes that the success of electronic commerce will require an effective partnership between the private and public sectors, with the private sector in the lead. According to the report, "government participation must be coherent and cautious, avoiding the contradictions and confusions that can sometimes arise when different governmental agencies individually assert authority too vigorously and operate without coordination." Georgia's governmental leaders should keep this in mind as they strive to develop an environment within the State that is conducive to the expansion of e-commerce.

2.1.1.2 *U.S. Government Working Group on Electronic Commerce: First Annual Report* (Nov. 1998)

This report essentially provides an update of the major governmental actions that transpired between the Clinton Administration's release of *A Framework for Global Electronic Commerce* in July of 1997 and November of 1998. It begins with a legislative update and notes that Congress has enacted four major pieces of legislation since 1997: the *Internet Tax Freedom Act Act*, the *Digital Millennium Copyright Act*, the *Government Paperwork Elimination Act*, and the *Children's Online Privacy Protection Act*. These acts addressed several of the major e-commerce issues outlined in the earlier *A Framework for Global Electronic Commerce.*

This Working Group's report also indicates that a number of international agreements related to e-commerce have been established since the release of *A Framework for Global Electronic Commerce.* A timeline for key international agreements is shown in Table 2-3.

Date	Action
July 1997	President Clinton issues *A Framework for Global Electronic Commerce* and the *Presidential Directive on Electronic Commerce*
July 1997	Global Information Networks Ministerial Conference in Bonn issues a *Declaration on Electronic Commerce*
October 1997	U.S. and the Netherlands sign a *Joint Statement on the Development of the Internet and Electronic Commerce*
November 1997	TABD issues communiqué at their Rome meeting regarding electronic commerce
November 1997	The APEC economic leaders issue a declaration on electronic commerce
December 1997	The U.S./EU *Statement on Electronic Commerce* is issued
March 1998	FTAA issues a *Ministerial Declaration* on electronic commerce
May 1998	WTO issues a *Declaration on Global Electronic Commerce*
May 1998	U.S and Japan sign a *Joint Statement of Electronic Commerce*
June 1998	U.S. and France collaborate to issue a *French-American Background Paper on the Challenges of the Information Society and the Digital Economy*
September 1998	U.S. and Ireland sign a *Joint Communiqué on Electronic Commerce* using digital signatures
October 1998	The OECD issues the *Ministerial Declaration* on authentication for electronic commerce and taxation
November 1998	U.S. and Korea sign a *Joint Statement on Electronic Commerce*

Table 2-3 Timeline of International Agreements

These international agreements reflect the Clinton Administration's continued support for expanding e-commerce both domestically and internationally.

The Working Group notes that businesses of all sizes are using the Internet to create, buy, sell, and distribute products and services and are realizing productivity gains from doing so. As a result, many firms are rapidly increasing their Internet business activities. The report notes that four companies — Cisco, Dell, General Electric, and Intel — were responsible for a combined $3 billion in Internet commerce in 1997 and are expected to collectively exceed $35 billion in online transactions by the year 2000. The Working Group predicted that total online Internet commerce is expected to exceed $300 billion very early in the next decade with contributions from virtually all sectors of the economy. Subsequent publications tend to indicate that this is an unrealistically *low* estimate of total Internet commerce.

The Working Group's report indicates that new issues have emerged while some old issues have increased in importance since the release of *A Framework for Global Electronic Commerce.* These key "new" issues include:

- Ensuring adequate bandwidth and access so that the growth of e-commerce is not inhibited by slow connection speeds. All telecommunications technology options (wireline, cable, wireless, terrestrial, and satellite) should be utilize to expand bandwidth and access, especially to under-served areas and populations.

- Ensuring consumer protection. Privacy, protection of personal information, and security of online transactions should be "givens" in the era of e-commerce.

- Bringing and expanding the Internet to developing countries so that they too can participate in and reap the benefits from e-commerce.

- Furthering our understanding of the digital economy including its effects on society, labor markets, and the rest of the economy.

- Ensuring that small businesses fully understand e-commerce and its potential benefits for them.

Recent data from other sources tends to reinforce the importance of such issues. The Zona Research group, for example, reports that potential buyers may discontinue potential Internet transactions if the information they request does not load within eight seconds. As indicated in Table 2-4, this research group suggests that slow download speeds account for as much as $3.86 billion in lost Internet sales each year.

Connection Type	Lost Sales Per Month (in millions)
14.4 Kbps modem	$73
28.8 Kbps modem	$97
56 Kbps modem	$100
ISDN	$14
T1	$38
Total:	$322

Table 2-4: Internet Sales Lost Monthly Because of Sluggish Web Downloads
(Source: Zona Research Inc., cited in *Business Week*, July 26, 1999, p. EB11.)

Consistent with the working group's observation, Table 2-5 illustrates that there is tremendous growth potential for e-commerce among small businesses.

Percent of small businesses with Internet access	32%
Percent that subscribe to online services	23%
Percent that have a Web site	10%
Percent whose computer systems permit remote access by customers/clients	8%

Table 2-5: Small Business Internet Activity in 1998
(Source: American City Business Journals and the Network of City Business Journals
Base: 785 small businesses (under 100 employees); date posted: Feb. 23, 1998)

The U.S. Government's Working Group on Electronic Commerce intends to release annual reports updating relevant federal-level activities. State-level policymakers should peruse these updates to ensure that they do not overlook federal and international activities that are directly related to e-commerce promotion within their own states (http://www.ecommerce.gov/governme.htm).

2.1.1.3 *The Emerging Digital Economy II*

The Emerging Digital Economy II report, released by the U.S. Department of Commerce in June of 1998, is a follow-up to the *The Emerging Digital Economy* report. Plans call for the publication of this report annually. Because of its content, state policy makers would be wise to review the most recent annual report for a "heads-up" on e-business's impacts on the general economy (http://www.ecommerce.gov/ede/).

Key points from *The Emerging Digital Economy II* include:

- Electronic commerce (business transactions on the Web) and the information technology (IT) industries that make e-commerce possible are growing and rapidly changing and are fundamentally altering the way Americans produce, consume, communicate, and play.

- Growth in available measures of e-commerce (e.g., estimates of the value of e-commerce business transactions) is outpacing last year's most optimistic projections.

In the retail portion of the economy, however, e-commerce remains quite small — less than one percent.

- IT-producing industries (i.e., producers of computer and communications hardware, software, and services) that enable e-commerce play a strategic role in the e-commerce growth process. Between 1995 and 1998, these IT-producers, while accounting for only about eight percent of U.S. GDP, contributed an average of 35 percent of the nation's real economic growth.

- In 1996 and 1997 (the last years for which detailed data are available), falling prices in IT-producing industries lowered overall inflation by an average 0.7 percentage points. These industries contributed to the U.S. economy's ability to control inflation and keep interest rates low during the time of historically low unemployment.

- IT industries have achieved outstanding productivity gains. From 1990 to 1997, IT-producing industries experienced a 10.4 percent average annual growth in Gross Product Originating, or value added, per worker (GPO/W). In the goods-producing subgroup of the IT-producing sector, GPO/W grew at the extraordinary rate of 23.9 percent. As a result, GPO/W for the total private non-farm economy rose at a 1.4 percent rate, despite a 0.5 percent growth rate in non-IT-producing industries.

- By 2006, almost half of the U. S. workforce will be employed by industries that are either major producers or intensive users of information technology products and services. Innovation has increased demand for highly paid, "core IT workers" (e.g., computer scientists, programmers, systems analysts, and computer engineers), has created new IT occupations, has changed skill requirements for some non-IT occupations, and has raised minimum skill requirements for many other jobs. As a result, wage gaps between workers in IT industries and all other workers continue to widen.

- In 1997, workers employed in IT-producing industries earned $53,000 compared with the economy-wide average of $30,000.

- The pervasiveness of information technology, the variety of its benefits to producers and consumers, and the speed of economic change in the digital era have tested the limits of established indices of economic performance. Federal statistical agencies have taken steps to improve data collection and analysis, but much remains to be done in this area.

- Both new Internet-based companies and traditional producers of goods and services are transforming their business processes into e-commerce processes in an effort to lower costs, improve customer service, and increase productivity.

This report includes a number of important facts and figures related to the recent growth of the Internet and e-commerce. *The Industry Standard,* for example, states that from 1998 to 1999 the number of Web users world-wide increased by 55 percent, the number

of Internet hosts rose by 46 percent, the number of Web servers increased by 128 percent, and the number of new Web address registrations rose by 137 percent (http://www.thestandard.com). In addition, a recent study by International Data Corporation (IDC) predicts that between 1998 and 1999 revenues of U.S. Internet service providers (ISPs) will rise by 41 percent. IDC projects that ISP revenues will continue growing at a compound annual rate of 28 percent through 2003 (http://www.idc.com). By any measure, the ability of consumers and businesses to reach the Internet and to engage in e-commerce is increasing rapidly; however, according to *Falling Through the Net: Defining the Digital Divide*, there are uneven rates of increase among demographic groups, regions, and countries.

According to Nua, an Internet strategy firm, as of May 1999, 171 million people across the globe had access to the Internet, over half of them in the United States and Canada (http://www.nua.ie/surveys). Not only do the United States and Canada occupy a large absolute share of the Internet world, they also have a high level of Internet participation on a per capita basis. Other data from a variety of sources show wide variations in the percentage of the population with access to the Internet, either at home or at work, by country or country group. For example, relative to population, the United States, Canada, the Nordic countries, and Australia have at least twice the level of Internet access so far achieved by the United Kingdom, Germany, Japan, and France.

This reports echoes other information from *Falling Through the Net: Defining the Digital Divide* (whose content is summarized next) by noting that within the United States, the growth in Internet access has occurred more rapidly at higher income levels and varies among various demographic groups and geographic areas. Such uneven growth has created a "digital divide" between certain groups of Americans; and between 1994 and 1997, this gap has widened between upper and lower income levels, and between whites and both blacks and Hispanics. Rural areas have lagged behind urban and central cities with respect to rates for online access. Similarly, throughout the world, lower income countries have lower rates of Internet access when compared to the higher income countries. In Mexico, a nation of close to 100 million people, for example, only about one million people have access to computers and only ten percent of those presently access the Internet (Jordan, 1998).

As noted in this report, the Internet is not only growing larger, but how it is used is changing. According to Media Matrix, as recently as 1996, education sites dominated the top 15 list of most visited sites; that year, the top 15 included *no* education sites. Today, nearly all of the top Web-site destinations offer content, communications, community, and commerce (Media Metrix press release, March 18, 1999, http://www.mediametrix.com). According to IntelliQuest Research, sending or receiving e-mail, general news, obtaining information about a hobby, and information for business continue to outrank online shopping as popular online activities (IntelliQuest Research, April 19, 1999, http://www.intelliquest.com). Growing business interest in the Internet can be seen in the doubling of advertising revenues more than doubled between 1997 and 1998 (Internet Advertising Bureau, Press Release, May 3, 1999, http://www.iab.net).

Available evidence of the growth of e-commerce is impressive. For example, during 1998, Dell Computer's online sales more than doubled, rising to more than $15 million per day and accounted for 25 percent of the company's total revenues. During the quarter ended April 30, 1999, Dell's online sales rose to an average of $18 million per day and accounted for 30 percent of the company's $5.5 billion first quarter revenues. Dell expects this percentage to increase to 50 percent by 2000 (Dell Computer Corporation press release, May 18, 1999, http://www.dell.com). Other examples of the growth of e-commerce include:

- During first quarter 1999, Travelocity.com had gross sales of more than $128 million. This was a 156 percent increase over the same period last year. The company registered 1.2 million new members during this time frame (SABRE news release, June 3, 1999, http://www.sabre.com).

- Users of Quicken Mortgage, Intuit's online mortgage provider, arranged for $400 million in loans in the first three months of 1999 compared to $600 million in mortgage loans for all of 1998 (Johnson, 1999).

This explosive growth has caused numerous e-commerce prognosticators to adjust their forecasts. For example, Forrester Research estimates that business-to-business e-commerce will rise to $1.3 trillion by 2003 (Forrester Research press release, December 17, 1998, http://www.forrester.com). This estimate exceeds the $300 billion business-to-business forecasts included in the *Emerging Digital Economy Repor*t in 1998. Similarly, early 1998 estimates suggested that Internet retailing might reach $7 billion by 2000. In all likelihood, this level was exceeded in 1998 (current estimates of 1998 online retail trade range between $7 billion and $15 billion). Forecasters now project online retail sales in the range of $40 billion to $80 billion by 2002. And even these increased forecasts of both business-to-business and business-to-consumer e-commerce may prove to be low if a recent study, financed by Cisco Systems, is a more accurate estimate. It estimated the1998 total e-commerce (business-to-business plus business-to-consumer) to be $102 billion (Barua, Shutter, & Whinston, 1999).

The first Federal Government data on the levels of e-commerce activity will be published in late 2000 or early 2001. The Census Bureau will ask about the dollar value of e-commerce sales in its *Annual Survey of Retail Trade* and will publish the results in late 2000 or early 2001, the first official U.S. data on e-commerce, covering online retail trade for the calendar years 1998 and 1999.

Similar to most of the documents summarized in this chapter, *The Emerging Digital Economy II* notes that a key factor in the continuing growth of e-commerce is the availability and cost of broadband access. Increased private investment in high-speed networks will facilitate the distribution of information, particularly bandwidth-intensive applications that use graphics and video. The availability of this increased bandwidth will enable Web-sites to mimic more closely the "real" store shopping experience as well as

encourage Internet innovators to construct multimedia environments and deliver them with little delay.

As mentioned previously, e-commerce's and IT-producing industries' impact on the rest of the economy is significant. Between 1995 and 1998, the IT-producing industries contributed, on average, more than one-third of total real economic growth. In addition, in both 1996 and 1997 (the last years for which detailed data are available), declining prices in IT-producing industries brought overall inflation down by 0.7 percentage points. The steep declines in IT prices for both 1996 and 1997 pulled down *overall* inflation to below 2 percent. This contributed to the remarkable ability of the U.S. economy to keep inflation at bay and interest rates low in a period of historically low peacetime unemployment. More detailed statistics on the estimated growth of IT industries, including software and computer services are included in this Government report.

This report also describes the major impacts that the diffusion of information technologies (IT) and growth in electronic commerce is having on labor markets. It notes that IT and e-commerce has affected the way businesses operate; it has forced some to adopt flexible organization structures and has generated operational efficiencies for large numbers of organizations. Small businesses are competing globally and multinationals are expanding their global operations.

Increased competition, global access, and organizational change are affecting labor markets by influencing employment demand, wages, and skill requirements. The report outlines the general trends in employment demand, wages, and skill requirements in information technology industries that are focused on in the Department of Commerce's *The Digital Workforce: Building Infotech Skills at the Speed of Innovation*. It notes that increasing employment demand in IT industries is accompanied by rising wages and skill requirements. By 2006, almost half (49 percent) of the private workforce is predicted to be employed either by industries that produce IT equipment or services or by industries that are heavy users of IT equipment or services. In 1989, 44 percent of the private workforce was employed in these industries.

Labor markets are responding to these changes. For example, a significant and growing training infrastructure is emerging to train workers for low-to-medium skill IT jobs through community colleges and proprietary training and certification programs. In addition, enrollment in U.S. four-year computer science programs has doubled in the past three years and government, business, and education have begun a number of joint initiatives to help increase the supply of IT workers.

This analysis also reports evidence of a "churning" effect of employment gains and losses among IT industries and occupations. The innovations in computing and telecommunications technologies that are rapidly creating jobs in some industries are causing jobs to be lost in other industries. This has increased the need for continuing education and worker retraining. IT professionals are finding that they must be "multi-skilled" and commit to a lifetime of learning and retraining in order to remain flexible in

the rapidly changing labor market. Detailed statistics documenting these trends are included in this Federal report.

This report also notes that in order to provide an immediate increase in the number of highly skilled workers available for employment in the United States, Congress acted to temporarily increase the annual number of visas available for high-skilled workers (H-1B non-immigrant visas). The quotas were increased from 65,000 to 115,000 for fiscal years 1999 and 2000, 107,500 in fiscal year 2001, then returning to 65,000 per year in fiscal year 2002. The 1999 cap was reached in June.

In addition to bringing workers in, companies can access global labor markets by sending the work out. The advances in technology that have contributed to the strong growth in demand for IT skills make it possible to rearrange work processes and distribute work over the globe in a variety of ways. This redistribution may involve outsourcing specific activities to firms located outside of the United States or establishing virtual teams, where team members collaborate over networks while remaining physically distant.

A number of initiatives designed to increase the U.S. IT skills-base (rather than importing needed talent or outsourcing IT work to firms located outside the U.S.) have been developed and implemented across the country. Many view such initiatives as essential for helping the U.S. maintain its lead in IT and e-commerce. These initiatives have emerged in numerous forms; but in many instances, educational institutions working together with the state and local governments are forging new partnerships with local businesses to develop courses that deliver the needed content. Examples of such initiatives listed in this report include:

- **Go for IT!:** A focal point of this initiative is a searchable database of more than 200 IT worker development programs across the country that is maintained by the U.S. Department of Commerce's Technology Administration (http://www.go4it.gov/). This database enables instructors to find educational tools for teaching IT skills to their students. It also enables workers to locate training opportunities for upgrading IT skills, students to search for scholarship and internship information, non-profit agencies to identify grant and other funding sources, and companies to find model programs that can be replicated to develop a skilled workforce in their own communities.

- **Maryland Applied Information Technology Initiative (MAITI):** This effort was started July 1998 through a special appropriation from the State of Maryland and is designed to make Maryland a national center for information technology business development. The principal goals of MAITI include doubling the number of IT professionals produced by Maryland's institutions of higher education and strengthening college and university IT research and development activities. (http://www.onestopshop.umd.edu/MAITI).

- **Tech Corps:** This is a national non-profit volunteer organization established in 1995 and funded by corporate sponsors that is improving K-12 education by helping educators to use technology in schools. Tech Corps volunteers conduct teacher training seminars, mentor students and staff, repair and install computers, participate on technology planning teams, work side-by-side with teachers in the classroom, assist teachers with the integration of technology into the curriculum, and support a wide variety of other local technology activities. Currently 42 states and the District of Columbia have Tech Corps chapters (http://www.ustc.org).

- **Talent Alliance:** This is a non-profit initiative launched in 1997 with two major goals: ensuring that employees have the skills they need throughout their working lives and ensuring that companies have the workforce talent they need. Member companies include Armstrong World Industries, AT&T, Ceridian, Complete Business Solutions, DuPont, GTE, Johnson & Johnson, Lucent Technologies, Metropolitan Life Insurance, TRW, Unisys, and United Parcel Service. The Talent Alliance is currently developing an Internet career management services system to provide distance learning (http://www.talentalliance.org) .

- **Cisco Systems Networking Academy Program:** In partnership with school districts throughout the United States, Cisco Systems has developed a four-semester program on the principles and practice of designing, building, and maintaining networks. The Networking Academies are localized to individual needs of high schools and junior or community colleges, and feature hands-on, project-driven training in high-demand job skills. There are currently Networking Academies in 28 states (http://www.cisco.com). Microsoft, Novell, and IBM have similar partnerships.

Georgia has not overlooked the importance of such initiatives. Georgia-based initiatives include ICAPP and the IT-workforce programs that have been developed by the Georgia Department of Technical and Adult education (DTAE). Still, Georgia policy makers should be aware of the major IT-workforce initiatives mentioned in *The Emerging Digital Economy II* and the potential for implementing and/or expanding these and similar programs within the State.

2.1.1.4 *Falling Through the Net: Defining the Digital Divide*

Falling Through the Net: Defining the Digital Divide (Commerce, 1999b) is an important document for policy makers who are interested in learning more about the societal impacts of the information revolution. It provides comprehensive data on the level of access that U.S. citizens have to telephones, computers, and the Internet and provides a factual foundation to promote greater access to such technologies for all Americans. The report provides compelling evidence that the "digital divide" between certain demographic groups (especially between whites and African-Americans and Hispanic Americans) and regions of the country continues to persist and is widening in some instances. The content of this report complements that of *The Emerging Digital Economy II* (discussed previously) and *The Digital Dilemma: Building Infotech Skills at the Speed of Innovation* (discussed next).

According to this report the "digital divide"— the divide between those with access to new technologies and those without — is now one of America's leading economic and civil rights issues. This report updates two previous reports: *Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America* (July 1995) and *Falling Through the Net II: New Data on the Digital Divide* (July 1998).

As noted in this update, the number of Americans connected to the nation's information infrastructure is soaring. Nevertheless, the digital divide exists and is widening rather than narrowing with the passage of time. Minorities, low-income persons, the less educated, and children of single-parent households, particularly when they reside in rural areas or central cities, are among the groups that lack access to information resources. Because Georgia has substantial numbers of citizens that fall into each of these categories, State policy makers cannot ignore the digital divide and should take steps to increase Internet access for all Georgians.

The report provides a wealth of valuable information that can be used by policymakers, researchers, industry, academics, and the general public. Critical data are presented in comprehensible charts and tables. Additional charts, a link to the original Census data, and the survey instrument can be obtained through the NTIA's Web site (www.ntia.doc.gov).

According to the report, at the end of 1998, more than 40 percent of American households owned computers and more than 25% had Internet access. In general, access to computers and the Internet has increased for all demographic groups and geographic regions since the NTIA began issuing these reports. Telephone access has also increased across time. However, the digital divide between the "information rich" (whites, Asians/Pacific Islanders, those with higher incomes, those with more educated, and dual-parent households) and the "information poor" (such as those who are younger, those with lower incomes and education levels, certain minorities, and those in rural areas or central cities) continues to persist.

The 1998 data include several troubling findings:

- Households with incomes of $75,000 and higher are more than *twenty times* more likely to have access to the Internet than those at the lowest income levels, and more than *nine times* as likely to have a computer at home.

- Whites are more likely to have access to the Internet from home than blacks or Hispanics have from *any* location.

- Black and Hispanic households are approximately *one-third* as likely to have home Internet access as households of Asian/Pacific Islander descent, and roughly *two-fifths* as likely as white households.

- Regardless of income level, Americans living in rural areas are lagging behind in Internet access. At the lowest income levels, those in urban areas are more than twice as likely to have Internet access than those earning the same income in rural areas.

- The gaps between white and Hispanic households, and between white and black households, are now more than six percentage points larger than they were in 1994.

- The digital divide, based on education and income level, also increased. Between 1997 and 1998, the divide between those at the highest and lowest education levels increased 25 percent, and the divide between those at the highest and lowest income levels grew 29 percent.

Further evidence of the digital divide can be observed in the following data included in the report:

- Those with a college degree are more than *eight times* as likely to have a computer at home, and nearly *sixteen times* as likely to have home Internet access, as those with an elementary school education.

- A high-income household in an urban area is more than *twenty times* as likely as a rural, low-income household to have Internet access.

- A child in a low-income white family is *three times* as likely to have Internet access as a child in a comparable black family, and *four times* as likely to have access as children in a comparable Hispanic household.

- A wealthy household of Asian/Pacific Islander descent is nearly *thirteen times* as likely to own a computer as a poor black household, and nearly *thirty-four times* as likely to have Internet access.

- A child in a dual-parent white household is nearly *twice* as likely to have Internet access as a child in a white single-parent household, while a child in a dual-parent black family is almost *four times* as likely to have access as a child in a single-parent black household.

The report includes a large number of tables and charts that illustrate these disparities.

On a more positive note, the report indicates that for Americans with incomes of $75,000 and higher, the divide between whites and blacks has actually narrowed considerably between 1997 and 1998. It also speculates that if computer prices and Internet access charges continue to decline, the divide between the information “haves” and “have nots” may begin to narrow. The increasing use of other Internet-accessing devices, such as televisions, palm computers, and Internet phones may also promote competition among manufacturers, reduce prices for consumers, and promote greater Internet access for all citizens.

The authors of this report contend that until every home can afford access to information resources, public policies and private initiatives will be needed to expand affordable access to those resources. Pro-competition policies designed to reduce the prices of basic phone and information services, as well as universal service policies are considered to be important steps toward eliminating the digital divide. Other approaches include provide assistance for low-income households (e.g., the Federal Communications Commission's Lifeline Assistance and Link-Up America and various state programs) and support for high-cost regions of the country (e.g., the FCC's Universal Service Fund and state and Federal rate-averaging programs). In addition, the U.S. Department of Agriculture's Rural Utilities Service (RUS) provides targeted lending and technical advice to help ensure that advanced telecommunications infrastructure is in place for rural communities. In a similar vein, the Rural Task Force of the Federal-State Joint Board on Universal Service reaches a similar conclusion on the rural telephone service (http://www.wutc.wa.gov/rtf). Expanding competition in rural areas and central cities is particularly important because these areas lag behind the national averages for PC-ownership and household Internet access.

Community access centers — such as schools, libraries, and other public access points — can also play an important role in narrowing or eliminating the digital divide. According to the 1998 data collected for this report, community access centers are particularly well used by those groups who lack access at home or at work. These same groups (such as those with lower incomes and education levels, certain minorities, and the unemployed) are also using the Internet at higher rates to search for jobs or take courses. Hence, there is evidence that providing public access to the Internet can help the "have not" groups advance economically, as well as help them acquire the technical skills needed to contribute to today's digital economy.

According to data in the report, Georgia is ranked among the lowest tier of states in terms of telephone penetration with a 91.4 percent penetration rate. Among states in the South and Southeast, only Louisiana and Mississippi have lower telephone penetration rates and also find themselves classified in the lowest tier (see Table 2-6).

State	Total Households (in thousands)	Percent with Telephone	Tier
Minnesota	1,865	98.0	1
North Dakota	245	97.5	1
Maryland	2,101	97.2	1
Pennsylvania	4,589	96.7	1
Delaware	291	96.6	1
Maine	517	96.5	1
Wisconsin	2,040	96.4	1
Missouri	2,199	96.2	1
Oregon	1,307	96.0	1
Iowa	1.162	96.0	1
Ohio	4,481	9.8	2
Nebraska	652	95.8	2
Alaska	215	95.7	2
New Hampshire	451	95.6	2

Table 2-6: Telephone Penetration Among U.S. Households By State

State	Total Households (in thousands)	Percent with Telephone	Tier
Washington	2,227	95.5	2
Massachusetts	2,398	95.5	2
Colorado	1,550	95.4	2
New York	6,974	95.1	2
Connecticut	1,252	95.1	2
California	11,782	95.1	2
New Jersey	2,933	95.1	2
Michigan	3,793	94.9	2
Vermont	240	94.8	2
Montana	351	94.7	2
Rhode Island	375	94.6	2
Utah	674	94.6	2
Kansas	1,052	94.5	2
Idaho	446	94.1	2
Wyoming	180	94.0	2
Indiana	2,338	93.9	2
Alabama	1,688	93.6	2
North Carolina	2,928	93.6	2
West Virginia	750	93.5	2
Tennessee	2,221	93.4	2
Hawaii	393	93.2	2
Nevada	665	93.1	2
Arizona	1,732	92.9	2
Kentucky	1,591	92.9	2
South Carolina	1,488	92.6	2
Virginia	2,629	92.3	2
Florida	6,012	92.3	2
Illinois	4,507	91.8	3
Texas	7,302	91.6	3
Georgia	**2,926**	**91.4**	**3**
Louisiana	1,586	91.1	3
Washington, DC	235	91.0	3
South Dakota	280	91.0	3
Mississippi	1.078	90.3	3
Oklahoma	1,297	89.6	3
Arkansas	1,026	88.7	3
New Mexico	649	87.1	3

Table 2-6: Telephone Penetration Among U.S. Households By State (cont'd)
(Source: *Falling Through the Net: Defining the Digital Divide,* Table I-1, p. 16)

The report also indicates that Georgia fell into the lowest tier of states in terms of the percentage (35.8%) of households with computers in 1998 (see Table 2-7). Other states in the South and Southeast included in the lowest tier include Alabama, Louisiana, North Carolina, South Carolina, Mississippi, and Tennessee.

State	Percent of Households with Computers	Tier
Alaska	62.4	1
Utah	60.1	1
Washington	56.3	1
Colorado	55.3	1
New Hampshire	54.2	1

Table 2-7: Computer Penetration Among U.S. Households By State

State	Percent of Households with Computers	Tier
Oregon	51.3	1
Idaho	50.0	1
Vermont	48.7	1
New Jersey	48.1	1
Minnesota	47.6	1
California	47.5	1
Virginia	46.4	1
Maryland	46.3	1
Wyoming	46.1	1
Arizona	44.3	2
Michigan	44.0	2
Connecticut	43.8	2
Kansas	43.7	2
Indiana	43.5	2
Maine	43.4	2
Massachusetts	43.4	2
Wisconsin	43.0	2
Nebraska	42.9	2
Illinois	42.7	2
Hawaii	42.3	2
New Mexico	42.2	2
Missouri	41.8	2
Nevada	41.6	2
South Dakota	41.6	2
Iowa	41.4	2
Washington, DC	41.4	2
Rhode Island	41.0	2
Montana	40.9	2
Texas	40.9	2
Ohio	40.7	2
Delaware	40.5	2
North Dakota	40.2	2
Florida	39.5	2
Pennsylvania	39.3	2
Oklahoma	37.8	3
Tennessee	37.5	3
New York	37.3	3
Kentucky	35.9	3
Georgia	**35.8**	**3**
South Carolina	35.7	3
North Carolina	35.0	3
Alabama	34.3	3
Louisiana	31.1	3
Arkansas	29.8	3
West Virginia	28.3	3
Mississippi	25.7	3

Table 2-7: Computer Penetration Among U.S. Households By State (cont'd)
(Source: *Falling Through the Net: Defining the Digital Divide,* Table I-2, p. 24.)

According to this report, 23.9% of the households in Georgia have Internet access. This ranks 33rd of the 50 states (see Table 2-8). States in the South and Southeast with lower percentages and rankings include Alabama, Louisiana, North Carolina, South Carolina, Mississippi, and Tennessee.

State	Percent of Households with Internet Access
Alaska	44.1
New Hampshire	37.1
Washington	36.6
Utah	35.8
Colorado	34.5
Oregon	32.7
Connecticut	31.8
Vermont	31.8
New Jersey	31.3
Maryland	31.0
California	30.7
Arizona	29.3
Minnesota	29.0
Massachusetts	28.1
Virginia	27.9
Hawaii	27.9
Florida	27.8
Idaho	27.4
Rhode Island	27.1
Illinois	26.5
Nevada	26.5
Indiana	26.1
Maine	26.0
New Mexico	25.8
Kansas	25.7
Michigan	25.4
Wisconsin	25.1
Delaware	25.1
Pennsylvania	24.9
Ohio	24.6
Texas	24.5
Missouri	24.3
Washington, DC	24.2
Georgia	**23.9**
South Dakota	23.9
New York	23.7
Nebraska	22.9
Wyoming	22.7
Iowa	21.8
Alabama	21.6
Montana	21.5
South Carolina	21.4
Tennessee	21.3
Kentucky	21.1
North Dakota	20.6
Oklahoma	20.4
North Carolina	19.9
Louisiana	17.8
West Virginia	17.6
Arkansas	14.7
Mississippi	13.6

Table 2-8: Internet Penetration Among U.S. Households By State
(Source: *Falling Through the Net: Defining the Digital Divide*, Table I-2, p. 30.)

The data in this report suggest that policymakers should explore ways to continue to boost telephone penetration, and to expand computer and Internet connectivity,

particularly among the under-served. For some individuals, lower prices, leasing arrangements, and even free computer deals will help them bridge the digital divide. For high-cost communities and low-income individuals, universal service policies are likely to be of critical importance. For other individuals, language and cultural barriers need to be addressed; and in some instances, products will need to be adapted to meet special needs, such as those of the disabled community. In general, policymakers should develop more aggressive outreach efforts that target the information disadvantaged.

In another measure of electronic commerce penetration, Table 2-9 shows a ranking of U.S. cities by their internal usage. On this listing of major cities, Atlanta ranked eighth nationally.

TOP U.S. CITIES RANKED BY PERCENT OF POPULATION ONLINE

DMA Designation	Percent Online
San Francisco Bay Area, CA	72
Miami, FL	67
Houston, TX	65
Seattle/Tacoma, WA	65
Washington, DC	64
San Diego, CA	64
Cleveland/Akron, OH	62
Atlanta, GA	**61**
Dallas, TX	60
Philadelphia, PA	60
Sacramento, CA	59
Los Angles, CA	59
Chicago, IL	58
New York, NY	58
Phoenix, AZ	57
Boston, MA	57
Denver, CO	55
The United States as a nation	55
Detroit, MI	52
Minneapolis/St. Paul, MN	52
Pittsburgh, PA	49

Table 2-9 Cities with the Highest Online Populations
(Source: INTECO Corp.)

Some 72 percent of adults in the San Francisco Bay area regularly access the Internet, making it the most wired community in the nation, according to INTECO Corp. "Given the large number of technology-related companies in the area, we were not surprised that it ranked high on the list," said Dr. Harry Doyle, INTECO's VP Senior VP for Research. "However, growth in the number of Internet users was even faster than we were expecting, both in terms of accessing from home and those accessing from work." INTECO surveyed 16,500 nationally representative U.S. households in December of

1998 and found that 108 million adults, approximately 55 percent of the adult population, had accessed the Internet at least once in the previous 30 days. The December 1998 figure was up 38 percent from May of 1998 and 71 percent from September of 1997. According to INTECO, 76 million Internet users have access from home and 51 million have access from work. Twenty-four million users have access to the Internet from schools, libraries, or community centers, and 22 million have access from a friend or relative's home, according to the research. The research also found that 39 percent of Internet users are in the 18-34 age group and 38 percent are 35-49 (http://cyberatlas.internet.com/big_picture/geographics/article/0,1323,5911_151251,00.html).

2.1.1.5 *The Digital Work Force: Building Infotech Skills at the Speed of Innovations*

The Digital Work Force: Building Infotech Skills at the Speed of Innovation (Commerce, 1999a) focuses on one of the key economic impacts that the rapid expansion of e-commerce is having; that is, its contribution to already tight IT labor markets. As noted in this report, there has been sustained rapid growth in the demand for highly-skilled IT workers — and the rate of increase in this demand has accelerated in recent years. The demand is a product of the Information Age — virtually every segment of the American economy has embraced IT because of its potential to produce productivity improvements, as well as new capabilities, products, and services.

IT is ubiquitous in the U.S. economy. This is apparent in the shift of businesses' equipment investments in information technologies, in the emergence of the Web as a key venue for commerce and communication, and in the proliferation of computers in businesses and homes. As a result, demand for highly-skilled IT workers leads all other occupations; and this trend is expected to continue in the years ahead.

Increased demand is also driven by the increasing variety and complexity of software and hardware products and the unique business requirements of each industry. This combination of factors has created "spot" demand for workers with unique combinations of IT skills, experience, and industry knowledge — expressed often by employers as needing "the right person, with the rights skills, at the right time." The combination of time-sensitive competitive pressures and limited-time need for employees with unique combinations of technical skills, business skills, and hands-on experience has led many employers to pursue "buy" decisions in this labor market, rather than "make" or "grow." As a result, there is a need to address both the general growing demand for highly-skilled IT workers, as well as industry needs for niche talent.

The report focuses primarily on "core IT occupations " which include computer scientists (including database administrators, computer support specialists, and all other computer scientists), computer engineers, systems analysts, and computer programmers. Some key facts and figures from the report that help explain the growing demand for IT workers are the following:

- Information technology's share of the U.S. economy nearly doubled between 1977 and 1998, growing from 4.2 percent to 8.2 percent.

- Information technologies contributed more than a third of real U.S. economic growth between 1995 and 1997.

- The cost of computing — measured in millions of instructions per second, or MIPS — fell 98.5 percent from $230 in 1991 to $3.42 in 1997; it is expected to fall below a dollar by the end of 1999 and to about one-fifth of a cent within a decade.

- The decline in computing costs is credited with reducing inflation by more than a full percentage point in 1997.

- In 1994, three million people used the Internet. Year-end 1998 figures indicate more than 147 million people worldwide were accessing the Internet at least once a week from home or business. The number of Internet users is projected to grow to approximately 320 million by 2000, and to 720 million by 2005.

- Traffic on the Internet is doubling every 100 days. The rapid growth in traffic is generating demand for both hardware and software, as well as for skilled IT workers to implement and manage these systems.

- Between 1998 and 2003, U.S. business-to-business commerce over the Internet is projected to grow from $48 billion to $1.3 trillion, with an additional $1.8 to $3.2 billion in global e-commerce; and U.S. consumer sales over the Internet are projected to rise from $3.9 billion to $108 billion.

These statistics are comparable to those reported earlier in this chapter.

Echoing many of the points made in *The Emerging Digital Economy II*, this report states that many companies have turned to a "buy" strategy to gain the critical skills they need, and they have undertaken a wide range of strategies to attract and retain workers.

Unlike so many occupations in which job stability is a hallmark of success, the business environment in IT has created a labor market in which job hopping serves as a means to gain the vital technical skills needed for career advancement. Research by the Computing Research Association supports this finding, "Jobs are now regarded as another element of the training process, of learning by doing, and employees move from job to job to gain new skill sets and experiences rather than assume they will stay with a particular company for life. Acquiring new skills allows them to move within the entire IT work community for opportunities, rather than solely within a particular company."

This report notes that states have become directly involved in IT recruitment efforts often because they see a highly-skilled IT work force as a major tool to encourage economic development. As a result, some states and regions have instituted efforts to lure people away from other regions of the country. For example, the State of Michigan launched its

"Come Home to Michigan" campaign to attract IT workers who grew up in Michigan or were educated there. The Minnesota High Technology Association, in partnership with the Minnesota Department of Economic Security, conducted a five month "Upgrade to Minnesota" ad campaign in Silicon Valley to introduce workers there to the advantages of Minnesota living. The campaign reportedly generated thousands of resumes of technical and scientific workers for the sponsoring companies.

The loss of skilled IT workers to other states is also a concern of state, regional, and local economic development officials. For example, the Hudson Valley, New York area is losing IT professionals to contract work for employers in other areas. At a Hudson Valley town meeting it was noted that the northern New Jersey market pays IT professionals 10 percent more and New York City pays 25 percent more. Similar anecdotes echo around the State of Georgia when contrasting local and Atlanta labor markets.

Other states view IT as a potential tool to keep the residents from moving to other states for job opportunities. U.S. Senator Kent Conrad (D-ND) expressed his concern about the isolation of small towns around the country stating, "There is a need to keep the best and brightest in North Dakota. This is the biggest concern of parents. IT is an opportunity to provide these jobs." (Commerce, 1999a) Many Georgia parents share similar concerns.

As noted earlier in *The Emerging Digital Economy II*, the tight IT labor market has caused some employers to look to foreign workers to meet their skill needs. The issue of whether or not to allow larger numbers of skilled foreign workers to enter the country in order to meet employers' demands for new IT workers is contentious. Of late, the debate has focused on the allowable number of H-1B visas, which allow skilled foreign workers to work in the United States for up to six years. Although H-1B visas are "non-immigrant" visas, they are often used as a stepping-stone to permanent immigration. Immigration data indicates that nearly half of the people who become permanent employment-based immigrants convert from H1B-visa nonimmigrant status.

This report also notes that mid-career IT professionals have experienced difficulties in today's IT labor market. Widely cited reasons for the difficulties experienced by these workers include:

- The IT industry is populated by many younger workers. Approximately 75 percent of computer systems analysts and scientists, and nearly 80 percent of computer programmers are under the age of 45 (Information Technology Association of America. Winter 1999, available at http://www/itaa.or/govt/pubs/ppr.htm).

- Many managers in the IT industry are in their 20s and 30s, and may be uncomfortable hiring or managing older and more experienced workers. For example, a *Network World* survey of 200 readers with some hiring responsibility showed that younger network managers are less likely to hire older workers than younger workers and almost half of respondents 20 to 30 years of age had never hired a person over the age

of 40 (See the position papers of the Institute of Electronic and Electrical Engineers, online at http://www.ieeeusa.org).

- Many IT companies have operating modes that require long and intense work hours; and mid-career workers, for example those with family obligations, may be assumed to be unwilling to work these long hours (although they may in fact be willing).

- Some employers may hold the perception that mid-career workers expect higher pay for doing the same work that younger workers do.

- There is a perception that mid-career workers may not be current with the latest skills, may not be as flexible in doing different kinds of work, and may be less innovative, compared to younger workers.

- Concern that mid-career workers will cost the company more in insurance premiums, due to age and higher likelihood of having covered family members.

Since many mid-career workers have kept up with the latest skills (or could easily obtain them), are innovative, and are willing to work long hours for market pay rate, state policymakers should ensure that their needs are not overlooked.

This report also indicates that employers are increasingly turning to temporary and contract employees to satisfy their IT staffing needs. Others are gaining access to IT expertise, especially niche expertise, through outsourcing contracts.

The report focuses primarily on "core IT occupations " which include computer scientists (which consists of database administrators, computer support specialists, and all other computer scientists), computer engineers, systems analysts, and computer programmers. Because information technology has emerged as a fundamental driver of global business and economic growth, there has been explosive growth in the demand for IT professionals. For more than 15 years, employment in the core IT occupations has grown dramatically. The growth rate for computer scientists and systems analysts has accelerated in recent years.

According to this Federal report, the growth rate for core IT workers increased 190 percent between 1993 and 1998. This was more than six times higher than the overall rate of job growth in the U.S. Growth is expected to remain strong through 2006; the numbers of computer scientists, computer engineers, and systems analysts are expected to more than double between 1996 and 2006.

The report includes a number of key findings for state and regional IT job growth:

- The two states with the largest populations, California and Texas, are projected to have the largest number of core IT workers in 2006; Virginia, with a comparatively small population, ranks third. These three states also lead the country in the average annual number of core IT job openings between 1996 and 2006.

- Oregon, Georgia, and Colorado top the list of states with the fastest growing cadre of core IT workers between 1996 and 2006; Oregon is projected to triple its core IT work force, while Georgia and Colorado are projected to double in size.

- Virginia (3.7 percent), Massachusetts (2.6 percent), and Colorado (2.6 percent) are projected to have the highest state IT worker intensity in 2006; the national IT worker intensity in 2006 is projected to be 1.7 percent. (IT worker intensity is defined as the percentage of core IT workers in a state's total workforce.) Georgia's IT worker intensity is projected to be 1.8 percent in 2006.

- Only four states are among the top ten in each of the four ranking categories (total number of core IT workers in 2006; percentage increase in core IT jobs, average annual number of new job openings, and IT worker intensity (the percentage of IT workers in the entire state labor pool); they are Virginia, California, Massachusetts, and Georgia.

Table 2-10 summarizes Georgia's standing each of these categories relative to other states in the South and Southeast. Table 2-11 compares Georgia to other key states in the U.S. on these same dimensions.

State	Number of IT Workers Employed (Estimate for 2006)	Ranks Reg.	Ranks US	Fastest Growth Percent Increase 1996-2006)	Ranks Reg.	Ranks US	Average Annual Job Openings 1996-2006	Ranks Reg.	Ranks US	IT Worker Intensity (Total Share of Labor Market) (%)	Ranks Reg.	Ranks US
Alabama	31,000	6	19	64%	4	20	1,730	6	18	1.3	5	20
Florida	95,400	3	7	63	5	23	4,620	4	9	1.1	6	28
Georgia	**90,750**	**4**	**9**	**112**	**1**	**2**	**5,560**	**3**	**5**	**1.8**	**2**	**9**
Louisiana	16,100	9	24	59	7	27	760	9	24	0.7	9	36
Mississippi	7,350	10	33	54	10	35	330	10	33	0.6	10	41
North Carolina	69,950	5	12	80	3	7	3,770	5	12	1.5	4	16
South Carolina	16,250	8	23	56	9	31	770	8	23	0.8	8	34
Tennessee	27,550	7	20	59	8	28	1,310	7	19	0.8	7	33
Texas	167,500	1	2	61	6	26	7,900	1	2	1.5	3	15
Virginia	135,100	2	3	98	2	4	7,670	2	3	3.7	1	1

Table 2-10: Important IT Labor Market Statistics for States in the South and Southeast.
(Source: *The Digital Workforce*, U.S. Department of Commerce, July 1999)

Table 2-10 indicates that Georgia compares favorably to states in the South and Southeast on these key IT labor market statistics. Only Texas, Virginia, and Florida are expected to have more core IT workers in 2006 than Georgia. Georgia leads the region in the growth of core IT workers and its growth rate is second nationally. Georgia's average annual increase of 5,560 core IT jobs is fifth nationally; in the South and Southeast, only Texas and Virginia are adding more IT workers to their state labor pools per year than Georgia.

Georgia IT intensity (the percentage of the state work force made up of core IT workers) is estimated to be 1.8% by 2006. This is second to Virginia in the region and ranks ninth nationally (see Table 2-11).

State	Number of IT Workers (Estimate for 2006)	Rank	Fastest Growth Percent Increase 1996-2006)	Rank	Average Annual Job Openings 1996-2006	Rank	IT Worker Intensity (Total Share of Labor Market) (%)	Rank
California	295,700	1	78%	10	16,520	1	1.9	8
Colorado	71,050	11	101	3	4,160	11	2.6	3
Georgia	**90,750**	**9**	**112**	**2**	**5,560**	**5**	**1.8**	**9**
Massachusetts	96,400	6	79	9	5,060	7	2.6	2
Washington	79,750	10	76	11	4,040	10	2.3	5

Table 2-11: Comparing Georgia to Other Key States on Important Labor Market Statistics
(Source: *The Digital Workforce*, U.S. Department of Commerce, July 1999)

While these numbers would generally indicate that Georgia is well-positioned in the region and nation to assume a leading role in the evolution of e-commerce, they may be masking some important challenges faced by the State. For example, the University System of Georgia is currently unable to produce enough graduates to fill the 5,560 new core IT jobs that are available in the State each year. This contributes to a tight labor market and puts pressure on Georgia's businesses to satisfy their IT staffing needs through foreign workers with H1-B visas, temporary and contract workers, and outsourcing arrangements. While these may be viable short-term IT staffing solutions, they may run counter to the desires of State policymakers who wish to develop an IT labor market infrastructure that will be capable of supporting sustainable growth. Until an appropriate educational initiatives and IT talent development programs can be implemented, state policymakers may want to consider programs similar to those devised by Michigan and Minnesota for recruiting IT talent from other areas.

When compared to other key states that are, by all indications, well-positioned to help e-commerce flourish, Georgia also seems to be in a very favorable situation. A more specific look at changes expected in core IT jobs in Georgia is found in Table 2-12.

Other sections of this Commerce Department report focus on the fact that women and minorities are under-represented in core IT occupations. The report also notes that in order to lessen pressure on the IT labor market, initiatives for encouraging young people to enter technical education and careers will be needed. To make sure that young people are ready for technical education and careers, strengthening math and science education in secondary schools may be required as well as special initiatives (a large variety of special initiatives from around the country are included in the report).

Occupational Title	1996 Employment	2006 Employment	Total Change	Percent Change	Average Annual Openings
Computer Scientists	6,000	16,200	10,200	171	1,080
Computer Engineers	4,400	11,300	6,900	156	720
Systems Analysts	13,600	34,300	20,700	152	2160
Computer Programmers	18,750	28,950	10,200	54	1,600
Totals	42,750	90,750	48,050	112	5,560

Table 2-12: Core IT Jobs in Georgia, 1996-2006
(Source: *The Digital Workforce*, U.S. Department of Commerce, July 1999)

Additional options for easing IT labor market shortages include tapping non-traditional labor pools and programs aimed at increasing the number workers from under-represented groups (women and minorities). The report notes that:

- While women represent a significant portion of the IT work force, their highest levels of representation are in administrative support positions such as data entry and computer operators. In core IT occupations, women represent only 26.9 percent of computer systems analysts and scientists, and only 28.5 percent of computer programmers.

- As with women, blacks and Hispanics have their highest levels of representation as data entry personnel and computer operators. At the professional level, blacks represent only 7.2 percent of computer systems analysts and scientists and 6.4 percent of computer programmers. Hispanics account for only 3.6 percent of computer systems analysts and scientists, and only 4.9 percent of computer programmers. For both blacks and Hispanics, this is significantly lower than their overall rates of work force participation.

- Women, blacks, and Hispanics are also under-represented in the technical education pipeline.

The report concludes with a summary of the Federal Government initiatives for addressing IT work force challenges. These include administrative initiatives from the Department of Commerce, the Department of Education, the Department of Labor, and the National Science Foundation. Legislative initiatives include:

- *The Technology Education Technical Investment Act of 1999 (H.R. 706)*

- Amendments to the *Job Partnership Act (H.R. 201 and H.R. 203)*

- *The Mathematics and Science Proficiency Partnership Act of 1999 (H.R. 1265)*

- Amendments to the *Internal Revenue Code of 1986 (S. 211 and H.R. 323*)

- The *Regional Skills Training Alliances Act of 1999 (H.R. 733)*

Other Federal initiatives include revising the Federal Government's own IT recruiting, training and development, and retention policies.

2.1.2 U.S. LEGISLATIVE INITIATIVES

The administrative branch of the federal government has not been the lone actor in the promotion of e-commerce in the United States. Congress has also played a significant role and key legislative branch initiatives are summarized in the following sections.

2.1.2.1 Expanded Immigration Quotas to Support Technology (H1-B Visas)

As noted in both *The Emerging Digital Economy II* and *The Digital Workforce: Building Infotech Skills at the Speed of Innovation*, many businesses in the U.S. have been turning to foreign workers to satisfy their IT staffing needs. In order to provide an immediate increase in the number of highly skilled workers available for employment in the United States, Congress acted to increase temporarily the annual number of visas available for high-skilled workers (H-1B non-immigrant visas). The quotas were increased from 65,000 to 115,000 for fiscal years 1999 and 2000, 107,500 in fiscal year 2001, then returning to 65,000 per year in fiscal year 2002.

Prior to 1998, the number of H-1B visas had been capped at 65,000 workers per year. Over time, the IT industry has increasingly turned to H-1B visas to meet their IT staffing needs. In 1995, only about a quarter of temporary skilled foreign workers were in IT-related fields; by 1997 about half were in IT fields. Largely due to the increased use by the IT industry, the H-1B cap was reached for the first time in August 1997. In 1998, the cap was reached in May.

The IT industry has played a major role in efforts to put pressure on Congress to increase the H-1B visa cap. It has argued that:

- the IT industry needs more skilled foreign workers to help meet IT skill shortages;
- an inability to find workers has limited growth in the IT industry and other parts of the economy that need IT workers;
- the IT industry needs an international work force to meet the needs of international markets;
- the IT industry needs to be able to attract the best and brightest workers from around the world; and
- the alternative to bringing foreign workers to the United States is to move work overseas.

Groups that represent U.S. scientists, engineers, and other technical workers have opposed expansion of the H-1B program, arguing that:

- there are Americans who can do the work but industry wants lower-cost labor;
- the availability of H-1B workers reduces the incentive for employers to hire older U.S. unemployed and underemployed engineers or to recruit women and underrepresented minorities actively;
- H-1B workers cause wages in IT occupations to be lower than they would otherwise be, reducing the incentive for U.S. residents to enter, or stay in, these occupations; thus immigration can create a self-perpetuating demand for more immigration; and
- the H-1B program has been abused some firms which have brought in foreign workers to work at less than the prevailing U.S. wages.

In late 1998, the Congress and the White House agreed to compromise legislation that would temporarily increase the H-1B cap and also attempt to curb abuses in the program. As noted above, the legislation raises the H-1B cap to 115,000 for fiscal years 1999 and 2000, and then decreases it to 107,500 in 2001, and 65,000 in 2002. The law also provides for the collection of a $500 fee for each H-1B application in order to create a fund for low-income student scholarships and training programs. The National Science Foundation will administer the newly established Computer Science Engineering and Mathematics Scholarship Program, providing student scholarships for higher education degree programs in IT-related disciplines.

The law also includes new provisions intended to prevent abuses of the program. For example, H-1B dependent employers (generally those for whom H-1B visa holders are more than 15 percent of their work force) must attest that they are not laying off U.S. workers for similar jobs and that they have made significant efforts to recruit U.S. workers.

2.1.2.2 Telecommunications Act of 1996

The Telecommunications Act of 1996 encourages competition in all aspects and markets of telecommunications services and carriers. The legislation directs the Federal Communications Commission (FCC) to develop the rules for allowing local exchange carriers (LECs) and inter-exchange carriers (IXCs) to compete in each other markets. It also opened the door for companies to provide local access service in competition with Regional Bell Operating Companies (RBOCs); such companies are known as competitive access providers (CAPs) or competitive local exchange carriers (CLECs). Table 2-13 summarizes the major implications of the Telecommunications Act of 1996.

Perspective	Implication and Importance
Strategic Intent	Provides a pro-competitive deregulatory national policy framework by opening all telecommunications markets to competition Directs the FCC to create rules to produce a deregulated telecommunications environment
Federal Communications Commission	Charged with developing new rules to ensure that the deregulated market operates in a manner that is fair to all competitors Directed to examine all carrier regulations and to eliminate those that do not serve a productive service in the deregulated telecommunications market
Inter-exchange Carriers	Eliminated need for long-distance carriers to file tariffs; rates determined by competitive pricing and free market Allowed to enter local access markets and compete with local exchange carriers
Competitive Access Providers	Allowed to compete in Regional Bell Operating Companies' local markets
Local Exchange Carriers	Allowed to compete with long-distance carriers Allowed to enter the telecommunications equipment manufacturing industry
Cable TV Companies	Can enter the telephone business once cable rates are deregulated Telephone companies allowed to compete with cable companies for television services
Users	More opportunities for bundled services from a single vendor (CAP, LEC, IXC, or cable TV company) May realize lower costs due to increased competition in a variety of markets

Table 2-13: Key Implications of the Telecommunications Act of 1996
(Source: Goldman, James E. *Applied Data Communications* (2nd ed.). New York: Wiley, 1998)

2.1.2.2.1 Key Implications of the Telecommunications Act of 1996

The Telecommunications Act of 1996 enables some segments of the industry to offer new services once they have allowed competition in their own segment. For example, RBOCs will be allowed to provide long-distance services to their own in-region customers when they have demonstrated that they have adequately opened their local markets to competition. This process requires the successful completion of a 14-point checklist, approval by state regulators, the U.S. Department of Justice, and ultimately, the FCC. Also, this Act enables cable and telephone companies to enter each other's markets. Hence, although this Act represents an important step toward deregulation, it creates new regulatory issues.

Since its passage, a number of important decisions have emerged via FCC policymaking, state public utility commission decisions, and court cases. To date, the FCC has adhered to a rigorous interpretation of its checklist provisions and has rejected RBOC proposals to provide long-distance services in many states. As a result, incumbent providers still control more than 99% of their local markets, suggesting that competition has made few inroads so far.

In 1998, the FCC began considering a proposal to deregulate high-speed data services. This would allow RBOCs to offer high-speed data transmission services without tariffs, so long as they do not use their regional advantage to drive out rivals. In addition, CLECs are marketing their services in most states and have signed hundreds of local

interconnection agreements with incumbent local providers. In spite of these developments, a number of experts are concerned that the Telecommunications Act of 1996 is not fostering competition quickly enough.

2.1.2.2.2 Impact of Telecommunications Act of 1996 on Georgia

Georgia's businesses and consumers have generally benefited from intensified competition among telecommunications service providers. BellSouth has taken steps to compete with interchange carriers (ATT, Sprint, MCI-WorldComm) and has entered the telecommunications equipment manufacturing business. Inter-exchange carriers have begun to enter some local markets. Georgia's cable TV companies have been slow to take advantage of the opportunity to compete with telephone companies, but telephone companies are beginning to compete with cable companies for television services in a few Georgia markets. Recent evidence of the impact of this Act on the State of Georgia is the expansion of BellSouth's ADSL services for businesses (Krill, 1999)).

To date, few Georgia-based firms are classified as cable modem service providers or CLECs. Only one Georgia-based firm (Cox Communications) is listed in either of Boardwatch's directories of Cable Internet Access Providers (http://boardwatch.internet.com/isp/summer99/cable/) or CLECs (http://boardwatch.internet.com/isp/summer99/clecs/). Ironically, the Cox Communications Web site indicates that it does *not* provide cable Internet access in Georgia!

In sum, Georgia policymakers may be unwise to consider taking a "wait and see" attitude. The pro-competitive telecommunications environment that this Act was intended to create has not yet been realized. Also, such an environment is only one aspect of an e-commerce friendly climate, albeit an important one.

2.1.2.3 Other Important Federal-Level Legislative Initiatives

Several key legislative acts enacted between the Clinton Administration's release of *A Framework for Global Electronic Commerce* in 1997 and November 1998 are summarized in the *U.S. Government Working Group on Electronic Commerce: First Annual Report.* These include:

- The *Internet Tax Freedom Act* which placed a three-year moratorium on new and discriminatory taxes on Internet commerce and mandated the creation of a commission to develop a uniform system for the application of existing taxation of remote sales.

- The *Digital Millennium Copyright Act* ratified and implemented the World Intellectual Property Organization's Copyright Treaty as well as its Performances and Phonograms Treaty in an effort to provide online protection for intellectual property.

- The *Government Paperwork Elimination Act* encouraged the prompt implementation of electronic record keeping and filing systems by the Federal Government including the recognition of electronic means for authentication.

- The *Children's Online Privacy Protection Act* protects the privacy of young children online.

Other legislative initiatives mentioned in the Department of Commerce's report *The Digital Workforce: Building Infotech Skills at the Speed of Innovation* include:

- *The Technology Education Technical Investment Act of 1999 (H.R. 706).* This act expands the National Science Foundation's (NSF) informal programs promoting the understanding of math and science to students at the pre-kindergarten through secondary-education levels. It also authorizes the Department of Education to make matching grants to states to provide supplementary scholarships to students for study leading to a postsecondary degree in science, mathematics, engineering, or related fields. The bill authorizes the Commerce Department to make start-up grants to institutions of higher learning to develop industry-sponsored internship programs that provide opportunities for undergraduate engineering students to receive hands-on training at local businesses. In addition, the bill authorizes the creation of a Technology Workforce Commission to report to the President and the Congress on all matters relating to the shortage of technology workers in the United States. The status of this bill is pending.

- Amendments to the *Job Partnership Act (H.R. 201* and *H.R. 203).* H.R. 201 is a bill to amend the *Job Training Partnership Act* to establish regional private industry councils for labor market areas that are located in more than one state. The bill would authorize the Department of Labor, in cases where a labor market is located in more than one state, to establish regional private industry councils if requested by the governors of those states. The regional private industry councils established would be in addition to the private industry councils for each service delivery area. H.R. 203 would amend the *Job Training Partnership Act* to allow the use of a specified portion of direct training services funds to pay incentive bonuses to certain job training providers that place large percentages of individuals in occupations for which a high demand exists. The status of both bills is pending.

- *The Mathematics and Science Proficiency Partnership Act of 1999 (H.R. 1265).* This is a bill to develop a demonstration project through the National Science Foundation to encourage interest in the fields of mathematics, science, and information technology. The bill would authorize the NSF to make grants to eligible local educational agencies in urban and rural areas to develop information technology programs that build or expand mathematics, science, and information technology curricula. Eligibility requirements for educational agencies would include evidence of agreements with the private sector providing internship, mentoring, and scholarship opportunities for students who participate in the information technology program. Eligible educational agencies that receive a grant would use the funding to train

teachers specifically in information technology, mathematics, and science, and to provide students with similar specialized training in those areas. Like the previous bills, the status of this bill is pending.

- Amendment to the *Internal Revenue Code of 1986* (*S.456* and *H.R. 838*). The Senate bill and its companion bill in the House of Representatives propose to amend the *Internal Revenue Code of 1986* to allow employers a credit against income tax for information technology training expenses paid or incurred by the employer. The bill would extend an estimated $112 million in tax credits over 10 years to employers who train or retrain workers in the information technology field. Employers would be eligible for tax credits for information technology education expenses of up to 20% per year, with a ceiling of $6,000 per employee. Businesses that focus on training or retaining individuals in designated enterprise or empowerment zones, or from designated federal disaster regions would be entitled to a 25 percent credit, as would employers with less than 200 employees. The bill also authorizes the use of private-sector providers for short-term IT training, with the intent of expand training opportunities for individuals beyond those offered by HOPE and Lifetime Learning Credit which applies only to accredited or undergraduate level training. The status of the bill is pending.

- Amendment of the *Internal Revenue Code of 1986 (S. 211* and *H.R. 323*). The Senate bill and its companion bill in the House of Representatives propose to amend the *Internal Revenue Code of 1986* to extend the exclusion (Section 127) permanently for employer-provided educational assistance and to restore the exclusion for graduate level educational assistance. Section 127 of the *Internal Revenue Code* is the tax provision that allows an employer to provide $5,250 per year in tax-free non-job related educational assistance to its employees. The current law covers undergraduate classes only and will expire on May 31, 2000. The status of the bill is pending.

- The *Regional Skills Training Alliances Act of 1999 (H.R. 733).* This bill authorizes and appropriates funds for the Commerce Department, in consultation with the Department of Labor, to provide grants to industry-led consortia and training alliances to assist such entities to improve the job skills common and necessary for employment in specific industries. Each consortium would consist of representatives from local businesses, state and local government, education, and employee organizations. A majority of the representatives comprising the consortium would come from industry and represent one or more industry sectors in a given region. The alliances would provide a collaborative framework for organizations in regions to develop common standards, curricula, apprenticeship and job retraining programs, and to share resources to train workers. The bill would limit federal government support to the alliances to three years, after which the efforts would be required to be self-supporting. The status of this bill is pending.

These pending bills should help to ease IT professional shortages in the U.S. All have state-level implications. States interested in promoting the expansion of e-commerce

should consider state-level tax incentives similar to the proposed amendments to the IRS tax code listed above. For a detailed description of these bills, see Appendix A.

2.2 E-COMMERCE TO SUPPORT STATE AND LOCAL GOVERNMENTS

In an effort to determine the impact that electronic commerce has on the functioning of state governments, the Web sites for all of the 50 United States were visited (see Appendix B for a summary of each of these state Web sites). In an attempt to reduce the bewildering amount of information available on each of the Web sites, a general "feel" of each Web site was obtained, a few areas were looked at more closely, and several initiatives and programs were found. A more exhaustive search may result in additional state initiatives or programs being found. But it is believed that the following is a fairly comprehensive list of the type and scope of programs and initiatives that are currently available.

2.2.1 PURCHASING

One measure of a state's involvement in electronic commerce is purchasing and contracts administration within state governments. A summary of the findings can be found in Table 2-14. Of the 50 states, only six allow vendors to bid on any contracts over the Internet. In general, Internet purchasing is reserved for small-value purchases where competitive bidding is not required or is minimal. Where large-value purchases and bids that require the submission of drawings, specifications, or plans are involved, sealed bids are usually required. These sealed bids are usually required to be opened before the public. Therefore, due to security concerns and the potential for fraud, some states have chosen not to accept Internet, telephone, or fax bids. In addition, in many cases state statutes require sealed bids for vendors doing business with the state.

In most cases vendors must register with the states before they can do business with a given state. The registration methods vary. In some cases, an address and/or phone number is given on the Web site; and the firm wanting to do business must call or write for a registration package. In other cases the firm can print an online form and mail it into the state. In some cases, the registration can be done online. Georgia is one of the most progressive states in this area. For certain conditions, the State accepts telephone or telegraph bids as well as bids on the Internet. Georgia also allows vendors to register online.

State	States Allowing Some Bidding for State Contracts on the Internet	States Providing Contract Information on the Internet	No Current Internet Access
Alabama		X	
Alaska		X	
Arizona	X		
Arkansas			X
California		X	

Table 2-14: Purchasing by States

State	States Allowing Some Bidding for State Contracts on the Internet	States Providing Contract Information on the Internet	No Current Internet Access
Colorado		X	
Connecticut	X		
Delaware		X	
Florida		X	
Georgia	**X**		
Hawaii		X	
Idaho			X
Illinois			X
Indiana			X
Iowa		X	
Kansas			X
Kentucky		X	
Louisiana		X	
Maine	X		
Maryland	X		
Massachusetts		X	
Michigan		X	
Minnesota			X
Mississippi			X
Missouri		X	
Montana		X	
Nebraska		X	
Nevada			X
New Hampshire		X	
New Jersey		X	
New Mexico			X
New York			X
North Carolina		X	
North Dakota	X		
Ohio		X	
Oklahoma			X
Oregon			X
Pennsylvania			X
Rhode Island			X
South Carolina			X
South Dakota			X
Tennessee		X	
Texas		X	
Utah		X	
Vermont	X		
Virginia			X
Washington			X
West Virginia			X
Wisconsin			X
Wyoming			X

Table 2-14: Purchasing by States (cont'd)

2.2.2 PERSONAL INCOME TAXES

Each of the states' department of revenue sites were visited to determine how each state interfaces with its customers, the taxpayers. The results are presented in Table 2-15. As can be seen for the 43 states that have individual income tax systems, nearly half provide only information and forms on the Internet. There are a number of ways that taxes can be filed electronically. In some cases, states allow their returns to be filed with the federal E-file return. This is called piggy-back E-filing. In some cases, states allow a system similar to E-file but the state return is filed separate from the federal return. In either case the e-file return requires a tax preparer to complete the return and then submit it to the government.

In another electronic filing system, the tax payer purchases a tax preparation software package, such as Turbo Tax or Secure Tax, either online or from a retail store. The taxpayer completes the return and submits it to the state through the Internet. Another possibility is for the taxpayer to use a tax preparation package provided by the state directly on the Internet. The final method of "electronically" filing taxes is via a touch-tone telephone. As might be expected, some methods, such as the telephone, are restricted to simpler returns. In most cases Internet filing is in its infancy and there are often restrictions on the forms that can be filed by telephone or online.

State	States Accepting On-line Tax Returns	States Providing only Forms and Information on the Internet	States Accepting Tax Returns Via Telephone
Alabama	X		
Alaska			
Arizona		X	
Arkansas	X		
California		X	
Colorado	X		
Connecticut			X
Delaware		X	
Florida			
Georgia	X		
Hawaii		X	
Idaho		X	
Illinois		X	
Indiana		X	
Iowa		X	
Kansas			X
Kentucky		X	
Louisiana		X	
Maine		X	
Maryland		X	
Massachusetts			X
Michigan		X	

Table 2-15: Online Personal Income Tax Submissions

State	States Accepting On-line Tax Returns	States Providing only Forms and Information on the Internet	States Accepting Tax Returns Via Telephone
Minnesota		X	
Mississippi		X	
Missouri	X		
Montana	X		
Nebraska			X
Nevada			
New Hampshire		X	
New Jersey	X		
New Mexico	X		
New York	X		
North Carolina	X		
North Dakota	X		
Ohio		X	
Oklahoma	X		
Oregon	X		
Pennsylvania	X		
Rhode Island	X		
South Carolina	X		
South Dakota			
Tennessee		X	
Texas			
Utah	X		
Vermont		X	
Virginia		X	
Washington			
West Virginia		X	
Wisconsin	X		
Wyoming			

Table 2-15: Online Personal Income Tax Submissions (cont'd)

2.2.3 ECONOMIC DEVELOPMENT

Approximately 40% of the states claimed in their Internet sites to support electronic commerce and economic development. In many cases, the virtues of electronic commerce in a state were touted. However, there were only a few cases where a state offered specific tax incentives for firms that would operate electronic or Internet businesses within its borders. Most of these tax incentives offered to attract new firms to a state were in the area of high-tech manufacturing. Colorado is unique in offering tax incentives for the development of Internet-based businesses. Colorado's *Rural Technology Enterprise Zone Act* allows a tax credit for firms that invest in the technology infrastructure required to provide Internet access in rural technology enterprise zones. These rural technology zones, and the tax credits to encourage their development, should be considered for the rural areas of Georgia.

A number of states are encouraging electronic commerce by enacting legislation that facilitates electronic commerce. For example, according to the *Study on the Legal Aspects of Digital Signatures* prepared by Juan Avellan at the University of London, approximately half of the states have enacted or are considering legislation that allows the use of electronic signatures in a variety of circumstances (http://www.qmw.ac.uk/~tl6345/). Many of these bills will encourage electronic commerce.

2.2.4 WELFARE

In the *Personal Responsibility and Work Opportunity Reconciliation Act of 1996*, commonly known as welfare reform, Congress required states to initiate EBT (electronic benefits transfer) programs for the disbursement of food stamps. According to the National Automated Clearing House Association (NACHA) and the Electronic Payments Association, as of March 1, 1999, 40 states and the District of Columbia have implemented full-scale or pilot EBT programs. Among these are the Alaska Quest card in Alaska, the Electronic Benefits Transfer (EBT) in New York, the Electronic Benefits Access (EBA) in Kentucky, and the Lone Star Card in Texas. These cards are similar to debit cards where benefits are electronically adjusted as necessary. These programs have the ability to monitor amounts and allow charges only for qualified purchases on the food stamp account while, at the same time, keeping track of the cash accounts for Temporary Assistance for Needy Families (TANF) and other federal, state, or other amounts.

As a result, the cards can be used by the beneficiary in the point-of-sale machines at participating vendors for both purchases and cash disbursements. Other uses of the smart cards are envisioned; for example, Kentucky is currently exploring the use of their EBA card as a Medical Assistance Identification card and may test the feasibility of using the EBA for other programs such as for Women, Infants, and Children's (WIC) Benefits (http://cfc-chs.chr.state.ky.us/reform/page12.htm). New York State is currently projecting that its welfare benefits delivery team will, by 2000, replace all aspects of New York's current benefits delivery system with a federally-approved, electronic system (http://www.dfa.state.ny.us/ebt/).

Many of the benefits of EBT can be seen from the information on the world's largest EBT system, Texas's The Lone Star Card. The following benefits and facts are cited on its Web site:

- The Lone Star card program is the world's largest EBT system.
- There are about 1.4 million food stamp recipients in Texas and almost 350,000 recipients of Temporary Assistance to Needy Families (TANF), previously known as the Aid to Families with Dependent Children (AFDC).
- No cash ever changes hands in a food-stamp transaction.
- TANF recipients can use the card to receive cash.

- The Lone Star system now processes an average of 4.8 million food stamp transactions and 240,000 TANF transactions each month, redeeming a total of $110 million in benefits.

- The Lone Star card has made it possible to remove 1,187,410 dormant cases worth almost $34.8 million from the food-stamp rolls and 300,450 cases worth almost $6.9 million from the TANF rolls.

- Within weeks of the Lone Star card's debut in Houston, police busted a $1 million illegal food-stamp ring that had been in operation for a year before the EBT system provided the necessary electronic trail to track them down.

- The number of ineligible food stamp retailers has dropped in the Houston area. A USDA sweep in Houston in 1996 disqualified only nine percent of all food stamp retailers, compared to as many as 15 percent in other cities under the paper coupon system.

- In August 1997, Texas and New Mexico worked cooperatively to become the first states in the nation to accept each state's EBT transactions at the local retailer level.

- State and federal savings will reach $126.6 million through the year 2001.

- Direct savings for Texas taxpayers will total $10.6 million over the same period. This includes cutting red tape and bureaucracy to save $7.6 million and another $2.4 million savings in interest payments to the federal government that would have been due under the old system.

- It also includes eliminating the cost of reconciling and tracking down lost welfare checks, saving Texas taxpayers $560,000 through 2001.

- The Lone Star card will save the federal government $79 million over seven years by doing away with the costs of mailing and processing the old paper coupons. As an example of these savings, the 11th District of the Federal Reserve in Dallas was able to cut its budget by $1.4 million a year since 1995, because it no longer has to account for and shred the paper coupons.

- The federal government saved $37 million in 1996 from the drop in Texas food stamp rolls directly attributable to the Lone Star card.

2.2.5 SALES TAX COLLECTIONS

The Internet Tax Freedom Act placed a three-year moratorium on new or discriminatory taxes on Internet access and electronic commerce beginning October 1, 1998. It does not prohibit states from enforcing and collecting existing sales and use taxes applicable to remote sales. However, the U.S. Supreme Court's 1992 decision in *Quill Corporation v.*

North Dakota restricts a state or local authority from imposing an obligation to collect sales or use taxes on remote sellers with no physical presence in the jurisdiction.

Currently, 46 states impose sales or use taxes. In many states, local governments also impose sales or use taxes. Under the *Quill* decision, a seller may only be required to collect and remit sales or use taxes from buyers in jurisdictions where the seller has a physical nexus. A seller with nexus must add sales tax to every sale, collect it from the buyer, and remit it to the tax authority. Many jurisdictions, including Georgia, also impose a use tax on an in-state buyer whose out-of-state seller was not required to collect sales tax.

The recent growth of Internet sales to consumers is alarming state and local revenue authorities that they may soon face significant erosion of their sales and use tax revenues. Relying on *Quill*, out-of-state Internet merchants frequently do not collect sales taxes. Typically unaware of their obligations to pay use taxes in such situations, consumers believe the absence of sales tax means their Internet purchases are tax free. This misperception is exacerbated by the inability of state revenue authorities to enforce consumer use taxes. While compliance with use taxes is fairly good in the business-to-business context, where audits are worthwhile, it is virtually nil in the business-to-consumer context, where audits are not cost-effective.

The Internet Tax Freedom Act established the Advisory Commission on Electronic Commerce to study solutions to Internet tax issues, including the anticipated decline in sales and use tax revenues. Composed of representatives from federal, state, and local government and industry and consumer advocates, the Advisory Commission has met only twice and has scheduled a third meeting for mid-December.

In addition, several bills have recently been introduced in Congress to address the state and use tax issues. These proposals assume that the states will be unable to solve the problem themselves and anticipate that federal intervention will be required. None of the current proposals would permit Georgia to apply its existing system of state and local sales and use taxes to out-of-state Internet merchants.

The Internet Tax Freedom Act also directed the Advisory Commission to ensure that its work does not undermine the efforts of the National Tax Association Communications and Electronic Commerce Tax Project. At the end of August, that project issued a draft report that suggested one possible solution to the sales and use tax issue is for the states to act cooperatively to develop a real-time approach to sales and use taxes.

In anticipation of this recommendation in the National Tax Association's report, when the governors met in St. Louis this summer, they agreed to schedule a later meeting here in Atlanta to discuss the option of developing state legislation to provide incentives for remote sellers voluntarily to collect and remit state and local sales and use taxes. That meeting took place on September 22 and 23, 1999. Over 30 states participated.

2.2.5.1 Proposed Action Plan

Following the summer meeting , but prior to the Atlanta meeting, the National Governors' Association (NGA) staff and representatives of three northwestern states (Idaho, Utah, and Washington) had begun work on a proposal. The Atlanta meeting included presentations about the concept and a group discussion of many key issues.

On the first day of the Atlanta meeting, Governor Leavitt of Utah urged all states present to join in the effort with a sense of urgency. He suggested that this initiative was the last opportunity for the states to avert federal preemption of sales and use taxes on remote sales.

The concept behind this initiative is simple. The initiative intends to head off the prospect of federal preemptive legislation that would deprive state and local governments of some or all of their current sovereign authority to establish and administer their own sales and use taxes. This would be accomplished through a cooperative effort of all states that impose sales and use taxes.

The central idea underlying the initiative, which the NGA has dubbed the "Voluntary Zero Burden Collection System," is that states and localities would assume, for remote sales, the cost of administering the sales and use tax to encourage remote sellers to volunteer for sales ands use tax collection. According to the working draft distributed at the September meeting, the long-term policy goal of the Zero Burden Collection System is to modernize the existing sales and use tax so that comparable purchases are treated equally, interstate commerce is not burdened with collection costs, the sovereignty of the states is preserved and the privacy of buyers is protected.

The above discussion was prepared by Richard Keck, of the Georgia Electronic Commerce Association, in a memo to Jim Flowers, the Governor's Assistant for Technology. The full memo, including additional details of the proposal, is reproduced in full in Appendix E.

CHAPTER 3
E-COMMERCE IN GEORGIA

3.1 GEORGIA DEPARTMENT OF ADMINISTRATIVE SERVICES

The Georgia Department of Administrative Services (DOAS) provides telecommunications and computer services from a single entity, the Information Technology Department. This arrangement positions DOAS in such a way that it enables them to respond quickly to emerging technologies and to offer quality services in support of customers' information technology needs. The IT team is composed of experienced personnel dedicated to helping customers achieve cost-effective benefits from the latest information technologies. Their vision is "to be the best business run by a government."

DOAS is one of 56 agencies in the government of the State of Georgia. Its operating budget totals $300 million a year, most of which comes from providing products and services to other state agencies, colleges, and universities. They also administer trust funds valued at $250 million. DOAS's services are quite diverse and range from insurance and communications to mail and courier. Fundamentally, DOAS operates an insurance company, an office supply company, a computer software development service, a telephone company, a paging service, a rental car operation, a mail and courier business, and a computer operations center. Many of these services are provided partially or completely through private-sector vendors. DOAS is continuously looking at all services to determine which are candidates for some form of privatization.

3.1.1 YEAR 2000 ISSUES

DOAS has taken extensive actions to identify and solve the Year 2000 issues. For example, with their vendor partners, they have taken actions to understand the nature and extent of the work required to make its systems, products, and infrastructure Year 2000 compliant. DOAS's Year 2000 plan calls for remediation and testing of its communication network and systems to be completed by early this year. Its vendor partners have begun the process of installing Year 2000 updates to their systems, software, and equipment and currently plan to make their communications network and systems Year 2000 compliant no later than October 31, 1999. Furthermore, DOAS's vendor partners have begun unit and systems testing of systems used by DOAS to support its voice and data telecommunications.

Because DOAS does not manufacture or develop any of the equipment used to provide communications services to its customers, it must rely, to a significant extent, on the efforts of its vendors and suppliers to make their products Year 2000 compliant.

Similarly, because DOAS uses software systems that are developed or owned by various third parties, DOAS is dependent on those third parties to make their products Year 2000 compliant. On April 1, DOAS began to issue purchasing documents to their vendor partners to upgrade and/or replace existing equipment. Its goal is to have them all replaced by the beginning of the fall.

The department has contingency plans in the event of Year 2000-related network problems, including network failures as a result of other network providers that may not by Year 2000 compliant. DOAS's network, like that of any other network provider, has the potential for problems caused by interconnected networks or systems outside of the department.

3.1.2 STATEWIDE PURCHASING INFORMATION NETWORK (SPIN)

The Statewide Purchasing Information Network – SPIN – was implemented to help State agencies expedite and better manage their purchasing activities. The network is broken down into four sections. The SPIN System Access Section includes instructions for signing on to the SPIN system and activation of new passwords. The SPIN System Navigation Section includes general information pertaining to the use of all SPIN transactions. The Inquiries Section includes transactions, which allow operators to view SPIN codes, activity and transactions. And finally, the General Transactions section includes all processing transactions designed for agency use. However, this network is fairly primitive and steps are underway to upgrade it.

3.2 GEORGIA GIS DATA CLEARINGHOUSE

The Georgia Geographical Information Systems (GIS) Data Clearinghouse was formed in March 1996 by the Information Technology Policy Council of Georgia and supported by the University System of Georgia, with funding provided by the State of Georgia. The idea behind the Clearinghouse is to collect, document, format, and publish GIS information collected by multiple agencies of Georgia State Government. The GIS Advisory Committee of the Georgia Information Technology Policy Council help determine State policies related to the Clearinghouse as well as Statewide GIS activities.

The Clearinghouse provides online and offline access to Clearinghouse data holdings. Data distribution services offered through the Internet are free-of-charge to all organizations. Data distribution services, offered offline on 8mm tapes, disks, or CD-ROM, are distributed on a cost-recovery basis. The Clearinghouse processes custom requests on a cost-recovery basis. All services are provided only as Clearinghouse resources are available. Services include:

- Converting data into the Clearinghouse-supported data-exchange formats.
  Vector: e00, DXF, DGN, and MIF
  Raster: BIL, JPG, and TIF
  Tabular: DBF and TXT

- Projecting vector data into state-supported projections (Geographic, Lambert Conformal, UTM, and StatePlane).
- Aggregating and subseting vector and tabular data into State-supported tiling schemes (statewide, county, and USGS quadrangles).
- Converting data into non-supported spatial-data-exchange formats, projections, and tiling schemes.
- Projecting and tiling raster data.
- Supporting users for application development.
- Providing map production services for Clearinghouse data.

The Clearinghouse continues to survey and inventory State agencies and other organizations for all existing GIS spatial data and planned new data development. They will also assist users in locating data not served by the Clearinghouse. Some of these data sets are not yet available through the Clearinghouse Data Discovery System.

On July 1, 1999, a new online ordering system became active. This newly developed system enables users to order county sets of DOQQs and DRGs quickly and efficiently through the Internet using their credit card or GeorgiaNet Authority account. With the new system, orders are confirmed via e-mail, assuring customers that the Clearinghouse has received their order. No longer will a customer have to wonder if a fax went through successfully, or if a letter was lost in the mail. Most orders will ship in just days. Customers with large or out-of-stock orders will be notified via e-mail with an estimated turnaround time for their order. The online ordering system streamlines the ordering and invoicing process, creating a more efficient distribution system. It also introduces current GeorgiaNet account holders to the products and services available from the Georgia GIS Data Clearinghouse.

3.3 LIBRARIES

Galileo Interconnected Libraries (GIL) is an extension of the GALILEO initiative funded by the Governor and the General Assembly of the State of Georgia to enhance and expand educational opportunities for the citizens of Georgia. GIL offers a gateway to information resources held in the University System of Georgia (USG) libraries. The USG already has a sophisticated system in GALILEO, which provides access to databases and the full text of journal articles. GIL will make online access even easier for patrons and staff. It will merge into one system, a Web-based online union catalog of all the book collections of the University System, a circulation system with self-service options, fund accounting, cataloging, and check-in and control functions. Library staff will be able to validate legitimate University System library patrons. USG patrons will be able to initiate requests for books directly from other libraries at their computers from

home or within libraries. Furthermore, librarians will be able to gather data on the growth and use of the collections that will guide future decision making and cooperative collection development.

The two committees that provide oversight for the GIL project are the GIL Steering Committee and the GIL Technical Operations Committee. The GIL Steering Committee performs such tasks as approving GIL policies and procedures, and appoint as necessary, functional committees such as acquisitions/periodicals, circulation, etc., to advise the Steering Committee. The GIL Technical Operations Committee will perform such tasks as determining timelines and ensuring that effective communication and problem solving are consistent and timely. Table 3-1 gives a listing of GIL project activities for 1999 (in reverse chronological order).

Date	Activity
June 10, 1999	The Union Catalog/Universal Borrowing Committee meets at Macon State College to discuss the proposal for the Union Catalog implementation.
June 4, 1999	GIL Users' Group Meeting is held at Middle Georgia College in Cochran, Georgia for University System librarians to report on the national Voyager Users Group meeting held May 22-24 in Chicago and discusses topics centered around the status and implementation of the Voyager Integrated Library System in University System libraries.
May 25, 1999	Georgia Southwestern State University becomes the last University System PALS Library to bring Voyager online.
May 24, 1999	Dalton State College goes live with the Voyager OPAC.
May 18, 1999	Gordon College makes the announcement that they are live with Voyager.
May 7, 1999	A GIL Update Presentation is made by the Director, Virtual Library Support for the OCLC/SOLINET Users' Group Meeting held at Wesleyan College in Macon, Georgia.
May 7, 1999	Georgia College & State University announces its conversion to Voyager, and is the thirteenth USG institution to move to Voyager.
April 26, 1999	Middle Georgia College announces its conversion to Voyager.
April 23-24, 1999	University System Librarians attend the annual Voyager Users Group Meeting (VUGM) held in Chicago, Illinois. There are approximately 700 total attendees to VUGM 99. In addition, there is an organizational meeting for a Southeastern Voyager Users Group with attendees from Georgia, Alabama, Kentucky, Tennessee, South Carolina, southern Virginia, and Louisiana.
April 13, 1999	Abraham Baldwin Agricultural College announces its conversion to Voyager. ABAC is the eleventh USG institution and the sixth PALS institution to move to Voyager.
April 7, 1999	South Georgia College becomes the fifth PALS institution to bring-up the Voyager OPAC.
March 29, 1999	Southern Polytechnic State University announces its conversion to Voyager.
March 26, 1999	Coastal Georgia Community College becomes the first Sirsi Library to make the changeover to Voyager.
March 12, 1999	North Georgia College & State University becomes the fourth PALS institution to make the changeover to Voyager.
March 8, 1999	Clayton College & State University makes the change-over to Voyager. CCSU is a former Ameritech PALS library.
March 4, 1999	Macon State College becomes the fifth University System institution to make the change-over to Voyager. Macon State is a former Ameritech PALS library.
February 19, 1999	Georgia State University Libraries (The Pullen Library, The Law Library, and the

Date	Activity
	ITC (Instructional Technology Center) becomes the fourth institution in the University System to go live with Voyager. Georgia State University's library is a former PALS library.
January 25, 1999	Bainbridge College Library becomes the third library in the University System to go live with Voyager. Bainbridge College is a former DataTrek site.
January 4, 1999	Columbus State University's Schwob Library becomes the first library on the multi-library Voyager Server located at the University of Georgia to go into production with Voyager. Columbus State University is a former Notis Library.

Table 3-1: GIL Project Updates in 1999

3.4 HEALTH CARE

According to research by Jupiter Communications, the online consumer healthcare market is expected to increase to $1.7 billion by 2003, despite regulatory obstacles, limited product offerings, and product and distribution complications. Jupiter also expects further marriages of online content providers and health-related commerce sites in the future, given that more money is available in the commerce arena than in advertising. Jupiter's research splits the consumer online health industry into four segments, prescription pharmaceuticals; over-the-counter (OTC) drugs; nutraceuticals, (i.e., vitamins, and herbal supplements); and personal care products — and approximates that the total online/offline market for consumer health goods is expected to be $205.2 billion by 2003.

ONLINE HEALTH SPENDING IN 2003	
Segment	**Projected Spending (in millions)**
Prescription Drugs	$966
Personal Care Products	$706
Nutraceuticals	$434
OTC Drugs	$314

Table 3-2: Projected U.S. On-line Health Care Spending in Key Areas in 2003 (Source: Jupiter Communications)

According to Jupiter (see Table 3-2), online prescription drug spending will reach $966 million by 2003, which is only 0.6 percent of the total retail prescription drug market. But Jupiter also discovered that the overall prescription drug market is so immense, that even a small channel shift to online purchasing creates a substantial market. In the OTC market, Jupiter predicts consumers will spend $314 million by 2003, which indicates a compound annual growth rate of 215.8 percent. Without institutional barriers, Jupiter expects the channel shift to online buying for this portion of the market to be higher than for offline buying. The online nutraceutical market will reach $434 million by 2003, up from only $1 million in 1998. Repeat purchases will drive online buying for this channel, according to Jupiter. Traditional brick-and-mortar retailers experience roughly a 50/50 split between the back-end pharmacy and front-end products, according to Jupiter. However, online drugstores will have to put extra emphasis on personal care items while the issues surrounding selling prescriptions over the Internet are worked out. The online

personal care market will grow from $8 million in 1998 to $706 million by 2003, with a compounded growth rate of 145 percent. (For a general discussion of a number of trends affecting the health-care industry in the U.S., see Appendix C.)

3.4.1 TELEMEDICINE

"Telemedicine" is defined as the use of medical information, exchanged from one site to another via electronic communications, for the health and education of the patient or health-care provider, and for the purpose of improving patient care. The information may include medical images, live two-way audio and video, patient medical records, output data from medical devices and sound files. The telemedical interaction may involve two-way live audio and video visits between patients and medical professionals, sending patient monitoring data from the home to a clinic, or transmitting a patient medical file from a primary care provider to a specialist. Depending on the need and availability of communications infrastructure, telemedicine uses a variety of transmission modes including ISDN, T-1, ATM, DSL, satellite, microwave, digital wireless, local wireline, and the Internet. The combination of equipment and transmission technology enables the health providers to relate with other providers or patients using either live audio or video or through "storing" and later "forwarding" multimedia information such as when sending e-mail. The largest areas of utilization of telemedicine currently are:

- **Teleradiology**. Teleradiology involves the transmission of medical images (x-ray, MRI, etc.) to a radiologist for interpretation.

- **Patient monitoring**. Telemedicine is used to replace holter-based monitoring systems within hospitals with remote patient monitors, which will allow the patient to remain at home and deliver the monitoring data to the health professional through the telephone.

- **Correctional care**. Prisons in the U.S. already receive guaranteed health care coverage. However, with telemedicine, the cost of transporting prisoners to a medical clinic and the potential danger to the civilian populations as a result of the prisoner transport will decrease.

- **Federal populations**. Federal agencies, which have responsibility for large populations such as the DOD, VA and NASA, will use telemedicine in the delivery of care. One of the largest investments in telemedicine research and development was made by DOD aimed at bringing medical care to the soldiers on the front lines of battle.

Telemedicine is facing major obstacles. These obstacles are not in the development of the technology, but rather in changing existing laws and the attitudes of many involved in the traditional delivery of medicine. The following are two obstacles that represent a major challenge to telemedicine: payment for services and state medical licensure.

3.4.1.1 Payments

There is still not a broad reimbursement plan for telemedicine services. Reimbursements are available only for such telemedical services as teleradiology, remote patient monitoring, and live consulting with patients. Also, it is still vague as to whether telemedicine is an allowable service under federally funded capitated payment or HMO programs. The growth of telemedicine has been slowed due to the failure to allow for coverage of telemedical services.

3.4.1.2 Licensure

Right now, every state requires separate medical licenses for physicians practicing inside state boundaries. With telemedicine, physicians would be able to practice across state lines. There are many other important issues and concerns that may require federal policies. These include protection of certain entities from unnecessary liability arising out of the use of telemedicine, assuring the correct use of the Internet for direct patient-provider consultations, and prescribing of medications and maintaining patient privacy and confidentiality in the transmission of medical information and electronic storage of personal medical information.

The future of telemedicine is expected to grow in three areas: export service, home care, and the Internet. There are many people in the United States who struggle to access quality medical care in a reasonable amount of time. With telemedicine, this is now possible, even if the patient and health-care provider are separated geographically.

3.4.1.3 Export Services

The improvements in telemedicine will allow major U.S. medical centers to export their services throughout the world for use in patient consultations and medical training of health professionals in other nations. One issue that is surfacing is the possible enactment of restrictive licensing laws by other nations in an effort to keep out U.S. health providers, similar to measures already in place in several U.S. states.

3.4.1.4 Home Care

With the aging of the U.S. population, telehomecare has the potential for becoming one of the fastest growing areas in the field of health care.

3.4.1.5 The Internet

Finally, the delivery of medical care will soon be supported by the Internet. Many companies, in an effort to emerge as a major player in providing consultations, diagnoses, treatment, and delivery of prescription medications online, are quietly investing in telecommunications-based health care systems. At first, these services will be mainly in general medical treatment but should expand to include specialty care services as well.

According to a recent report to Congress by the U.S. Departments of Commerce and Health and Human Services:

> "Telemedicine has the potential to make a difference in the lives of any Americans. In remote rural areas, where a patient and the closest health professional can be hundreds of miles apart, telemedicine can mean access to health care where little had been available before. In emergency cases, this access can mean the difference between life and death. In particular, in those cases where fast medical response time and specialty care are needed, telemedicine availability can be critical. For example, a specialist at a North Carolina University Hospital was able to diagnose a rural patient's hairline spinal fracture at a distance, using telemedicine video imaging. The patient's life was saved because treatment was done on-site without physically transporting the patient to the specialist who was located a great distance away."

3.4.1.6 Georgia Statewide Telemedicine Program

The Medical College of Georgia (MCG) Telemedicine Center has developed the Georgia Statewide Telemedicine Program (GSTP) that uses standardized procedures, protocols, and data collection with the help of remote communities. The *Georgia Distance Learning and Telemedicine Act of 1992* set forth provisions to create a network called the Georgia Statewide Academic and Medical System (GSAMS) which is a coordinated distance learning and telemedicine network that currently connects more than 450 sites. The GSTP seeks to increase Statewide access to specialty and subspecialty care and eventually to improve the overall delivery of health care to all citizens throughout the State of Georgia.

The State of Georgia has provided funding for the development of the GSTP. The *Distance Learning and Telemedicine Act of 1992* allocated approximately $10 million for the installation of T-1 and business telecommunications lines, purchase of telemedicine equipment and cabinetry for 54 sites, a 50% subsidy of line and maintenance costs per site for two years, funding for technical training and clinic-specific training, development of a multi-media patient record system, and other programming efforts.

The Medical College of Georgia obtained contracts from the State Office of Rural Health totaling $1.4 million to establish seven of the 54 telemedicine sites, develop a Patient Administrative Database, and provide for database and refresher training. In addition, these funds were used to pay monthly line costs for remote telemedicine sites, support a quarterly GSTP newsletter and annual conference, and purchase continuing education resource materials for remote telemedicine sites. MCG provided $1.2 million of institutional funds toward the development of the GSTP. These funds were used to finance five of the 54 telemedicine sites, line costs for eleven sites, purchase of telemedicine lab testing and validation of equipment. Furthermore, these funds also provided for the development of an *Operations Manual*, showcasing clinical use, and

provision of manual and other supporting program documentation to all telemedicine sites.

Today, the Georgia Statewide Telemedicine Program is quickly establishing a network that benefits patients, providers, and health-care facilities. The GSTP connects hospitals, health departments, community and public health centers, and state prisons in towns and cities across the State. With the Medical College of Georgia serving as its oversight agency, the GSTP will ultimately network 54 telemedicine sites throughout the state.

The 54-site network will consist of a series of remote sites and secondary and tertiary hub sites, including seven Georgia Department of Corrections and two of Georgia's major referral centers — Medical College of Georgia and Emory University Hospital. Currently, 31 sites are fully installed and operational. The Telemedicine Center continues to work with communities, providers, and facilities to ensure that the GSTP membership actively uses this technology to improve access to appropriate health care for all persons in Georgia.

3.5 GEORGIA'S GOVERNMENTAL ACTIVITIES TO SUPPORT PRIVATE SECTOR E-COMMERCE

3.5.1 LEGISLATIVE ACTIVITES

There have been a number of initiatives on the legislative scene in Georgia.

3.5.1.1 State Bill 61

This bill was introduced January 26, 1999; substituted February 24, 1999; amended March 2, 1999; and finally enacted April 19, 1999. *Georgia Senate Bill 61* amends Code Section 50-29-12 of the *Official Code of Georgia Annotated* (Information Technology Policy Act O.C.G.A. §59-29-12) relating to electronic signature pilot projects. A major purpose of this bill is to create an Electronic Commerce Study Committee and provide for its membership, organization, terms of office, vacancies, meetings, powers, and reports; to provide for allowances and expenses; to provide for an effective starting date; to provide for the eventual termination of the Electronic Commerce Study Committee and the repeal of laws relating thereto; and to repeal conflicting laws. This committee has the potential of operating as a State-level equivalent of the Federal Government's E-Commerce Working Group and could be charged with producing annual reports similar to those produced by the Federal Working Group.

Code Section 50-29-12, relating to Electronic Signature Pilot Projects, was amended by striking subsection (d) thereof and insert in its place a new section (d) relating to the composition of the committee, the number of members, and appointments to the committee. It reads as follows:

> "d) There is created the Electronic Commerce Study Committee to be composed of 13 members. The committee shall study the issues relating to electronic

records and signatures. The President of the Senate shall appoint five members to the committee, three of whom shall be members of the Senate and two of whom shall be citizen members with recognized interest and expertise in electronic commerce. The Speaker of the House of Representatives shall appoint five members to the committee, three of whom shall be members of such House and two of whom shall be citizen members with recognized interest and expertise in electronic commerce. The members of the committee shall serve for terms of office beginning at the time of their appointment and expiring December 31 of each even-numbered year. Vacancies occurring on the committee shall be filled in the same manner as the original appointment to serve out the remaining unexpired term of office. The President of the Senate and Speaker of the House of Representatives shall also each designate from among their legislator appointees one co--chair of the committee to serve as co-chair during their terms of office as a member of the committee. The GeorgiaNet Authority shall appoint one member of the committee. The Georgia Information Technology Policy Council shall appoint one member of the committee. The Secretary of the State shall appoint one member to the committee. The committee, upon the call of either co-chair, is authorized to conduct meetings at such places and at such times as it considers or expedient and to do all other things which are necessary or convenient to enable it to fully and adequately exercise its powers, perform its duties, and accomplish its objectives and purposes. Members of the committee who are state officials, other than legislative members and state employees shall receive no compensation for their services on the committee, but they shall be reimbursed for expenses incurred by them in the performance of their duties as members of the committee. The funds necessary for the reimbursement of the expenses of state officials, other than legislative members, and state employees shall come from funds appropriated to or otherwise available to their respective departments. The committee shall make a report of its findings and recommendations, with suggestions for proposed legislation, if any on or before December 15, of each year. The Electronic Commerce Study Committee created in this subsection shall be terminated on December 31, 2000, and this subsection shall be repealed in its entirety on December 31, 2000. This act shall become effective upon its approval by the Governor or upon its becoming law without such approval."

3.5.1.2 State Bill 62 - Digital Signatures

This bill was introduced January 26, 1999; substituted February 10, 1999; substituted March 2, 1999; and finally enacted April 19, 1999. This bill is generally applicable to all communications. This bill amends Chapter 12 of Title 10 of the *Official Code of Georgia* (*Georgia Electronic Records and Signatures Act*). The bill changes the provisions relating to definitions; provides for the legal effect, validity, and admissibility of electronic records, electronic signatures, and secure electronic signatures; provides for contesting an electronic record or signature on the basis of fraud, provide for compliance with rules of evidence requiring authentication or identification of a record or signature,

provide for burden of proof, provide for exceptions; repeal conflicting laws; and for all other purposes. The bill also states that any rule of law which requires a notary shall be deemed satisfied by the secure electronic signature of such notary. It includes the following features:

Definition of Electronic Signature: 10-12-3 "'Electronic signature' means a signature created, transmitted, received, or stored by electronic means and includes but is not limited to a secure electronic signature."

Effect Given to an Electronic Signature: 10-12-4 "(a) Records and signatures shall not be denied legal effect or validity solely on the grounds that they are electronic. (b) In any legal proceeding, an electronic record or electronic signature shall not be inadmissible as evidence solely on the basis that it is electronic. (c) When a rule of law requires writing, an electronic record satisfies that rule of law. (d) When a rule of law requires a signature, an electronic signature satisfies that rule of law. (e) When a rule of law requires an original record or signature, an electronic record or electronic signature shall satisfy such rule of law."

Definition of Secure Electronic Signature: "'Secure electronic signature' means an electronic or digital method executed or adopted by a party with the intent to be bound by or to authenticate a record, which is unique to the person using it, is capable of verification, is under the sole control of the person using it, and is linked to data in such a manner that if the data are changed the electronic signature is invalidated."

Effect Given to a Secure Electronic Signature: "Any rule of law which requires a notary shall be deemed satisfied by the secure electronic signature of such notary."

3.6 NOTABLE E-COMMERCE INITIATIVES IN GEORGIA

3.6.1 THE GEORGIA RESEARCH ALLIANCE

The Georgia Research Alliance is a non-profit, private company which represents a partnership of the State's research universities, the business community, and State Government. It is involved in leading-edge research at the six Georgia research universities with the goal of creating an environment that advances research and development leading to economic development for the State of Georgia. The Georgia Research Alliance is helping to create an environment conducive to high-tech company growth, as well as to solidify Georgia's image as an advanced technology state and to create high-paying, good quality jobs for Georgians. Research programs are concentrated in three main areas: communications, biotechnology, and environmental technologies.

This commitment to Georgia's future is made possible through a public-private partnership in which private donations are matched by state funding. This investment program includes the recruitment of Eminent Scholars. These scholars serve as a magnet for economic activity, as technology-based companies around the world seek to form

alliances and partnerships with the leading scientific talent, often resulting in the location of corporate R&D labs and operations in proximity to these Eminent Scholars.

3.6.2 INTELLECTUAL CAPITAL PARTNERSHIP PROGRAM (ICAPP)

Georgia's Intellectual Capital Partnership Program (ICAPP) was created in 1996 as the umbrella for all of the University System of Georgia's economic development programs. ICAPP works with Georgia businesses in need of high tech workers such as computer programmers and analysts.

There are two major programs in ICAPP. ICAPP Advantage is a partnership between the University System of Georgia and the State's businesses. In this partnership, companies specify the skills needed. They then recruit and sponsor the trainees. Each participant is, therefore, assured a job after completing the training. The other program, ICAPP Access makes the resources of the University System easily available to Georgia businesses. In addition to these two programs, there are also ICAPP regional programs that attempt to find regional answers to specific regional needs.

ICAPP serves an important economic development purpose by assisting Georgia in attracting and retaining IT firms. It also provides a mechanism of helping to satisfy the State's need for IT workers. ICAPP has the potential to provide an umbrella for e-commerce initiatives that involve USG institutions. So far, the program has net a 15:1 return on the State's investment via high-paying jobs, increased tax revenues through higher salaries, and increased corporate profits.

3.6.3 G.L.O.B.E.

Georgia G.L.O.B.E. is an administrative initiative of the Board of Regents of the University System of Georgia. G.L.O.B.E. (Global Learning On-line for Business and Education) is charged with coordinating the use of technology and distant-learning to foster high-tech programs in the System's 34 colleges and universities. G.L.O.B.E. has a number of goals. Among them are to expand access to higher education for older students and to support Georgia's strategic economic development by providing technology-based learning courses, degrees, and training, especially in high-tech fields such as information technology. It is intended to provide Georgia companies with a competitive advantage by making a university education available online. It also is expected to increase the number of Georgia residents who earn undergraduate degrees in fields of importance to Georgia-based firms.

3.6.4 THE YAMACRAW MISSION

In 1999, Governor Barnes announced a major initiative designed to position the State to be a global leader in high-technology industries and to create several thousand new jobs

in software engineering and electronic design over the next decade. The initiative, called the Yamacraw Mission, is named for the place where Georgia founder James Oglethorpe established a settlement in 1733.

The Yamacraw Mission represents a combined effort by the University System of Georgia; the Georgia Department of Industry, Trade, and Tourism; and the Georgia Research Alliance to encourage development of a cluster of businesses involved in high-bandwidth communications. The key elements of the mission include:

- creating and recruiting high-bandwidth communications companies;
- training and developing and attracting professionals with the qualifications needed by these companies;
- targeting research in high-bandwidth communications in order to attract and build a critical mass of high-bandwidth communications companies;
- adding faculty and creating topical curricula at State universities in order to increase graduates in the targeted fields;
- attracting the venture capital and providing necessary support for new companies; and
- establishing an electronic design center to serve as a focal point for this multi-agency economic development effort (Anonymous, 1999).

3.6.5 GEORGIA DEPARTMENT OF TECHNICAL AND ADULT EDUCATION PROGRAMS

Georgia's Department of Technical and Adult Education (DTAE) has the potential to play a key role in the expansion of e-commerce across the State. Its Quick Start program illustrates this potential.

Georgia's Quick Start Business and Industry Services Training Program is responsible for providing customized training for new, expanding, and existing businesses in Georgia. Training is provided to companies Statewide and includes hands-on skill-based training, interpersonal, and employee development training, and computer-based training. It could be leveraged to convince e-commerce prospects to settle in the State just as it has been used to convince other firms to locate within the State. Quick Start has a solid reputation for assisting new firms in satisfying their staffing needs through specially targeted and customized training programs that involve the state's public funded technical schools.

3.6.6 THE SAVANNAH COLLEGE OF ART AND DESIGN

After students at the Savannah College of Art and Design (SCAD) complete their core curriculum of art courses, many are introduced to the world of high tech. As might be expected, students majoring in computer arts or in video and film are using state-of-the-art computer programs and equipment. Industrial design, architecture, and interior design majors are taught to use a wide range of computer software. Much of this software is the same as currently in use by the leading design and architectural firms. In addition, advanced technology is used in some departments not normally associated with high-tech equipment. For example, the Fibers Department uses the same technology used by major textile and carpet manufacturers. As a result of this technology, SCAD is becoming known as a source of high-tech intellectual capital through Georgia and the Southeast and has the potential to facilitate the development and growth of e-commerce firms throughout Georgia.

3.6.7 HOPE

Georgia's HOPE scholarship program (Helping Outstanding Pupils Educationally) provides funds for Georgians to attend the State's public and private colleges and universities. The program is entirely funded by the Georgia lottery and as a result requires no funds from the taxpayers. To be eligible students must be Georgia residents and have completed high school with at least a "B" average. Students must maintain a "B" average while in college. For public institutions, HOPE provides tuition, mandatory fees, and a book allowance. Students attending private institutions are provided a $3,000 per academic-school-year scholarship and a $1,000 Tuition Equalization Grant. Students who graduated from high school before the HOPE program began can earn a HOPE scholarship by achieving a cumulative 3.0 grade point average after 30 semester hours of study.

Other HOPE programs include the PROMISE Teacher Scholarship Program. Portions of this award are forgiven for each year that the recipient teaches in a Georgia public school. The Georgia HOPE Teacher Scholarship Program provides forgivable loans for individuals who will teach in Georgia public schools in areas where there is critical shortage of qualified teachers. Finally, the Georgia Public Safety Memorial Grant provides assistance to children of Georgia law enforcement officers, firefighters, emergency medical technician and correctional officers who are permanently disabled or killed in the line of duty, to attend a college, university, or technical institute.

3.6.8 THE ELECTRONIC COMMERCE INSTITUTE AT GEORGIA STATE UNIVERSITY

With a view to the future of business, Georgia State University's J. Mack Robinson College of Business has made a major commitment to ensure that today's business leaders will set the pace for tomorrow's electronic commerce and business environment.

The eCommerce Institute, an innovative inter-disciplinary unit of the College and University, has been created to oversee three distinct areas for the advancement of electronic commerce to:

Inform (Research) — The Center for Digital Commerce
Prepare (Education) — Regular and Executive Degree Programs
Create (Entrepreneurship) — E-Commerce Incubators

In addition, the eCommerce Institute is an outreach resource, providing information and assistance regarding electronic commerce to a broad audience. With the guidance of an internationally recognized group of eCommerce faculty and practitioners, the Institute's mission is clear:

> "To discover, assimilate, facilitate, and disseminate knowledge regarding all facets of electronic commerce and business (eCommerce) through programs of education, research, incubation, and outreach; in so doing, to position the Institute and its faculty, staff, students, and partners as trusted sources of competence and knowledge in this area, to better promote and effect change in organizations and the markets they serve."

3.6.8.1 Center for Digital Commerce

Informing leaders of the digital economy demands an in-depth understanding of the many facets embraced by the digital economy. Meaningful discovery and the extraction of knowledge from this rapidly changing area require skilled researchers.

Initiated by a grant from the Georgia Research Alliance (GRA), the Center for Digital Commerce at Georgia State University is supported by a combination of public and private contributions, grants, and contracts. Support for an endowed chair in Digital Commerce was also provided by the GRA. Dr. Ravi Kalakota, a leading authority on electronic commerce, is the current Georgia Research Alliance Eminent Scholar in Digital Commerce chair holder based within the Center.

Center facilities include state-of-the-art equipment and space for administration, scholars and research assistants, seminar rooms, and research collaboration areas. The Center was specifically designed to promote cross-disciplinary collaboration among the many areas impacted by e-commerce. The Center employs existing and emerging technologies to reach out to the community, the State, and beyond. The Center seeks to be a major resource for Georgia in attracting and retaining "industries of the mind."

A variety of research methods are employed within the Center to better understand and describe e-commerce. In addition to traditional research approaches, direct involvement in implementation projects, think tanks, and policy-formation activities provide both practical and theoretical perspectives on this rapidly emerging area. Already, several Ph.D. dissertations in this area are near completion and many published papers have

appeared in scholarly and practitioner journals. The Center has become the primary home for work in Legal XML and continues to contribute to work in electronic signatures and documents.

To extend its reach, Center is building a powerful, virtual network of university-based e-commerce research centers from around the world, based upon existing relationships with these research groups. In this manner, the research capability and knowledge delivery of the Center can be increased by an order of magnitude, providing global access to e-commerce scholars and their findings. Visiting scholars to the Center from all corners of the world further extend this capability.

3.6.8.2 The Educational Programs

Preparing the next generation of leaders to operate effectively in a global digital economy demands the implementation of new professional development programs. The educational mission of the Institute involves the development of programs for skill requirements within newly created professions brought about by electronic commerce, and new skill requirements to complement existing professions. A variety of alternative programs and delivery mechanisms will be originated by the Center and its faculty. These include public seminars, executive development programs, post-degree certification programs, and Internet-based programs.

At present, the J. Mack Robinson College of Business provides several degree options in electronic commerce. These include an MBA concentration and an MS/CIS specialization. Beginning in the fall of 2000, two major new programs are expected.

The first is an Executive MBA program in eCommerce with content prescribed by the Global Electronic Commerce Masters (GEM) degree consortium. GEM is an international masters-level degree program addressing individuals, companies, and organizations seeking a more globally-balanced perspective on the rapidly emerging field of e-commerce. The program is intended to educate managers, policy-makers, and entrepreneurs to strategize, plan, and deploy e-commerce successfully. GEM is a joint venture of some of the best business schools and universities in Europe, North America, and the Pacific Rim.

The GEM program requires 16 months to complete over five mini-mesters, plus an in-company project. Twelve of the 15 courses present e-commerce perspectives in traditional areas (e.g. law, policy, marketing, technology, strategy). To accommodate executive needs, the courses are conducted on weekends, with a portion via the Internet. In addition to the five mini-mesters, there will also be three one-week international seminars attended by all students from all participating universities. The program, which begins each fall, will accept a limited number of students.

It is proposed that a regular MBA program in e-commerce (the eMBA program), will also be offered and will be content-compliant with the GEM curriculum. This program will be conducted according to the normal University semester schedule.

In addition to the preceding degree programs, the Institute will assist individual academic units in defining e-commerce specialization certificates within their degree disciplines, as well as non-credit certificate programs in conjunction with the J. Mack Robinson College of Business Office of Executive Education.

3.6.8.3 The E-Commerce Incubators

While existing organizations work to transform themselves to the expectations of a digital economy, many new industry leaders are being created. The eCommerce Institute will feature two incubators for electronic commerce start-up ventures. They are designed to encourage and support entrepreneurship within the area of e-commerce, mainly among students and alumni of Georgia State University.

The first, or “hatchery” level, is primarily for GSU-enrolled students pursuing a concept developed to the point of prototypes, business models, and plans to attract initial “angel” funding. These individuals typically work on their own and have need for space, technology infrastructure, shared office support, and ready access to expertise. The first-level incubator is intended to respond to these needs to provide the best chance for these ideas to mature sufficiently to attract first-round funding interest.

The second stage incubator provides housing and other resources for the build-up of electronic commerce-based companies to a size of approximately five people. This incubator level is designed for those seeking venture capital funding or other forms of backing to enable their companies to launch.

In addition to Institute faculty and partners, these incubators also draw upon the expertise of the College’s International Center for Entrepreneurship.

3.6.8.4 Partnerships and Alliances

As with e-commerce itself, this Institute expects to continuously adapt to opportunities identified from within, and react to feedback received from its students, alumni, external partners, and the Board of Advisors. GSU’s eCommerce Institute is involved with various local, state, national, and international organizations in efforts to strengthen the foundation of the digital economy. In addition, the Institute has established an alliance with the Georgia Electronic Commerce Association to enhance their efforts to promote a legal framework for e-commerce and government in the State and beyond.

3.6.9 THE IXL CENTER FOR ELECTRONIC COMMERCE AT GEORGIA TECH

The iXL Center for Electronic Commerce at Georgia Tech is devoted to research and teaching in the area of electronic commerce. The Center was founded in 1999 after receiving a generous gift from iXL Enterprises. It seeks to establish collaborative relationships with industry partners within the information technology (IT) and electronic commerce communities.

The mission of the Center is to be a world-class research and teaching center examining the dynamics of managing in electronic environments. The Center uses multiple channels to disseminate research findings and educational materials to be a valuable resource for the community of executives managing in electronic environments.

While the Center is located in the DuPree College of Management at Georgia Tech, the operational model of the Center is highly interdisciplinary, drawing upon the various technical strengths of Georgia Tech. The Center's three member executive committee includes the iXL Center Director Professor Anindya Datta, Associate Director of Educational Programs Professor Fred Riggins, and ITM Area Coordinator Professor Sridhar Narasimhan.

The major research thrusts of the Center can be broken down into six key focus areas:

- understanding online marketing and consumer behavior,
- strategic uses of business-to-business interorganizational systems,
- information security,
- IT-enabled entrepreneurship,
- business intelligence, and
- business models for Internet-based ventures.

Faculty associated with the Center conduct applied research in one or more of these areas and develop new educational programs for undergraduate students, graduate students, and industry executives. The research results are disseminated via traditional academic publications and conferences, local executive seminars and roundtables, and the Center's Web site. The center is also negotiating with a major publisher to create an archival journal in the field of e-commerce.

The Center's education programs include the development of a graduate certificate in electronic commerce that will be available to any Master's student at Georgia Tech. The certificate will be granted at the time of the student's graduation when the student has completed a four or five-course track of classes (depending upon background) devoted to

issues pertaining to electronic commerce. In addition, the Center's executive education program offers an 18-hour evening class entitled "Strategic Uses of Electronic Commerce." Some of the topics covered include an introduction to the e-commerce space, a framework for identifying Web-based e-commerce opportunities, Internet security issues, using the Internet to reach end customers, redefining trading partner relationships using business-to-business extranets, the emergence of the new "netrepreneurs," and future directions for electronic commerce.

Finally, the Center supports the creation of new ventures in the e-commerce arena. To this end, one of the efforts underway is to create a resource base for Internet-based start-ups. This will be implemented as a Web site to which start-ups will come to tap into the resources that Georgia Tech can provide, including technical assistance, help with resolving business issues, student support, etc.

3.6.10 COLUMBUS STATE UNIVERSITY

Columbus State University (CSU) has been a key player in the University System of Georgia's ICAPP Advantage program. CSU initiated a special education and training program for Total Systems Services, Inc. (TSYS), one of the world's largest credit, debit, commercial, and private-label card processing companies.

In 1996, TSYS, with headquarters in Columbus, projected that it would need up to 500 new computer and business analysts *per year* to keep up with its anticipated growth. At that time, the entire University System of Georgia was graduating less than 800 people with such backgrounds each year. As a result, TSYS began to search for alternative locations capable of meetings its needs for a skilled, educated work force. This decision underscored the growing perception among Georgia's policy makers that companies with similar needs are likely to base location decisions on the availability of an appropriately educated labor pool.

In response to possibility of losing key high-tech employers like Total Systems, Governor Zell Miller announced the creation of ICAPP in March 1996 with an expedited education program at Columbus State University, designed to help TSYS fill its work force needs, as its first significant initiative. This commitment of State resources influenced TSYS to end its search for alternative locations and to announce its intention to expand its operations in Columbus with a capital investment of $100 million and a plan to increase its work force to 5,000 (from 3,200 in 1997). The *Wall Street Journal* identified the TSYS decision as the most significant investment in the Southeastern U.S. for 1996.

CSU's first ICAPP class (consisting of 80 students) graduated in March 1997 after an intensive six-month educational program that included extensive hands-on experience with the same hardware and software used by Total Systems. All graduates were offered positions at TSYS. By the end of 1998, over 500 individuals had completed this ICAPP education program.

A number of other Columbus-based companies, such as AFLAC, are now taking advantage of this work force development and expansion incentive. The AFLAC project is focused on providing expedited computer education in Java, HTML, Windows NT, and distributed computing systems. AFLAC needs job candidates with such skills in order to fulfill its plans to increase the size of its Information Technology Division in Columbus by more than 200 people.

3.6.11 CLAYTON COLLEGE AND STATE UNIVERSITY

Clayton College and State University (CCSU) has also initiated an important ICAPP program that can be traced back to a university dialogue with AT&T about its work-force needs. CCSU has created three programs in order to provide a high-tech career ladder for students. The first is a one-year Certificate in Information Technology program, aimed at helping students to plug quickly into jobs at existing companies. The second is a two-year Associate of Applied Science in Information Technology degree program for more skills. The third is a full four-year Bachelor of Information Technology degree program.

CCSU's initiatives are notable because they prepare students for a wide-range of IT jobs, both entry-level and beyond, and because they are not targeted on the work-force needs of specific companies. The tiered approach to work-force preparation that they are using could be emulated in a other urban (and suburban) centers across the State that wish to serve the staffing needs of existing companies and wish to provide a local training and education infrastructure that would be attractive to high-tech, IT, and e-commerce firms that are looking for operating locations within Georgia. CCSU has also gained significant attention for becoming a "laptop university." All students at CCSU utilize computer laptops throughout their degree programs and the school has made significant investments in its infrastructure to enable student access to campus networks in classrooms and student work spaces.

3.6.12 OTHER INNOVATIVE EDUCATION PROGRAMS IN GEORGIA

A number of other IT-oriented education and training initiatives have been implemented throughout the State; these include Valdosta State University, Dalton College, Southern Polytechnic State University, Kennesaw State University, and Georgia Institute of Technology.

- Valdosta State University has implemented an ICAPP program in response to the needs of Goldleaf Technologies for entry-level database programmers and applications developers. Goldleaf Technologies, a premier provider of electronic banking solutions, was considering closing its operations in Hahira, Georgia, because it could not find enough skilled employees. The development of this ICAPP program persuaded the company to maintain its operations in the State; to date, it has graduated more than 30 computer professionals.

- Dalton College has implemented a two-year Associate of Applied Science in

computer networking technology in order to meet critical IT employment needs in the Dalton carpet industry.

- The Southern Polytechnic State University has developed a Bachelor of Science in telecommunications engineering technology. Its courses are especially geared to provide graduates with the skill sets needed by the wireless communications industry.

- Kennesaw State University has developed a Master of Science in Information Systems degree program that emphasizes networking and the World Wide Web.

- Georgia Tech has received special ICAPP funding to buy the equipment and hire the faculty needed to double the number of software developers that it graduates. Three Atlanta-based e-commerce companies — CheckFree, Internet Security Systems, and Nortel Networks — have announced expansion plans as the result of this ICAPP program.

- The Georgia Tech Regional Engineering Program (GTREP) has begun offering high demand four-year engineering degree programs outside the Atlanta metropolitan area. For example, a computer engineering degree can now be earned in its entirety via Georgia Tech faculty in residence at Georgia Southern University. Because close proximity to engineering programs are often key location selection criteria for firms seeking to expand their operations (especially high technology companies), the implementation of this program is likely to play a key economic development role across the State.

- A collaborative effort to develop a virtual MBA is underway in order to increase Georgians' access to an AACSB-accredited MBA program. Web-based courses are being developed by seven universities in the State including Georgia State, Georgia Southern, Georgia College and State University, Kennesaw State, Valdosta State, West Georgia, and Clayton State. While not directly aimed at increasing the pool of core IT workers within the State, with a slight refocusing of the planned courses, it could provide the State with individuals who are ready to manage and develop e-commerce and high tech firms.

3.6.13 GEORGIA INFORMATION TECHNOLOGY POLICY COUNCIL

The State of Georgia Information Technology Policy Council (ITPC) is developing a strategic IT plan for the State of Georgia (the plan can be accessed at http://www.ganet.org/itpc/plan.html). When complete, the strategic plan will include five major sections: environmental profile, strategic directions, strategic initiatives, tactical implementation, and funding priorities and resources. The work that has been completed on the plan so far shows promise and echoes many of the points made in this report. Twelve ITPC policies have already been created and published on the Web (see http://www.ganet.org/itpc/policy.html). Several of these are especially relevant to e-commerce.

3.7 INTERNET SERVICE PROVIDERS (ISPs)

A large number of Internet service providers (ISPs) are active in Georgia. Table 3-3 summarizes the results of area code searches performed on three ISP databases (Sources: http://www.currents.net/resources/ispsearch; http://boardwatch.internet.com/isp; and http://thelist.internet.com) As may be observed in this table, there is considerable variation in the yields of area code searches for the three databases. The ComputerCurrents database is a Georgia-based (Atlanta) database and consistently yields the lowest number of ISPs. The List database consistently yields the highest number of ISPs. The Boardwatch database tends to yield numbers that are closer to those produced by The List than by ComputerCurrents.

ISPs in Georgia			
Area Code	**Computer Currents**	**Boardwatch**	**The List**
404	164	447	456
678	71	223	233
770	173	279	457
706	111	285	428
912	93	214	425

Table 3-3: ISPs in Georgia
(Sources: www.currents.net/resources/ispsearch; http://boardwatch.internet.com/isp; http://thelist.internet.com)

None of the databases is necessarily more reliable than another in helping to pinpoint the actual number of ISPs in Georgia. For example, numerous ISPs listed in the Boardwatch database for each area code are not included in The List database even though the latter consistently yields the highest number of ISPs per area code. Hence, even The List's yields may be understatements of the number of ISPs serving each of Georgia's area codes. Also, the yields for searches on the ComputerCurrents database for non-metro area codes (706 and 912) contain very few local (to the area code) and in-state ISPs.

Some of the differences in the search yields may be due to the fact that ISPs are responsible for inserting and maintaining/updating their own listings. An ISP may have provided an entry in one database but not another. This is a very likely scenario for the low numbers in the ComputerCurrents database which is designed to serve the Atlanta metropolitan area rather than a national or international audience. In some instances, the same ISP is listed multiple times in both the Boardwatch and The List. (Note: such multiple listings *are not* reflected in Table 3-3; each ISP was counted only once when creating the table). Such multiple listings may be the result of updating a previous listing. Also, some of the listings in each of the databases have not been updated in over a year. As a result, an ISP may, in fact, be providing a wider variety of dial-up and dedicated connections and services today than is reflected in the databases. In sum, some of the differences that may be observed across the databases may be result of requiring ISPs to enter a listing in each and to take responsibility for keeping the information in each database current.

The List database provides the most detailed information about the types of dial-up and dedicated Internet access services that are provided by ISPs in Georgia. For example, it includes information about the range of dial-up modem speeds that are provided and whether or not cable modem connections, ISDN, DSL, T1 (or fractional T1), and T3 (or fractional T3) services are available from the ISP. For out-of-state service providers and in-state ISPs with headquarters in other area codes in Georgia, it is unclear if the full range or only a partial range of services is available to Georgia subscribers. One can only be confident that the ISP is providing each of the listed services to someone, somewhere (assuming that the information they have provided is accurate). The List does not indicate whether or not VPN (virtual private network) services are provided, a service that would tend to indicate that the ISP is serious about providing e-commerce connections for businesses. Such information is only available through the time-consuming process of clicking on the hyperlinks for the individual ISPs.

Consistent with the information provide in the U.S. Department of Commerce's *Falling Through the Net: Defining the Digital Divide*, one would suspect that the availability of higher speed connections is most likely to be concentrated around the Atlanta metropolitan area and Georgia's other major cities. While higher speed connections may be available in other parts of the State, their availability is more likely to be spotty than widespread. These same trends are probable for Internet access via cable modem as well as the presence of CLECs. Although more detailed data collection is needed to verify the probable unevenness of access to high-speed Internet connection services within the State, State policymakers would be wise to develop incentives for carriers and ISPs to provide high-bandwidth Internet access to areas of the State that currently lack such access.

The Boardwatch database is arguably the most useful of the three ISP databases for State policymakers in spite of its questionable completeness and reliability. This is because it breaks out ISPs as local (to the area code), in-state (in another area code in Georgia), and out-of-state. A summary of this breakdown is provided in Table 3-4.

Area Code	Local	In-State	Out-of-State
404	16	64	367
678	1	49	173
770	42	32	205
706	19	34	232
912	25	18	171

Table 3-4: Local, in-state, and out-of-state ISPs providing service within Georgia's area codes. (Source: http://boardwatch.internet.com/isp)

As may be observed in Table 3-4, the out-of-state ISPs providing service within each of Georgia's area codes is often more than three times the sum of the local and in-state ISPs providing Internet access to Georgia. These differences may be deceiving in that the

actual number of subscribers to local and in-state ISPs may be vastly greater than the number subscribers to out-of-state ISPs that provide service within Georgia's area codes. More detailed information focusing on the number of subscribers to local, in-state, and out-of-state ISPs may be useful to State policymakers as well as estimates of the total revenues that may be flowing from Georgia subscribers to out-of-state ISPs.

3.8 WEB DESIGN COMPANIES

Other databases provide further insights into the extent to which Georgia is positioned to capitalize on the global growth of e-commerce. The Internet.com Web site, for example, includes a database of Web design firms, firms that provide Web-site development and maintenance services to other companies (http://designlist.internet.com/index.html). This database is searchable by state and by the type of services provided. Four categories of services are included:

- Basic services (HTML, photography, graphic creation, copy writing)
- Web-site development services (CGI forms, Perl scripts, Java scripts, Java applets, Server-side Java, Active Server Pages, database development)
- Technical services (Web hosting, domain name registration, transaction processing, and credit card processing, etc.)
- Multimedia services (RealAudio, animated GIFs, Javascript animations, Java animations, and streaming video)

The database can be searched by state and individual (or combinations) of services.

Table 3-5 summarizes a series of searches performed on the Web design firm database and compares states in the South and Southeast on four dimensions:

- The total number of Web-design firms listed in the database (summarized in the Total column)
- The number of Web-design firms that provide at least one of the four types of technical services — Web hosting, domain name registration, transaction processing, or credit card processing — (summarized in the Technical Services column)
- The number of Web-design firms that provide transaction processing services (summarized in the Transaction Processing column)
- The number of Web design firms that provide credit card processing services (summarized in the Credit Card Processing column)

According to the data in this database, as of July 1999, Georgia is in the middle of the pack among states in the South and Southeast. While it is headquarters to more Web design firms that provide e-commerce services than Alabama, Louisiana, Mississippi, South Carolina, Tennessee, and Virginia, Georgia slightly trails North Carolina and is significantly behind both Florida and Texas. An investigation focusing on the reasons why Florida and Texas are significantly ahead of Georgia in the number of firms providing technical e-commerce services may be warranted.

	Total	Technical Services	Transaction Processing	Credit Card Processing
Alabama	22	15	12	11
Florida	98	90	60	63
Georgia	**43**	**40**	**24**	**21**
Louisiana	6	6	4	2
Mississippi	4	4	2	2
North Carolina	45	42	24	26
South Carolina	10	10	7	7
Tennessee	15	15	9	7
Texas	115	103	54	54
Virginia	42	38	21	20

Table 3-5: A State-by-State Comparison of Firms in the South and Southeast that Provide E-Commerce Services (cont'd) (Source: http://designlist.internet.com/index.html)

Table 3-6 compares Georgia to other important states outside the South and Southeast. Generally speaking, Georgia compares favorably to these states with the exception of California and New York.

	Total	Technical Services	Transaction Processing	Credit Card Processing
California	273	242	164	154
Colorado	38	35	22	20
Georgia	**43**	**40**	**24**	**21**
Massachusetts	44	35	16	17
Michigan	44	39	22	23
New York	107	94	67	63
Washington	52	45	22	22
U.S.A. Totals	1602	1438	888	843

Table 3-6: A Comparison the Number of Firms in Georgia and Other Key States that Provide E-Commerce Services

While Georgia generally stacks up well against other states in the region and U.S. on the number of Web design firms who are capable of helping other businesses engage in transactions over the Internet, it is important to note that the vast majority of firms in the State are located in the Atlanta metropolitan area. Only a handful are located in other cities in Georgia. As a result, businesses in most sections of the State (outside of the Atlanta metropolitan area) do not have local access to Web design services. This is

troublesome because many small-to-moderate size businesses are reliant on such services in order to establish a presence on the Internet and to participate in mainline e-commerce. State policymakers should consider incentives for Web design firms to locate in currently under-served areas. They should also investigate the staffing needs of these firms and begin the process of creating the infrastructure needed for such firms to expand.

3.9 CONSULTING FIRMS

Virtually all of the major consulting firms have a significant presence in Georgia. Although the types of consulting services they provide vary among these firms, all are engaged in information technology work for clients. Recently, this has been expended to include e-commerce, although there is a wide variation in how each firm approaches the topic, particularly among the "Big Five" accounting/consulting firms. By visiting the Web sites of each of the Big Five and conducting personal interview with senior executives, these differences become apparent. Ernst & Young and Pricewaterhouse-Coopers give e-commerce extensive attention on their Web site. KPMG Peat Marwick barely mention it and Andersen Consulting and Deloitte Consulting are somewhere in between. In the following sections, the Big Five's commitment to e-commerce is discussed as well as the activities of Keane and IBM Global Services.

3.9.1 ANDERSEN CONSULTING

The Andersen Consulting Web site is fairly limited in the amount of information on electronic commerce and Internet-related business practices. (An attempt to arrange for a personal interview was unsuccessful.) The site lists a number of services listed under the banner of EsureSM, a compendium of e-commerce services which include:

- **ERisk** — The use of Andersen professionals to assist businesses assess the risk of participating in an e-commerce venture or, more importantly, the risk they face in *not* participating in an e-commerce venture.

- **EReady** — Aid in determining the readiness of the technology, people, processes, interfaces, structure, and performance capability within an organization; i.e., the readiness of a firm for starting an electronic commerce venture.

- **ESecure** — The promotion of e-commerce security and integrity, primarily focusing on penetration testing, security design, and certification.

- **EMeasure** — Used to determine if the organization is achieving its stated electronic commerce-related business goals, and if the appropriate measurement system is in place to capture these business expectations.

- **EComply** — Used to advise firms in electronic commerce-related tax, legal, and regulatory compliance issues. Additionally, it focuses on global regulatory issues that

can affect the deployment of e-commerce solutions in other countries as well as partnerships with other companies.

- **EFraud** — Issues involving fraud require real-time fraud risk management capability as well as forensic and other analysis techniques.

Additionally, the Web site presents Andersen's overall philosophy on electronic commerce. The firm believes that business-to-business, as opposed to business-to-consumer commerce, will dominate e-commerce growth for the next decade. Moreover, Andersen feels that e-commerce will cut the cost of purchasing dramatically by streamlining the time-consuming processes that precede purchase orders (i.e., exchanging product specifications, requesting quotes, negotiating prices, and authorizing purchases). Andersen also feels that e-commerce can be used to improve the management and efficiency of trading partnerships by providing product and marketing information in real time.

E-commerce also includes the streamlining of logistics, inventory management, distribution, and delivery. On their Web site, they quote a recent Forrester Research study demonstrating that companies spend, on average, $55 to process a traditional purchase order. The use of the Internet has been shown to reduce this amount to less than $2 per order. Similarly, Andersen stresses that e-commerce applications must be tightly integrated with a company's legacy systems in order to provide the "seamless service" to make e-commerce an effective business tool. They say that only through this integration can a company effectively leverage its investment.

As with most companies' Web sites, Andersen's site is a combination marketing tool and information source. They list quite a bit of support for software from second generation e-commerce vendors, such as Interworld, which can provide seamless integration of electronic commerce solutions to financial packages and enterprise resource planning (ERP) systems, such as SAP, Oracle, and PeopleSoft.

Similar to other service vendors, Andersen Consulting identifies the threat to a firm's competitive advantage as buyers can more easily access suppliers around the world, 24 hours a day, seven days a week. They point out that geographic proximity will no longer be a key factor in maintaining customer loyalty. Thus, many firms will be forced to identify and develop new competitive differentials in response to the transforming market dynamics.

This is a role that Andersen feels they can play. They believe they can add value to supply chain management, not through logistical expertise, but through providing supply and availability information. They term this "infomediaries," playing the dual role of providing information to buyers about vendors' products and providing information about buyers' habits and preferences to the vendors.

3.9.2 ERNST & YOUNG

Ernst & Young has redefined its consulting business to acknowledge the changes to traditional business paradigms brought about by electronic commerce. When logging onto their Web site, one immediately sees the commitment that Ernst & Young is making to e-commerce. The bulk of their Web site is designed for informing and marketing the electronic services and products offered by Ernst & Young. These products and services are divided into six main subject headings: the eFirm; eCommerce; Assurance; Advisory Services; Java Programming Services; and Technology, Communications, and Entertainment Services (TCE). The section on eFirm represents the overall philosophy of Ernst & Young management. They believe that all people, organizations, and devices will be connected by the year 2005. An e-company uses the Internet to enable new and more powerful relationships with customers, suppliers, employees, and business partners to increase sales, effectivness, and efficiency (http://www.ey.com/ecommerce/vision.asp). To enable the eFirm to occur, Ernst & Young provides assistance to companies to eliminate cumbersome processes, assists in the acceleration of product development, establishes new distribution channels, shows how to reach new customers, and improves service to existing customers.

To provide additional information, Joe Gagnon, a senior partner in charge of the three Ernst & Young Global E-Commerce Specialty Centers, agreed to an interview.

When asked if the strong e-commerce emphasis on the Web was a conscious change of strategic direction for Ernst & Young, Mr. Gagnon said that the e-commerce presence was a conscious effort, but not a new one. He indicated that Ernst & Young had been moving into e-commerce consulting since 1993. He believes that the current strategy is an additive one; that is, one that has been evolving since their first e-commerce consulting job. He emphasized that, for Ernst & Young, electronic commerce consulting has been "more of an evolution than a revolution." He also mentioned that a big question for his company is how to build the necessary skills for this type of consulting. Currently, most of these skills are developed internally. As the company personnel gain experience, they expand the scope of their operation. They are now ready to expand into the South American market.

There are four specific markets they target: service industries, product industries, the health industry, and mid-size firms that gross between $100-500 million a year. When asked who are Ernst & Young's biggest competitors within these markets, Mr. Gagnon replied IBM and Hewlett Packard are key competitors for these target markets; but he felt that their greatest competitive threat comes from the "pure play" companies such as Scient, *i*XL, Proxicom, Sapient, and U.S. Web.

On another matter, Mr. Gagnon was asked why New York, Chicago, and Mountain View, CA, were chosen as the centers for their e-commerce consulting. He said the company had many discussions as to whether to choose cities centered on "trade routes vs. competency routes." They decided on the former. He defined "trade route" cities as

those where a large volume of traditional commerce transactions occurred. Another criteria they use for a trade route city is one which hosts more than one major industry convention. "Competency route" cities, on the other hand, include those where a great deal of intellectual capital could be found, such as Cambridge, MA, or Boulder, CO.

Seattle, Costa Mesa, CA, and Dallas are planned expansion cities scheduled to open within the next three, six, and nine months, respectively. When asked about whether there were any plans for Atlanta, Mr. Gagnon said it was "on their radar screen." Also, their preference is to open offices in areas with a concentration of vertical industries, such as the entertainment industry in New York City.

This led to another area of discussion. Specifically, what had attracted Ernst & Young to open a main office in New York City? Apparently, NYC Mayor Rudolph Guliani actively sought to create of a technology center when Drexel Burnham & Lambert folded and left a prime building location empty. He provided companies with favorable tax incentives as well as expediting city infrastructure upgrades for new technologies. A total of $40 million was spent on renovating the Drexel building. According to Joe Gagnon, one of the best things the city did was "they kept at arm's length" while the real estate community sought new tenants for the renovated building. Mr. Gagnon has invited anyone from Governor Barnes's office to a personal tour of the Ernst & Young New York facilities.

Finally, when asked what he would suggest to Governor Barnes to encourage his making Atlanta a center for electronic commerce activity, Mr. Gagnon replied: "I think the time to do things is now. I would suggest that the Governor come up with a list of ten projects that convey the spirit of the Internet and then implement them. Government, by their actions, can lead the business community."

3.9.3 PRICEWATERHOUSECOOPERS

Like Ernst & Young, PricewaterhouseCoopers gives high visibility to its e-commerce activities on its Web site. Its Technical Electronic Commerce Service (http://www.pwcglobal.com/extweb/service.nsf/DocID/B2C02940688AC17B852566650055DF2C?OpenDocument) is a global center of expertise encompassing PricewaterhouseCoopers' Global Technology Risk Services Practice. The center provides assessments of the electronic commerce solutions deployed by Internet-connected merchants. The scope of services within the center covers:

- The design of strategies and processes for electronic business integration. Proactive risk management for electronic commerce projects includes the assessment and verification of electronic commerce maturity levels for electronic merchants, guidance towards higher maturity levels, the implementation of secure payment systems, and usage assurance reviews for virtual ventures.

- Internet and Electronic Commerce Venture Assessment Services which support clients in implementing electronic commerce solutions and in managing the risks to their business of existing and implemented electronic commerce solutions.

- Trusted Third Party Assurance & Consulting Services which assess, design, and implement the organization processes and technology infrastructures necessary to establish a trusted third party (TTP) operation.

- Internet Security Services which provide "best-practice" advice on connecting to the Internet. These services include Internet and intranet security evaluation and review Internet and intranet security design and implementation, and the review and identification of potential Internet and intranet security problems.

The services mentioned above are fairly similar to those offered by other consulting firms. However, PricewaterhouseCoopers did cite a unique distinction not found on competitor sites. On July 7th, 1999, they were named the 1999 Best Electronic Commerce Industry Partner (large business) by the U.S. Department of Defense (http://www.pwcglobal.com/extweb/ncpressrelease.nsf/DocID/695998ED2915AC55852567A7007701FE?OpenDocument). The Defense Department's Best Electronic Commerce Partner Award honors businesses providing superior electronic commerce services to the Department. Nominations for the award are made by several Defense Department organizations to recognize industry partners. A board of Defense Department executives reviews nominations and selects industry partners with outstanding records of providing "on-time, at or below cost, and value-added" services. The government-partnering activities considered by the awards panel had to be clearly related to electronic commerce having a direct impact on the department's electronic commerce goals.

The Department also recognizes the firm for its work on the Central Contractor Registration and Department of Defense Business Opportunities projects. The Central Contractor Registration project provides a single registration point for all Defense Department vendors and the front-end electronic commerce information required to do business with the department, including vendor electronic funds transfer information to facilitate electronic payments. In all, the Department of Defense now has an electronic link to more than 152,000 vendors.

The Department of Defense Business Opportunities Web site provides a single point of entry to search value-added Defense Department procurement and acquisition Web sites for opportunities to sell products and services. The system works cooperatively with current Defense Department Internet sites. It is designed to index, organize, synergize, and utilize the capabilities of the Department's existing sites. PricewaterhouseCoopers provides the development, production, maintenance, and overall program management support for the program. They have also built this site to be flexible to accommodate new Defense Department procurement Web sites as necessary.

3.9.4 PEAT MARWICK KPMG

A search of the KPMG Web site on the term "electronic commerce" yielded only two hits reflecting their involvement in this area. One mentions a standard to send secure transactions over the Internet (http://www.kpmg.net/library/99/may/story1%5Fm5%5Fkvdm.asp). The "WebTrust Seal of Approval," provides customers with the assurance that a company uses sound business practices and controls in electronic commerce. To obtain a WebTrust seal, a company must meet strict requirements in the areas of business practice, transaction integrity, and information protection. Among others, these criteria require that an operator's e-commerce business practices be clearly stated, that orders are completed and billed as agreed, and that private customer information is protected from third party use. The WebTrust seal was developed in cooperation with the American Institute of Certified Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA) and is currently in use in the United States, Canada, and, most recently, Europe.

The only other material found on the KPMG Web site related to KPMG's involvement in retail and financial institutions in Australia (http://www.kpmg.net/library/97/november/story1.asp). These Australian Internet success stories were the subject of a presentation by KPMG electronic commerce senior manager Steve Wullschleger at a recent Internet World trade show held in Sydney, Australia. Apparently, there is a title of "Electronic Commerce Senior Manager" at KPMG, but no other reference was made to it on their entire Web site. An attempt to contact Steve Wullschleger to provide additional information proved unsuccessful.

3.9.5 DELOITTE CONSULTING

On their Web site, Deloitte Consulting states that they believe electronic commerce will dramatically change the way organizations conduct business with each other and their customers. However, they appear to be entering this business arena with extreme caution. They are offering two primary services: 1) The Electronic Commerce Reliability Services, which support their clients in the development and use of information and communication technologies to integrate internal and external business processes electronically; and 2) the Electronic Commerce Service Provider, which includes such services as electronic loan applications for financial institutions.

The Electronic Commerce Reliability Services facilitate an organization's accessibility to the Internet through the extension and modification of existing business processes. This precludes the necessity of managing the new risks associated with these new processes. Deloitte Consulting utilizes existing technical know-how to provide client solutions for threats to availability, usefulness, integrity, authenticity, and confidentiality of data. They are also delving into newer security technologies such as Kerberos, encryption, firewalls, OSF/DCE, digital time-stamps, token-based authentication, and single sign-ons.

Additionally, they have developed secure messaging services for intra- or extra-corporate communications. They have used public-key cryptography in their application software. They have created a certificate management infrastructure for Web document certificate-based security. They have integrated firewall and Web-server security techniques, hardened the operating and database management systems used on the production servers, and worked with several Internet service providers to engineer a highly reliable Internet solution.

Deloitte Consulting's Electronic Commerce Service Provider specializes in financial institutions. They have developed an architecture for the implementation of an Internet-based loan application acceptance, verification, and processing system. One of their stated goals for this particular application was to assess the risks faced by a bank when providing this service on the Internet. Their assessment approach contains the following elements: a) exposure to fraudulent activities via the new loan processing methods, b) fraud preventive methods, c) hardware selection for maximum security and efficiency, d) database linkages via Internet technologies, and e) system development and quality techniques.

Apparently with the skills and expertise gained from dealing with financial institutions, the Electronic Commerce Service Provider division is planning to move into various retail industries. *Retail Trends* (Deloitte, 1999) magazine reports the importance to Deloitte and Touche to leverage their global experiences in traditional retailing industries to the new global electronic community. There is no doubt that new retail concepts and channels will consistently emerge to dominate for the next decade; and, as such, Deloitte and Touche, and its consulting arm Deloitte Consulting, have acknowledged the opportunities for growth in new areas. To date, however, this business represents only a small portion of their overall practice.

Cathy Benko, Deloitte Consulting's Global Practice Leader for E-Business, believes that, with the advent of the Internet and the proliferation of a knowledgeable body of end-users, electronic commerce is a natural evolutionary step rather than a revolutionary leap. According to Ms. Benko, Deloitte Consulting's top management sees opportunities in the marketplace as new businesses develop, new alliances and joint ventures are formed, and supply-chain processes are streamlined to take advantage of Internet technologies. Similarly, the Deloitte Consulting group recognizes the threats posed by this technology to intermediaries. As technology makes transaction processes more efficient, the need for many intermediaries will disappear.

Out of a large body of e-commerce research done at Deloitte Consulting, two key concepts have emerged: 1) how best to serve a customer in segments of one; and 2) how to respond to market opportunities and threats in zero time. Of course, these concepts are far from new. For years, Tom Peters and others have been proponents of mass-specialization (Peters, 1984). Accordingly, competitive firms must now constantly innovate, put the customer in charge, and respond immediately and decisively to

opportunities and crisis from both within the organization and from the outside environment.

When asked why Deloitte Consulting chose San Francisco as the center for their worldwide center for electronic commerce consulting, Ms. Benko said San Francisco was chosen for its proximity to the most innovative hardware and software firms, such as Sun, Microsoft, Apple, and HP. One of Deloitte's chief concerns is having the ability to hire personnel with the technical know-how necessary to do leading-edge e-commerce installations. According to Ms. Benko, personal communication and broad technical skills are highly sought-after qualities within their company. Although much of their consulting is done in the Pacific Northwest, it is a common practice at Deloitte to pair consultants, one from the San Francisco office while the another is assigned from the Deloitte office closest to the city in which a client is located.

However, this is not to say that all Deloitte's e-commerce business is done solely in the San Francisco office. Atlanta is one of the largest Deloitte offices, handling much of the e-commerce projects for the Southeastern United States. When asked why the Atlanta office is so successful, Ms. Benko said: "Atlanta is where people want to live…" and "…we go where we can recruit."

The one key theme Ms. Benko kept coming back to was the importance of hiring quality people. More than any other factor, Deloitte believes that their service-oriented business starts and ends with the quality of people they are able to attract. This is why their e-commerce business is headquartered in San Francisco; but, it is also why they have a very successful office in Atlanta.

3.9.6 KEANE

The Keane office in Atlanta is considered one of their larger offices, with over 300 people employed here. Overall, Boston-based Keane has 55 offices worldwide with annual revenues close to a billion dollars. Keane has a two-pronged approach for assisting firms with developing an electronic commerce presence. To do this, Keane has recently formed a high-level management division known as *Keane Management* designed to provide strategic planning assistance for electronic commerce initiatives. Keane Management operates out of the Boston and Chicago offices, but they service any city in the United States. After Keane Management works with a firm's CEO and CIO to develop an e-commerce strategy, local Keane offices operationalize the plans provided by the management group. Electronic commerce experts reside in each office. However, if additional experience in a given area is necessary, content experts are brought from other cities to work with client firms.

According to Joe Murphy, Managing Director of the Atlanta office, most of the consulting Keane does in electronic commerce is on the back-end or on business-to-business solutions rather than the more visible business-to-customer solutions. Mr.

Murphy also stated that Keane believes that electronic commerce is client-driven by their levels of expectation and creativity. A scan of the environment bears out his belief. Amazon.com, eBay, WebMD, and many others demonstrate that the traditional model of doing business is being supplanted by new, creative, electronic initiatives. Services which were once considered valuable, such as those provided by travel agencies, are now given away free to attract potential consumers to Web advertisements.

Sandra Sawyer, the Keane Account Manager for the State of Georgia, described a number of ventures in which Keane is currently involved. They are working with the Department of Agriculture to create a Web site for publishing a farmer's newsletter. Currently, farmers bring articles, advertisements, and other communiques to a local D.O.A. office. These are then put on a new Web site as a pre-hardcopy newsletter publishing tool. The plan is to move the publication of this newsletter completely online. However, this is not scheduled until more farmers gain access to the Internet. Keane has also developed a Web site for internal use for the Department of Human Resources. Here, D.H.R. employees can get reports on the benefit needs of State employees. Lastly, Keane is working on a Web site for Michael Hale to track the status of all of the State's Y2K projects.

Outside of Georgia, Keane is developing Web sites for deed recording in Cuyahoga County (Cleveland, OH); clinical lab reports for New York State's Department of Health; and court order tracking for New Hampshire's Administrative Office of Courts. They are also creating several Web sites in North Carolina. These include the Department of Health Services to assist in welfare reform processes; the Department of Justice for sex crime registration which allows for public notification of offenders; for the Department of Criminal Investigation to provide the public information on domestic violence; and a number of coordinated Web sites for the Department of Commerce.

When asked about Georgia's strengths and weaknesses, Mr. Murphy and Ms. Sawyer gave their opinions on a number of things the State should be aware of when developing its own electronic commerce infrastructure. The first they described as the "Greenbean Factor." This simply means that many projects are completed with personnel who could best be described as interns. These are people who generally have less than a year of experience and, unfortunately, are often left on their own to devise solutions. Project management is another weak point found in many IS projects, whether they be electronic commerce projects or other types. Again, this weakness is derived from the lack of quality information systems' personnel. Moreover, personnel, once hired, are very difficult to retain. Whether they are State employees or Keane personnel, once they gain experience, it is quite common for them to "shop" their talents. Quite often, the best people move on to other companies before a long-term project has been completed.

Sawyer and Murphy agree that this lack of stability in the workforce leads to overall project instability. Combined with the lack of quality project leadership and inexperienced replacement personnel, many projects flounder leading to goals not being met and delivered projects not meeting users' expectations. Finally, Joe Murphy

emphasized the distinct cultural factor present when dealing with state governments. In his experience, there are many legislatures that are "technology-challenged," i.e., representatives from some areas of the State who fail to see the importance of technology in State Government. In fact, with the potential of shifts in the power structure caused by enabling technologies, many people in our government actively resist leading-edge technology initiatives, such as electronic commerce.

Mr. Murphy and Ms. Sawyer were asked what the State of Georgia Government could do to overcome these weaknesses. In other words, how could the Governor promote the State as a center of electronic commerce activity? First, Mr. Murphy strongly believes in quality training programs tied to compensation plans. He says that, at Keane, training and promotion go hand-in-hand. The more their employees are willing to learn, the more the company rewards them. He feels that this should also be done by the State Government for its internal IS staff. Second, if the State doesn't have the necessary *qualified* personnel for an electronic commerce project, they must bring in that experience. Third, success breeds success. Mr. Murphy advises the best way to quiet vocal critics within State Government is to do a "quick hit" project. In other words, choose a project with high-visibility, but also with a high likelihood of success. Ideally, this "quick hit" project should be one that is linked to the Governor 's election platform. After this initial project, investigate where there is a real opportunity for high pay-off. Murphy mentioned the online driver's license renewal done by the State of Massachusetts as a good example. This project had excellent public relations value, both from within Massachusetts and from other states that refer to this project as a model for future government electronic commerce efforts. Also, this project not only saved the state money, but it did so by giving a discount to those Massachusetts residents who use the Web-based license renewal method. In fact, according to Mr. Murphy, electronic commerce projects transform existing business processes into more efficient ones. In terms of state government, these efficiencies can be translated into either increased revenues or decreased taxes, both of which should serve the State well. Finally, Ms. Sawyer pointed out the importance of giving the users what they want. In the case of a state government, she suggested taking a survey of taxpayer needs or polling them to determine what type of projects would provide the greatest degree of user satisfaction.

Mr. Murphy's final advice is "the State should lead by their actions. If the State of Georgia wishes to be known as a leader in electronic commerce, they should be proactive in their efforts. All too often states react slowly to make use of technology." This advise is very similar to that given by Jim Flowers, Governor Barnes's Assistant on Technology. He felt that the more the State uses e-commerce for its own processes, the more businesses would believe that the State supports electronic commerce businesses.

3.9.7 IBM GLOBAL SERVICES

IBM's Web site (www.ibm.com/e-business/) clearly illustrates its commitment to being an e-business solutions provider for all types and sizes of organizations. The Web site's

overview and discussion of what constitutes e-business and how it is transforming traditional organizations and business processes is supported by some compelling case examples. To IBM, key aspects of e-business include:

- *Customer-relationship management* (CRM) processes — systems that enable e-businesses to support, develop, and retain profitable customers

- *Supply chain management* (SCM) processes which involve the use of e-business concepts and Web technologies to optimize business processes and business value throughout the extended enterprise — which includes suppliers and customers. SCM processes enable manufacturers and vendors to share sales forecasts, manage inventories, schedule labor, optimize deliveries, and improve productivity. Processes within SCM include forecasting, inventory management, logistics, procurement, and warehouse management.

- *E-commerce processes* which include automated customer account inquiries, electronic presentation of goods and services, online order taking and bill presentment, and online payment and transaction handling.

IBM offers a wide range of business solutions in each of these key areas that enable organizations of all types and sizes to take the steps needed to become e-businesses.

IBM currently has a strong e-commerce presence in Atlanta. The company's Interactive Media Center and e-commerce research center employs approximately 500 IT professionals. About 280 of these are classified as technical employees whose job titles include solution architects, software engineers, programmers, network administrators, and technical directors. The remaining 200 are classified as creative employees whose job titles include producers, Web designers, creative directors, art directors, graphics designers, animators, information designers, content managers, writers, continuity directors, compression specialists, audio designers and engineers, videographers, post production editors, cybercasters, and photographers. According to Tom Howard, who oversees IBM's Interactive Design Studios in Atlanta, the Atlanta Center specializes in integrating multiple media types such as interactive Web technologies, CD-ROM, ITV, DVD, and Kiosk to ensure an engaging interactive, end-user experience.

In a recent interview, Walt McGill and Tom Howard, e-business executives with IBM Global Services, afforded some insights into the changing nature of IT development efforts for business and government. Mr. McGill presented the chart shown in Figure 3-1 representing the evolution of e-business efforts within IBM.

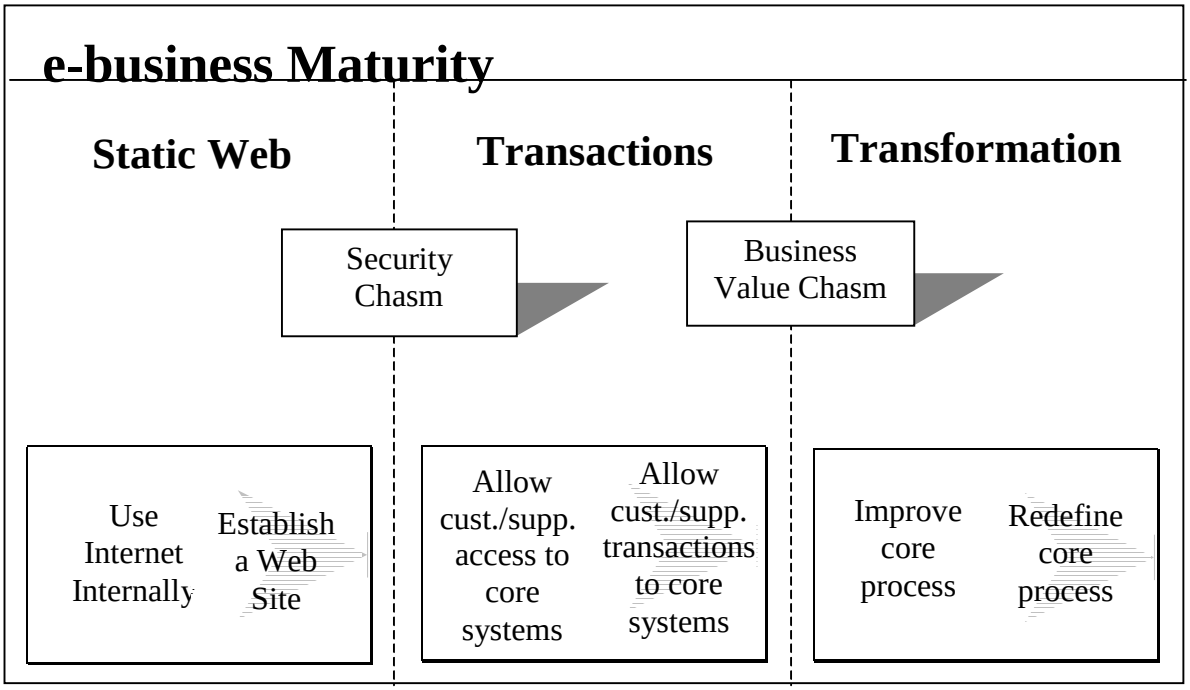

Figure 3-1: The Evolution of E-Business

In his experience, e-commerce activity starts with firms developing their own Web site internally. The next endeavor for most companies is to open their Web sites to customers. To accomplish this, security hurdles must be overcome. Once done, customers and suppliers may then access the firm's core systems, eventually leading to business transactions. Finally, as a Web-based business paradigm becomes incorporated, the firm begins to improve and re-evaluate core processes. Yet, for this to occur, the company must be open to change.

This necessitates a re-evaluation of the firm's basic beliefs and goals. As a result, successful transformations away from brick-and-mortar business to e-business has not been accomplished very often. However, according to Tom Howard, the competitive realities of the marketplace will dictate the degree of willingness for many firms to try this transformation.

When asked why Atlanta was chosen as the site for the company's Interactive Design Studio, McGill and Howard noted that there was intense national competition for the center. Primary reasons behind Atlanta's selection included the availability of suitable office space, Atlanta's reputation as a trade center, the availability of appropriate intellectual capital (both technical IT and creative talent), and its "way cool" environment. They note that similar centers are planned in cities that have comparable trade center reputations, intellectual capital mix, and progressive environment including New York and Los Angeles. Smaller centers are planned for Chicago, Dallas, and Miami.

When asked about key competitors, Howard and McGill noted that the competitive environment was very dynamic. In some instances, different companies are competing for a particular account, while in others, the same companies are partnering to provide a client with the e-business solutions that they need. Specific competitors identified by McGill and Howard include Andersen Consulting, EDS, Hewlett-Packard, and alliances between system integrator and consulting firms and infrastructure companies (such as Cisco). McGill and Howard noted that IBM enjoys a strong existing client base across Georgia that includes a large number of IBM Business Partners.

McGill and Howard also noted that IBM has been involved with the State of Georgia in a variety of other ways. They were selected as the IT Integration Partner for the 1996 Olympics, have demonstrated community support through United Way and a many other organizations, and have been involved in a variety of projects for the State including a parole officer kiosk-based system that facilitates parolee check-in and thereby enables each parole officer to handle more parolees. IBM is also involved in a Web-based education and training delivery system for the Gwinnett County school system.

McGill and Howard were quicker to cite Georgia's strengths than its weaknesses. They did point out that they felt that the number of counties in the State could be a deterrent to Statewide e-commerce initiatives. They felt that numerous county governments, especially those in rural and/or less prosperous areas of the State, currently lacked the computing infrastructure and IT talent needed to implement e-commerce applications even though these could streamline many of their routine processes and could eventually save taxpayer dollars.

When asked about what State policy makers could do to encourage the expansion of e-commerce within Georgia, McGill and Howard noted that the State should begin by accepting the challenge of becoming a leader in electronic governance. Their specific recommendations include:

- Make IT a strategic initiative in all state agencies.
- Demonstrate a financial commitment to electronic governance by ensuring that IT infrastructure, e-commerce, IT professional staff, and IT services are included in the line-item budgets for each State agency.
- Use "best of breed" e-commerce applications in all State agencies in order to attract IT professionals as well as to build skills and expertise. Such applications should also provide Georgia's citizens with 24/7 access to the State's agencies and services.
- Ensure access to State e-commerce applications for all citizens and constituencies — be aggressive in State-level initiatives to close the digital divide.
- Ensure consistent security and privacy across State e-commerce applications. There should also be consistent governance of the "look and feel" of the content of agency Web sites.

CHAPTER 4
A COMPARATIVE ANALYSIS AND RECOMMENDATIONS

4.1 SWOT ANALYSIS

A widely used method for comparative analysis is SWOT — strengths and weaknesses, opportunities and threats. The first two, strengths and weaknesses, have an internal focus: what is happening inside a company or, in this case, inside the State of Georgia, both good and bad. The last two have an external focus: what is happening in other states or in the nation as a whole that provides opportunities to build on the State's strengths, or threats that might take advantage of the State's weaknesses.

Following these analyses, the chapter concludes with a specific set of policy recommendations, grouped by areas of application.

4.2 STRENGTHS

As noted in Chapter 2, there are a number of Federal initiatives and documents capable of providing state policy makers with overall guidance for creating an economic environment in Georgia that is conducive to electronic business. Several of these highlight existing Federal and State-level programs that could be leveraged, promoted, or emulated in Georgia. Some of Georgia's strengths are:

- Georgia is ranked second in the nation in the rate of core IT job growth. Between 1996 and 2006, Georgia will be adding an average of 5,560 new IT jobs to its work force each year.

- Georgia is well positioned in the region (South and Southeast) in terms of core IT job growth, the total number of core IT workers in the work force, and IT worker intensity (the percentage of IT workers in the State work force).

- Georgia, largely because of Atlanta, is perceived as an IT center and source of IT talent by the business community. It is also gaining the reputation of being an e-commerce center.

- The percentage of citizens in Atlanta with Internet access places it among the nation's leading cities in this regard (see Table 3-2).

- Georgia is one of the more progressive states in the nation in using IT and e-commerce for government administration (see Table 2-14, Table 2-15, and related discussion).

- GIL (Galileo Interconnected Libraries) is a model program with the potential to provide benefits to all educational constituencies within the State.

- Georgia is recognized as one of the leading states for telemedicine and Web-based medical services.

- The Board of Regents and the University System of Georgia have implemented important initiatives to provide the State with the intellectual capital and human resource infrastructure required to attract, retain, and expand companies who are capable of being major players in the evolution of e-commerce across the state. Representative programs include ICAPP, GLOBE, and the Yamacraw mission.

- Georgia's renowned HOPE scholarship program is encouraging more of the State's most promising high school students to complete their college education at Georgia institutions. This is translating into higher average SAT scores for entering freshmen at the USG's four-year colleges and universities.

- Increasing enrollments at the State's technical schools, fueled by HOPE, are enhancing the quality of the labor pool across the State.

- As noted in a recent *Wall Street Journal* article, Georgia now leads the Southeast in per student funding for education as well as in the percentage of the state budget devoted to education. This demonstrates Georgia's financial commitment to enhancing its educational delivery systems.

- The creation of computer engineering and electrical engineering programs in previously under-served parts of the State has the potential to increase the presence of IT and e-commerce firms in those areas.

- Georgia's State-level policy makers generally exhibit an enlightened attitude toward IT and e-commerce and their potential benefits for State Government processes and Statewide economic development.

- There is effective legislative-executive cooperation on major reforms and initiatives. This was especially noticeable during 1999 and is expected to continue to be a strength.

- Strong fiscal policies by Georgia's State Government that underscore the State's commitment to major reforms and initiatives.

- The Atlanta metropolitan area is recognized as one of the leading trade centers in the U.S. as well as one of the nation's IT centers. It possesses a large number of positive attributes that can be leveraged to promote the expansion of e-commerce in Georgia. These include:
  - A solid base of "networking and telecommunications infrastructure" companies including (but by no means limited to) AT&T, BellSouth, Hewlett-Packard, IBM, Lucent Technologies, Scientific Atlanta.
  - Major offices and centers for most of the key firms which provide e-commerce consulting and e-business services needed by other Georgia-based companies (as well as State agencies). They include Andersen Consulting, Answerthink Consulting, Deloitte Consulting, Keane, IBM, Ernst & Young, KPMG, and PricewaterhouseCoopers.
  - The presence of companies whose services are directly related to e-commerce. These include CheckFree, Equifax, Total Systems, United Parcel Service, and the media (AJC, CNN, and Cox Communications). There are also hundreds of ISPs serving the Atlanta metropolitan area.
  - An excellent transportation system that includes Hartsfield Airport and the freeway system.
  - An exceptional housing and commercial real estate market. The lack of suitable commercial real estate is recognized as an inhibitor of e-commerce start-ups in the Silicon Valley (Stone, 1999). Atlanta's (and other cities in the State) bevy of suitable sites is a strength that can be used to attract e-commerce entrepreneurs to Georgia.
  - The legacy of the 1996 Olympic games. The international attention that Atlanta received from the Olympics continues to be potential selling point for Georgia.
  - Favorable national press as being one of the "best places to do business" and one of the nation's "most livable cities."
  - A growing number of Atlanta-based Internet start-up success stories such as WebMD.
  - Atlanta-based universities (notably Georgia Tech and Georgia State) that possess world class reputations in computer and electrical engineering, information systems, and digital commerce.
  - The home to a wide range of private sector firms that specialize in IT training and certification. A growing number of training opportunities exist for IT professionals who wish to acquire e-commerce skills.

4.3 WEAKNESSES

In spite of its many strengths, Georgia also has some weaknesses. They are listed below:

- Georgia is ranked in the lowest tier of states in terms of household telephone penetration rates. It has a 91.4 penetration rate (see Table 2-6).

- Georgia is ranked in the lowest tier of states in terms of households with computers (see Table 2-7). In 1998, only 35.8 percent of the households in Georgia had computers.

- As noted in Table 2-8, in 1998 only 23.9 percent of the households in Georgia had Internet access. High-speed Internet access (including ISDN, xDSL and access via cable modems) is unevenly distributed across the State. More high-speed alternatives are available in the Atlanta metropolitan area than in Georgia's other urban centers. Citizens and businesses in rural areas currently have few, if any, high-speed Internet access alternatives. Many citizens outside the Atlanta metropolitan area are limited to dial-in connections with maximum connection speeds of 56 Kbps. As noted in Chapter 2, e-commerce industry experts indicate that slow download speeds are responsible for hundreds of millions in lost sales and are a key inhibitor to more rapid expansion of business-to-consumer e-commerce.

- Web-site development firms with the expertise, skills, and experience required to enable Georgia-based companies to engage in electronic business transactions on the Internet are unevenly distributed across the State. The vast majority are concentrated in the Atlanta metropolitan area; Georgia's other urban centers are served by few, if any, Web-site development firms with the requisite expertise. This inhibits the ability of firms across the State to make the move to e-commerce.

- Georgia's population demographics make it vulnerable to a State-level digital divide, which, if not addressed, could result in significant segments of its population being left behind.

- Georgia's K-12 public education still receives negative national publicity, such as Georgia's 50^{th} ranking in average SAT scores.

- A general shortage of IT professionals exists in Atlanta and across the State. At a recent Society of Information Managers (SIM) meeting, Jim Flowers, the Governor's Assistant for Technology, stated that there is need for an additional 65,000 technology workers in Georgia. The upshot is intense competition for skilled IT professionals; competition for workers with critical e-commerce skills is especially intense.

- Georgia's public universities and technical schools currently have resources to satisfy only a fraction of the State's annual growth for core IT jobs. They are currently

unable to play a lead role in building the intellectual capital and human resource infrastructure that the State needs to ensure sustainable e-commerce growth.

- Access to IT and e-commerce-oriented graduate programs is uneven across the State. For example, in spite of being the second-fastest growing region of the State, there are no graduate programs for IS and IT professionals in Southeast Georgia. While ACM-accredited computer science programs exist at both Armstrong Atlantic State University and Georgia Southern University, neither institution offers a masters in computer science. Georgia Southern's College of Business Administration also has a sizable and well-respected AACSB-accredited information systems degree program but lacks the staffing to implement an IS emphasis within its 300+ MBA program.

- Access to e-commerce oriented training and certification programs is also uneven across the State. While some certification programs (such as those available through Microsoft, Novell, and Cisco) are available at some of the State's public technical schools — and through private firms — there is far greater access in the Atlanta metropolitan area than elsewhere. This can be a deterrent to State efforts to build a State-wide e-commerce infrastructure.

- There is uneven distribution of opportunities for technological developments around the State. Few urban, and no rural, areas of the State possess the telecommunications and IT infrastructure found in the Atlanta metropolitan area. This inhibits their ability to reap the benefits of e-commerce enjoyed by Atlanta's business community.

- The State's demand for IT professionals with core IT competencies and the current inability of its public universities and technical schools to address only a fraction of the demand increases the potential for Georgia-based firms to become dependent on H1-B workers. Large numbers of H1-B workers in the State labor pool can instill complacency about implementing State programs aimed capable of building the intellectual capital and human resource infrastructure required to ensure sustainable e-commerce growth. Recent Federal-level initiatives to increase H1-B quotas may perpetuate such complacency and weaknesses.

- There are no major "think tanks" or research centers in Georgia, nor are there any high-visibility public-private IT or telecommunications corridors in the State. As a result, Georgia risks losing potential IT and e-commerce prospects to cities like Richardson, TX, and centers like North Carolina's "research triangle."

- Georgia is not perceived as being a banking center and is not the headquarters for any major U.S. banks with nationwide and/or worldwide operations. This may inhibit investments in Georgia-based high-tech ventures.

- The State currently has policies that inhibit long-term projects and/or outsourcing agreements. State contract renewals currently preclude service contracts for more than one year. This prevents State agencies from entering into long-term service or

outsourcing contracts with vendors and inhibits the State in building the IT and networking infrastructures it needs to support e-commerce applications.

- There are variations in sales taxes across the State, especially special-purpose local-option sales taxes (SPLOSTs). Inconsistent sales tax policies across states was one of the reasons why Congress enacted the Internet Tax Freedom Act which placed a three-year moratorium on any tax related to the Internet. (Thibodeau, 1999a). Given the large number of taxing jurisdictions in Georgia, the potential for inconsistent sales taxes for Internet transactions is a weakness.

- While the city of Atlanta has much to offer IT professionals with e-commerce skills, it also has its share of "urban problems" with the potential to persuade potential new entrants to locate elsewhere. Atlanta metropolitan area weaknesses include:

  - **Traffic**. In spite of highway infrastructure improvements over the past decade and the presence of MARTA, gridlock is still a very common occurrence and contributes to lost productivity.

  - **Air Quality**. Degradation of the air quality in the Atlanta metropolitan area continues as was apparent in a record number of "smog days" during the summer of 1999.

  - **Water Quality**. The quality and reliability of Atlanta's water system infrastructure has been questioned by a wide variety of media sources.

  - **Over-building**. Some commercial real estate developers, when viewing office vacancy rates, consider overbuilding to be a problem. Recent debates on Atlanta's "urban sprawl" and consideration of new policies focused on development inside the perimeter may reinforce the notion that Atlanta is over-built.

  - **Inner city decay**. There are many statistics, including crime statistics, that suggest that inner city decay is a problem in Atlanta. Perhaps the most compelling are the Census Bureau's 1999 statistics indicating that more than one-third of the residents of Fulton County below the age of 18 are living in households below the poverty limits; in Dekalb County, nearly one-quarter of this same group are classified as being below the poverty limit. These statistics are in sharp contrast to those for other metropolitan area counties including, Clayton, Cobb, and Gwinnett. (See http://www.census.gov).

4.4 OPPORTUNITIES

As noted in *A Framework for Electronic Commerce* (summarized in Chapter 2), similar to any government, Georgia's State Government can facilitate e-commerce by:

- encouraging governmental facilitation and utilization of electronic communications (i.e., contracts, notarized documents, etc.) within and among all of its agencies;

- enacting legislation that enables and encourages the acceptance of electronic signatures and other authentication procedures for business and legal transactions;

- enacting legislation and/or regulations that promote adequate, efficient, and effective alternate dispute resolution mechanisms for e-commerce transactions; and

- monitoring and ensuring consistency among state legislation and e-commerce regulations to avoid contradictory policies.

Also noted in *A Framework for Electronic Commerce*, similar to any government, Georgia's has the opportunity to develop e-commerce policies that:

- encourage private sector investment in appropriate telecommunication infrastructures;

- promote and preserve competition by introducing competition to monopoly phone (and cable) markets, ensure interconnection at fair prices, open markets to foreign investment, and enforce anti-trust safeguards;

- guarantee open access to networks on a non-discriminatory basis, so that *all* users have access to the broadest range of information and services; and

- create an independent regulatory agency charged with developing pro-competitive and flexible regulation that keeps pace with technological development.

Georgia has an opportunity to enact legislation similar to Colorado's *Rural Technology Enterprise Zone Act* which allows a tax credit for firms that invest in the technology infrastructure required to provide Internet access in rural technology enterprise zones. In the short run, significant tax incentives for cable modem service providers and satellite-based Internet access providers (such as DirectPC) may have the greatest potential for bringing high-speed Internet access to rural areas in the State. These areas are not likely to be targeted for ADSL services since most households would be too far from the switching office.

Besides those opportunities for the State found in *A Framework for Electronic Commerce* and the *Rural Technology Enterprise Zone Act*, a number of other opportunities exist. These are listed below:

- Because of its diversity, Georgia has the opportunity to establish an oversight board or committee to measure and vigilantly monitor its "digital divide." The potential is great for significant segments of the State's population to be left out of the prosperity generated by e-commerce. Georgia policy makers should move quickly to establish State-level initiatives to close gaps between the State's technological "haves" and "have nots." This oversight group could also be charged with monitoring the societal

effects of e-commerce within the State as well as assessing e-commerce's impacts on labor markets and the rest of the State economy.

- Georgia has the opportunity to establish an independent regulatory agency charged with monitoring technological development and developing flexible, pro-competitive regulations.

- Georgia has the opportunity to enact e-commerce-friendly sales tax laws that are not complicated by local option sales taxes and variations in tax codes across the numerous tax jurisdictions in the state. It also has the opportunity to promote e-commerce friendly tax legislation in cooperation with other states.

- Georgia policy makers have the opportunity to protect the privacy rights of the children in the State by passing a State-level equivalent of the *Children's Online Privacy Protection Act.*

- Georgia has the opportunity to contribute to the nation's increasing demand for core IT workers by providing its public universities and technical schools with the resources they need to expand their computer science, information systems, computer engineering, and related discipline programs. According to the U.S. Commerce Department, Georgia is adding more than 5,560 new core IT jobs each year. Other reports indicate that State universities and technical skills are collectively satisfying less than one-third of this demand.

- Georgia policy makers have the opportunity to ensure that computer science, information systems, and computer engineering programs at the State's public universities and technical schools are refocused in order to produce graduates with the skills needed for the expansion of e-commerce within the State. These institutions can also be charged with developing e-commerce worker retraining and continuing education programs.

- Georgia policy makers have the opportunity to create a targeted initiative that would enable Savannah and coastal Georgia to become important players in the expansion of e-commerce within the State. Many of the pieces are already in place, including ACM-accredited computer science degree programs at both Armstrong Atlantic and Georgia Southern; a sizable and well-respected AACSB-accredited IS degree program at Georgia Southern; the GTREP computer engineering degree program at Georgia Southern; e-commerce oriented certification programs at area technical schools, including Savannah Tech and Ogeechee Tech in Statesboro; a variety of programs at the Savannah College of Art and Design that produce graduates with the visual arts skills sought by e-commerce firms; and an increasing base of Savannah-based IT firms. Bringing these elements together through a coordinated effort focused on expanding e-commerce in southeast Georgia would underscore the State's commitment to Internet commerce.

- Georgia policies makers have the opportunity to utilize targeting funding to ensure that Georgians across the State have access to graduate IS and IT programs. For example, there are no graduate level IS/IT or computer science programs in Southeast Georgia in spite of the availability of sizable, accredited, and well-regarded computer science programs at both Armstrong Atlantic and Georgia Southern, as well as a very strong information systems degree program at Georgia Southern. While degree programs and courses have been identified, USG institutions in Southeast Georgia currently have insufficient staffing to cover both their undergraduate programs and any new graduate level courses/programs. The creation of graduate programs in currently under-served regions of the State is needed to ensure an appropriate human resource infrastructure for e-commerce firms.

- E-commerce degree programs, such as Georgia State University's new G.E.M. program could be made available State-wide via the GSAMS distance education network. While some expansion of the network would be required, especially at Georgia State, this could increase State-wide access to key e-commerce graduate program.

- A wide range of IT workforce development and enhancement programs have been identified by the U.S. Commerce Department (see *The Digital Work Force: Building Infotech Skills at the Speed of Innovation*). These could be investigated more thoroughly by State policy makers for adaptation and implementation within Georgia.

- Georgia has the opportunity to market more aggressively the State as an attractive work location for IT workers, especially those that possess e-commerce skills. Its marketing package should include the presence of suitable office locations, e-commerce knowledgeable PR firms, and State policies and plans for upgrading the State's infrastructure to accommodate new technologies.

- Georgia has the opportunity to pursue aggressively prospective IT workers (especially those with e-commerce skills) who might be "turned off" by the Atlanta metropolitan area's urban problems by promoting the "lifestyle" opportunities afforded by other urban centers in the State. For example, Savannah and the coastal area of Georgia could be marketed to those interested in colonial charm, mild climate, and year-round golf, tennis, and water sports.

- Georgia has the opportunity to develop an e-commerce and/or e-business think tanks and to encourage the development of e-commerce corridors in urban centers across the State. Many of the elements to do so are already in place. Doing so would undoubtedly help attract e-commerce firms to Georgia.

- Georgia's State Government can seize the opportunity to lead by example. By initiating e-commerce applications and projects that illustrate the unique qualities of the Internet and its ability to save money through the reduction of transaction costs, the State has the opportunity to demonstrate to the business community that the State itself is committed to reaping the benefits of e-commerce. This can serve as an

important signal to prospective businesses that the State is committed to facilitating the expansion of e-business within its boundaries. This, in turn, may help attract new e-commerce firms to the State.

- The State has the opportunity to attract, develop, and retain a high quality IT workforce capable of using best-of-breed tools to develop e-commerce applications for the State Government and State agencies. Doing so could prove to be another important signal to the business community and prospective e-commerce firms that Georgia is committed to the expansion of e-commerce.

- The State has the opportunity to encourage the expansion of e-commerce within the State by creating mechanisms for venture capitalists to identify promising e-commerce entrepreneurs and vice-versa. Along the same lines, the State could enact measures geared at increasing e-commerce venture capital (and e-commerce investments) within the State.

- The State has the opportunity to encourage e-commerce expertise among public relations firms. Such expertise is often needed to market new Internet start-ups appropriately. The explosion of e-commerce start-ups in the Silicon Valley has exceeded the capacity of that area's PR firms. Georgia has the opportunity to ensure that similar problems are not encountered in the state.

- An opportunity exists for encouraging the expansion of warehousing facilities and logistics expertise needed to support e-commerce. In the short run, the State and its taxing jurisdictions might consider incentives for expanding e-commerce warehousing space through "tax exempt e-commerce enterprise zones" in which e-commerce inventory could be housed tax free (or at significantly reduced rates) for specific time periods.

- An opportunity exists for a significant e-commerce legacy for the current administration through high-visibility Statewide projects that have high payoff potential. Several representatives of consulting firms independently suggested the initiation of several high-visibility, quick-hit projects followed up by more comprehensive projects with high-payoff opportunities.

- State policies targeted at controlling growth inside the perimeter and in the Atlanta metropolitan area could help offset negative impressions of Atlanta's urban problems and could encourage e-commerce businesses to locate in Georgia. Controlled growth of e-commerce within the State could also involve aggressive attempts and incentives to encourage the location (and expansion) of e-commerce firms in Georgia's other urban centers.

- Expanded public transportation, such as the plans for rapid rail systems within the State, has the potential to enable the expansion of e-commerce into currently under-served areas by making it easier to bring e-commerce experts face-to-face with clients across the State.

- Lastly, Georgia has the opportunity to charge regional planning authorities with expanding e-commerce across the State. Currently, many regional planning authorities focus on traditional industries, not e-business.

4.5 THREATS

Some of the potentially harmful threats to the development of e-commerce initiatives within the State include the following:

- There is a severe nationwide shortage of skilled IT professionals. Estimates put the current shortfall at 400,000 (Reich, 1999). In *The Digital Work Force: Building Infotech Skills at the Speed of Innovation,* the U.S. Department of Commerce indicates that the U.S. will need some 1.3 million new IT workers by 2006, nearly double the number of high-tech workers now employed.

- Becoming dependent on H1-B workers to fill IT positions is not good public policy. While this may be a short-term solution to the IT worker shortage, it doesn't help to create a permanently bigger stream of IT professionals needed in the U.S. (and Georgia) to sustain the expansion of e-commerce. Georgia policy makers should be wary of supporting Federal proposals to raise the H1-B cap in order to address current shortages.

- Georgia must actively compete with a number of other states including California, Colorado, Florida, Massachusetts, New York, Texas, and Virginia for e-commerce and IT talent. Virginia, for example, is considering using tax credits and tuition assistance to boost its IT workforce and help fill its estimated 30,000 openings; Maryland and Pennsylvania have begun offering college students $3,000 annual scholarships to major in IT-related disciplines in return for agreements to work in their respective states for as many years as they received the scholarship. (Thibodeau, 1999b). Such programs may cause intense competition among states for current and prospective IT talent. Poaching of existing IT talent across state lines may result, and high-ability high school students may be lost to other states because of IT scholarship offers. Georgia must be vigilant in its efforts to develop, attract, and retain talented IT workers if it desires to build the intellectual capital and the human resource infrastructure needed for sustained e-commerce growth and expansion.

- In the South and Southeast, North Carolina, Virginia, Texas, and Florida provide the greatest competition for IT and e-commerce professionals. Policy makers must monitor these states to ensure that they do not adopt programs and initiatives which put Georgia at a competitive disadvantage.

- Tax laws, including sales tax laws, that constrain rather than promote the growth of e-commerce, are a definite threat.

- The inability to handle effectively the education, housing, and social-service needs of e-commerce generated-population growth is a problem. They have the potential to exacerbate current infrastructure challenges, especially those in the Atlanta metropolitan area.

- There is a lack of public support for State-level e-commerce initiatives. Given Georgia's relatively low rates of home computers and Internet access, it may be necessary for the State to educate citizens of the State about the benefits of State-level e-commerce initiatives.

- Finally, there appears to be resistance to tax incentives to ensure an appropriate education and technological infrastructure. This could come from State representatives and citizens who fail to appreciate the need to build the telecommunications and human resource infrastructure needed to support sustainable e-commerce growth. Resistors may be able to voice strong arguments for continuing to invest in traditional infrastructures rather than e-commerce infrastructures.

4.6 RECOMMENDATIONS

Based upon the above SWOT (strengths and weaknesses, opportunities and threats) analysis and the data cited in Chapters 1, 2, and 3, the following actions by the State are recommended. The State should:

4.6.1 STATE GOVERNMENT FUNCTIONING

- Expand the use of IT and e-commerce to support State Government administration. Georgia has the opportunity to leverage its already progressive reputation in this area to become a true model and benchmark for other states. Through such efforts, the State is likely to attract the attention of private sector firms and encourage them to set up or expand e-commerce operations within the State.

- Become a benchmark state for using IT and e-commerce within State Government. Towards this end, implement a high-bandwidth infrastructure interconnecting State agencies and utilize the "best" e-commerce technologies and services in order to attract, develop, and retain the IT talent needed to support such an architecture.

- Enact a State-level equivalent of the Federal Government's *Government Paperwork Elimination Act* which encourages the prompt implementation of electronic record keeping and filing systems as well as the recognition of electronic means for authentication.

- Produce high-visibility, low-risk, e-commerce applications such as the driver's license renewal program used in the State of Massachusetts. Establishing a State-level electronic benefits transfer (EBT) program would be another example. Such "quick-hits" will produce a maximum, positive public and media relations with a minimum of effort and risk.

- Enact legislation that promotes and ensures adequate e-commerce consumer protection. Privacy, the protection of personal information, and the security of online transactions should be "givens" for Georgians who engage in e-commerce.

- Implement Senate Bill 61 re-establishing the Electronic Commerce Study Committee. Expand the charge of this committee to include the issuance of reports similar to the annual reports produced by the Federal Government's E-Commerce Working Group.

- Leverage each of the following Federal laws and investigate the possibility of enacting State-level equivalents.
  - *The Technology Education Technical Investment Act of 1999 (H.R. 706)*
  - Amendments of the *Job Partnership Act (H.R. 201 and H.R. 203)*
  - *The Mathematics and Science Proficiency Partnership Act of 1999 (H.R. 1265)*
  - Amendment of the *Internal Revenue Code of 1986 (S. 211 and H.R. 323*)
  - The *Regional Skills Training Alliances Act of 1999 (H.R. 733)*

- Revise the State's IT recruiting, training and development, and retention policies to ensure that the State agencies are able to attract, develop, and retain talented IT workers and workers with e-commerce skills.

- Redo the State Web site in order to spotlight on the State's e-commerce and high-tech initiatives (SPIN, GSTP, etc.) These are often buried rather than prominently featured.

- Allocate the funds to produce an annual update of the progress made toward achieving these e-commerce initiatives, including a Web site to catalogue available information on e-commerce activities.

4.6.2 PROMOTING EMPLOYMENT AND SKILL DEVELOPMENT

- Encourage actively the expansion of the Talent Alliance as a means of expanding opportunities for retraining and continuing education in skills that are critically needed by IT professionals.

- Take a more active role in the Tech Corps in an effort to get more K-12 students involved in educational efforts aimed at interesting them in entering the IT field.

- Take a more active role in the U.S. Commerce Department's Go for IT! program. The State should leverage the information contained in the program's database to identify model programs that could be implemented at state and local levels.

- Implement programs similar Michigan's "Come Home to Michigan" campaign (to attract IT workers who grew up in Michigan or were educated there) or Minnesota's "Upgrade to Minnesota" ad campaign in Silicon Valley which was designed to introduce workers there to the advantages of Minnesota living. Similar programs in

Georgia could be used to lure IT professionals away from other regions of the country.

- Determine the extent to which firms within the State are "H1-B" dependent (usually defined as firms whose work force includes 10% or more H1-B workers). The State should enact legislation that provides tax incentives for reducing and/or eliminating H1-B dependency.

- Enact legislation and regulations that actively encourage greater participation of women and under-represented minority groups in e-commerce and core IT jobs.

- Ensure that racial, gender, and age discrimination is not present in Georgia-based e-commerce and IT firms.

- Monitor the IT worker compensation in Atlanta and around the State to ensure that it is competitive with other states with a high demand for IT workers.

4.6.3 OVERCOMING THE DIGITAL DIVIDE

- Establish an oversight board or committee to measure and vigilantly monitor the State's "digital divide." The potential is great for significant segments of the State's population to be left out of the prosperity generated by e-commerce. Georgia policy makers should move quickly to establish State-level initiatives to close gaps between the State's technological "haves" and "have nots."

- Address the State's digital divide by expanding and increasing the number of community-access centers — such as schools, libraries, and other public access points — across the State. These can provide under-served groups with Internet access and on-line "re-skilling" opportunities and can thereby play an important role in narrowing or eliminating the digital divide.

- Leverage the Federal Communications Commission's Lifeline Assistance and Link-Up America programs to expand Internet access for under-served segments of the State population, including developing and implementing State-level equivalents of these programs as other states have done.

- Tap into the U.S. Department of Agriculture's Rural Utilities Service (RUS) which provides targeted lending and technical advice to bring advanced telecommunications infrastructure to rural communities. As noted in Chapter 2, expanding communications to rural areas and central cities is particularly important because these areas lag behind the national averages for PC-ownership and household Internet access.

- Enact legislation that provides significant tax incentives for firms that expand high-speed Internet access services to rural and other under-served areas of the State. Such legislation should encourage the implementation of adequate bandwidth and access

throughout the State so that the growth of e-commerce is not inhibited by slow connection speeds. Tax incentives for bandwidth expansions for all telecommunications technology options (wireline, cable, wireless, terrestrial, and satellite) could be utilized to expand high-speed Internet access, especially to under-served areas and populations.

4.6.4 PROMOTING E-BUSINESS WITHIN THE STATE

- Establish an independent regulatory agency charged with monitoring technological development and developing flexible, pro-competitive regulations. This agency could also be charged with ensuring that regulations in other State government agencies do not unduly inhibit the growth of e-commerce in the State.

- Enact tax incentives for Web site development firms to expand their services and operations to under-served areas of the State. This might include tax incentives for increasing the number of employees of such firms.

- Assess the ability of the State's Small Business Development Centers (SBDCs) to help small businesses fully understand e-commerce and its potential benefits for them. E-business consulting services for small businesses should be expanded in the SBDCs throughout the State. Specific targets (such as those listed in Table 2-5) and timetables for improving small business e-commerce activities within the State should be established. Georgia's SBDC staff should develop sufficient expertise in e-commerce to be able to assist potential e-commerce entrepreneurs plan, implement, develop, and expand their companies.

- Enact tax incentives that encourage Georgia's small businesses to invest in the technologies and services needed to engage in e-commerce.

- Enact legislation that provides tax incentives for Georgia-based companies that outsource e-commerce and other IT functions to other Georgia-based firms. Such legislation should be aimed at keeping e-commerce jobs within the State and encouraging the expansion of e-commerce outsourcing service providers here.

- Encourage private sector and public sector partnerships that promote the expansion of e-commerce in all parts of the State. E-commerce business incubator programs that involve State universities, technical schools, and municipal governments in and around all major urban centers in the State should be created.

4.6.5 UNIVERSITY SYSTEM OF GEORGIA INITIATIVES

- Allocate funds to the Board of Regents and University System of Georgia to hire additional faculty capable of teaching courses which will enable students to develop needed e-commerce skills. Also, funds are needed for technology and facilities to support these expanded educational programs.

- Establish more clearly the respective roles of the four tiers in the University System of Georgia in meeting the needs of students studying the various aspects of e-commerce — the premier research universities (UGA, Georgia Tech, Georgia State, and Georgia Medical College), the regional state universities, the four-year colleges, and the two-year colleges.

- Implement targeted funding or special funding initiatives in order to enable USG institutions to hire sufficient faculty to implement graduate-level IS/IT and computer science programs in Southeast Georgia and other regions of the State currently without such programs.

- Leverage the programs already in place in Southeast Georgia (including existing IS and CS degree programs, SCAD, GTREP's computer engineering degree at Georgia Southern, and certification programs at technical schools) to create a coordinated initiative aimed at expanding/attracting e-commerce firms in Savannah and the coastal region of Georgia.

- Take a closer looker at Maryland's MAITI program to see if similar steps could be taken in Georgia to double the number of computer science, information systems, and computer engineering graduates from the State's public universities and technical schools.

- Enact legislation and/or regulations to promote the expansion of telemedicine and Web-based medical services within the State, including the resources necessary to accelerate the implementation of the Georgia Statewide Telemedicine Program.

- Provide the resources necessary to accelerate the implementation of GIL — Galileo Interconnected Libraries.

References

Anonymous. (1998). *Healthcare* (Volume 3). Computer Economics. Available: http://www.computereconomics.com/new4/benchhome/ch9.html# (1999, August 15.).

Anonymous. (1999, March 1999). *Printed Circuit Design*, 6.

Barua, A., Shutter, J., & Whinston, A. (1999). *The Internet Economy Indicators.* (10-Jun-99). The Internet Economy Indicators. Available: http://www.internetindicators.com (1999, June 29.).

Bollier, D. (1998). *The Global Advantage of Electronic Commerce: Reinventing Markets, Management, and National Sovereignty* : The Aspen Institute.

Bons, R., Lee, R., & Wagenaar, R. (1998). Designing Trustworthy Interorganizational Trade Procedures for Open Electronic Commerce. *International Journal of Electronic Commerce, 2*(3), 61-83.

Cameron, D. (1997). *Electronic Commerce: The New Business Platform for the Internet*: Computer Technology Research Corporation.

Choi, S., Stahl, D., & Whinston, A. (1997). *The Economics of Electronic Commerce*. New York: MacMillan.

Commerce, U. S. D. o. (1999a). *The Digital Work Force: Building Infotech Skills at the Speed of Innovation* . Washington, D.C.: Office of Technology Policy.

Commerce, U. S. D. o. (1999b). *Falling Through the Net: Defining the Digital Divide* . Washington, D.C.: National Telecommunications and Information Administration.

Deloitte. (1999,). *Retail Trends, 8*.

Dugan, S. M. (1999, July 19, 1999). Electronic Commerce Survey. *InfoWorld, 21*, 36-37.

Economist. (1999). A survey of business and the Internet. *The Economist, 351*(8125), special section 1-40.

Hapgood, F. (1999, Jun. 1 1999). Sign on the digital line. *CIO WebBusiness Section, 12*, 58-64.

Johnson, D. C. (1999,). Jostling for Share of E-Mortgages. *The New York Times*, pp. C3.

Jordan, P. (1998). Marketplace@internet.com.mx. *Business Mexico*, 42-46.

Kalakota, R., & Robinson, M. (1999). *e-Business: Roadmap for Success*. New York: Addison-Wesley.

Kalakota, R., & Whinston, A. (1997). *Readings in Electronic Commerce*. New York: Addison-Wesley.

Kalin, S. (1999,). Title Search. *CIO WebBusiness Section, 12*, 42-47.

Kimbrough, S., & Lee, R. (1997). Systems for Computer-Mediated Digital Commerce. *International Journal of Electronic Commerce, 1*(4), 3-10.

Krill, P. (1999). *Bell South Increases ASDL Services for Businesses* (30-Jul-99). InfoWorld Electric. Available: http://www.infoworld.com/cgi-bin/displayStory.pl?990730.enbellsouth.htm (1999, August 10.).

McCreary, L., & Horgan, T. (1999,). On the inside, looking out. *CIO WebBusiness Section, 12*, 28-32.

Mougayar, W. (1998). *Opening Digital Markets*. Boston: McGraw-Hill.

Peters, T. & Waterman, R. (1984). *In search of excellence : lessons from America's best-run companies.* New York**:** Warners.

Reich, R. B. (1999,). Coping with the U.S. Shortage of High-Tech Workers. *Computerworld,* 32-33.

Riggins, F. J., & Rhee, H. S. (1998). Toward a unified view of electronic commerce. *Communications of the ACM, 41*(10), 88-95.

Romm, C., & Sudweeks, F. (1998). *Doing Business Electronically: A Global Perspective of Electronic Commerce*. Verlag: Springer.

Stone, D. (1999,). Stop and Go Start-Ups. *Business Week,* 61.

Szuprowicz, B. (*1998*). *Extranets and Intranets: E-Commerce Business Strategies for the Future* : Computer Technology Research Corporation.

Thibodeau, P. (1999a,). E-Commerce Sales Tax Should be Simple. *Computerworld,* 25.

Thibodeau, P. (1999b,). States Seek to Grow Own IT Workforces. *Computerworld,* 16.

Zwass, V. (1996). Electronic Commerce: Structures and Issues. *International Journal of Electronic Commerce, 1*(1), 3-20.

APPENDICES
(A-D)

APPENDIX A - FEDERAL LEGISLATION

The following bills are ones that are either enacted or going through the House or Senate for passage at the Federal level. Georgia could look to these bills for some guidance on similar issues.

H.R.1572 Digital Signature Act of 1999

SPONSOR: Rep Gordon, Bart (introduced 04/27/99)

A bill to require the adoption and utilization of digital signatures by Federal agencies and to encourage the use of digital signatures in private sector electronic transactions. The following is a copy of the text of the legislation:

SECTION 1. SHORT TITLE.

None

SECTION. 2. RECOGNITION OF DIGITAL SIGNATURES.

(a) REQUIREMENT - To the extent that a Federal agency recognizes a written signature as authenticating a document, the agency shall recognize a digital signature as authenticating an equivalent electronically formatted document.

(b) EFFECTIVE DATE- Subsection (a) shall take effect 1 year after the date of the enactment of this Act.

SECTION 3. DIGITAL SIGNATURE INFRASTRUCTURE.

(a) GUIDELINES AND STANDARDS- Not later than six months after the date of the enactment of this Act, the Director, in consultation with industry, shall develop digital signature infrastructure guidelines and standards for use by Federal agencies to enable those agencies to effectively utilize digital signatures in a manner that is--

(1) sufficiently secure to meet the needs of those agencies and the general public; and

(2) interoperable, to the maximum extent possible.

(b) ELEMENTS - The guidelines and standards developed under subsection (a) shall include —

(1) technical security requirements for digital signature infrastructure products and services;

(2) validation criteria to enable Federal agencies to select digital signature infrastructure products and services appropriate to their needs; and

(3) minimum interoperability specifications for the Federal acquisition of digital signature infrastructure products and services.

(c) COORDINATION WITH NATIONAL POLICY PANEL - The Director shall ensure that the development of guidelines and standards under this section is carried out in coordination with the efforts of the National Policy Panel for Digital Signatures under section 7.

(d) REVISIONS - The Director shall periodically review the guidelines and standards developed under subsection (a) and revise them as appropriate.

SECTION 4. VALIDATION OF PRODUCTS.

Not later than six months after the date of the enactment of this Act, and periodically thereafter as appropriate, the Director shall make available to Federal agencies and to

the public an evaluation of the conformance with the guidelines and standards developed under section 3 of commercially available digital signature infrastructure products, and other such products used by Federal agencies.

SECTION 5. ELECTRONIC CERTIFICATION AND MANAGEMENT SYSTEMS.

(a) CRITERIA - Not later than six months after the date of the enactment of this Act, the Director shall establish minimum technical criteria for the use by Federal agencies of electronic certification and management systems.

(b) EVALUATION - The Director shall establish a program for evaluating the conformance with the criteria established under subsection (a) of electronic certification and management systems, developed for use by Federal agencies or available for such use.

(c) MAINTENANCE OF LIST - The Director shall maintain and make available to Federal agencies a list of electronic certification and management systems the Director has evaluated as conforming to the criteria established under subsection (a).

SECTION 6. REPORTS.

Not later than six months after the date of the enactment of this Act, and annually thereafter, the Director shall transmit to the Congress a report that includes —

(1) a description and analysis of the utilization by Federal agencies of digital signatures;

(2) an evaluation of the extent to which Federal agencies' digital signature infrastructures conform to the guidelines and standards developed under section 3(a);

(3) an evaluation of the extent to which Federal agencies' electronic certification and management systems conform to the criteria established under section 5(a);

(4) the list described in section 5(c); and

(5) evaluations made under section 4.

SECTION 7. NATIONAL POLICY PANEL FOR DIGITAL SIGNATURES.

(a) ESTABLISHMENT - Not later than 90 days after the date of the enactment of this Act, the Under Secretary shall establish a National Policy Panel for Digital Signatures. The Panel shall be composed of government, academic, and industry technical and legal experts on the implementation of digital signature technologies, state officials, including officials from states which have enacted laws establishing digital signature infrastructures, and representative individuals from the interested public.

(b) RESPONSIBILITIES - The Panel shall serve as a forum for exploring all relevant factors associated with the development of a national digital signature infrastructure based on uniform standards to enable the widespread availability and use of digital signature systems. The Panel shall develop —

(1) model practices and procedures for certification authorities to ensure the accuracy, reliability, and security of operations associated with issuing and managing digital certificates;

(2) standards to ensure consistency among jurisdictions that license certification authorities; and
(3) audit standards for certification authorities.

(c) COORDINATION - The Panel shall coordinate its efforts with those of the Director under section 3.

(d) ADMINISTRATIVE SUPPORT - The Under Secretary shall provide administrative support to enable the Panel to carry out its responsibilities.

(e) REPORT - Not later than 1 year after the date of the enactment of this Act, the Under Secretary shall transmit to the Congress a report containing the recommendations of the Panel.

SECTION 8. DEFINITIONS.

For purposes of this Act —

(1) the term 'certification authorities' means issuers of digital certificates;
(2) the term 'digital certificate' means an electronic document that binds an individual's identity to the individual's digital signature;
(3) the term 'digital signature' means a mathematically generated mark utilizing asymmetric key cryptography techniques that is unique to both the signatory and the information signed;
(4) the term 'digital signature infrastructure' means the software, hardware, and personnel resources, and the procedures, required to effectively utilize digital certificates and digital signatures;
(5) the term 'Director' means the Director of the National Institute of Standards and Technology;
(6) the term 'electronic certification and management systems' means computer systems, including associated personnel and procedures, that enable individuals to apply unique digital signatures to electronic information; and
(7) the term 'Under Secretary' means the Under Secretary of Commerce for Technology.

House Actions
April 27, 1999: Referred to the House Committee on Science.
May 5, 1999: Referred to the Subcommittee on Technology.

S.761: A bill to regulate interstate commerce by electronic means by permitting and encouraging the continued expansion of electronic commerce through the operation of free market forces, and for other purposes. **Sponsor:** Sen. Abraham, Spencer . There are actually two versions of Bill number S. 761 and can be viewed in their entirety at the following site http://thomas.loc.gov/cgi-bin/query/z?c106:S.761:

STATUS: Congressional Record Page References
04/12/99 Introductory remarks on Measure (CR S3584-3585)
04/12/99 Full text of Measure as introduced printed (CR S3585-3586)
07/15/99 Introductory remarks on Measure (CR S8694-8695)

H.R.1320: A bill to regulate interstate commerce by electronic means by permitting and encouraging the continued expansion of electronic commerce through the operation of free market forces, and other purposes. **Sponsor:** Rep Eshoo, Anna G.

Mar 25, 99: Referred to the Committee on Commerce, and in addition to the Committee on Government Reform, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned.

Apr 13, 99: Referred to the Subcommittee on Government Management, Information and Technology.

Mar 25, 99: Referred to the Committee on Commerce, and in addition to the Committee on Government Reform, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned.

Apr 12, 99: Referred to the Subcommittee on Telecommunications, Trade, and Consumer Protection.

Summary: Directs the Federal Government, to the extent practicable, to observe certain principles governing the use of electronic signatures in international commercial transactions, including to: (1) remove paper-based obstacles to electronic transactions by adopting relevant principles from the Model Law on Electronic Commerce adopted in 1996 by the UN Commission on International Trade Law (UNCITRAL); (2) permit parties to a transaction to determine the appropriate authentication technologies for such transactions, with assurance that they will be recognized and enforced; (3) permit such parties to have the opportunity to prove in court that such authentication approaches and transactions are valid; and (4) take a nondiscriminatory approach to electronic signatures and authentication methods from other jurisdictions. Authorizes parties to an interstate transaction to establish the methods by which electronic signatures and electronic records are created, used, and are recognized as valid. Directs each Federal agency to report to the Director of the Office of Management and Budget (OMB) and the Secretary of Commerce on any provision of law administered, or regulation issued, by it that imposes a barrier to electronic transactions. Requires the Secretary to report to Congress concerning any legislation needed or Executive or Federal agency action being taken to remove such barriers.
The bill in its entirety can be viewed at http://thomas.loc.gov/cgi-bin/query/z?c106:H.R.1320:

H.R.1714: A bill to facilitate the use of electronic records and signatures in interstate or foreign commerce.
Sponsor: Rep Bliley, Tom .
Electronic Signatures in Global and National Commerce Act - **Title I: Validity of Electronic Records and Signatures for Commerce** - Prohibits any rule of law from denying the legal effect of certain instruments of electronic commerce on the ground that: (1) they are not in writing; or (2) they are not signed or affirmed by a signature if they have been signed or affirmed by electronic signature.
Sets forth guidelines under which a Federal or State rule of law may alter or supersede the general rule of validity governing instruments of electronic commerce. Empowers the Secretary of Commerce (the Secretary) to enjoin a State rule of law in violation of such guidelines. Excludes certain testamentary instruments and matters of family law from the purview of this Act.
Title II: Development and Adoption of Electronic Signature Products and Services - Directs the Secretary to: (1) conduct and report to the Congress on the results of an inquiry regarding impediments to commerce in electronic signature products and services; and (2) promote the practice of electronic signatures in interstate and foreign commerce. products and services; and (2) promote the practice of electronic signatures in interstate and foreign commerce.
Title III: Use of Electronic Records and Signatures Under Federal Securities Law
Amends the Securities Exchange Act of 1934 to reflect the provisions of this Act regarding the use of electronic records and signatures. Authorizes the Securities Exchange Commission to prescribe implementing regulations.
This bill can be viewed in its entirety at http://thomas.loc.gov/cgi-bin/query/z?c106:H.R.1714:

House Actions

May 6, 99: Referred to the House Committee on Commerce**.**

May 25, 99: Referred to the Subcommittee on Telecommunications, Trade, and Consumer Protection.

June 9, 99: Subcommittee Hearings Held. (Jun 24, 99).

H.R.1685: A bill to provide for the recognition of electronic signatures for the conduct of interstate and foreign commerce, to restrict the transmission of certain electronic mail advertisements, to authorize the Federal Trade Commission to prescribe rules to protect the privacy of users of commercial Internet Web sites, to promote the rapid deployment of broadband Internet services, and for other purposes.
Sponsor: Rep Boucher, Rick.
This bill can be viewed in its entirety at http://thomas.loc.gov/cgi-bin/query/z?c106:H.R.1685:

House Actions

May 5, 1999: Referred to the Committee on Commerce, and in addition to the Committee on the Judiciary, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned.

May 25, 1999: Referred to the Subcommittee on Telecommunications, Trade, and Consumer Protection.

May 5, 1999: Referred to the Committee on Commerce, and in addition to the Committee on the Judiciary, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned.

June 30, 1999: Committee Hearings Held.

S.798: A bill to promote electronic commerce by encouraging and facilitating the use of encryption in interstate commerce consistent with the protection of national security, and for other purposes.
Sponsor: Sen McCain, John .
TABLE OF CONTENTS:

- Title I: Domestic Encryption Provisions
- Title II: Government Procurement
- Title III: Advanced Encryption Standard
- Title IV: Improvement of Governmental Technological Capability
- Title V: Export of Encryption Products

Promote Reliable On-Line Transactions to Encourage Commerce and Trade (PROTECT) Act of 1999 - **Title I: Domestic Encryption Provisions** - Prohibits the Federal Government or any State from establishing any conditions, ties, or links between those encryption products, standards, and services used for confidentiality and those used for authenticity or integrity purposes. Defines encryption as the scrambling of electronic communications or information to preserve its confidentiality, integrity, or authenticity, and to prevent unauthorized recipients from accessing or altering such communications or information.
(Sec. 102) Makes the development, sale, and use of encryption lawful in the United States unless otherwise provided in this Act.
(Sec. 103) Prohibits a Federal or State government from requiring an encryption key (solution) or other access to plaintext communications or information in the building of computer hardware or software.
Title II: Government Procurement - Authorizes any Federal department, agency, or instrumentality (entity) to purchase encryption products for use by Federal officers and employees. Requires the interoperability of such product with other commercially-available encryption products. Prohibits any Federal entity from requiring any person in the private sector to use a particular encryption product or methodology.

Title III: Advanced Encryption Standard - Directs the National Institutes of Standards and Technology (NIST) to complete the Advanced Encryption Standard (AES) process initiated on January 2, 1997, and to make a final selection of one or more new private sector-developed encryption algorithms by January 1, 2002.
(Sec. 302) Prohibits the Secretary of Commerce from promulgating or enforcing any regulation, adopting any standard, or carrying out any policy that: (1) establishes an encryption standard for use by businesses and entities other than for computer systems operated by a Federal entity; or (2) imposes government-designed encryption standards on the private sector by restricting the export of encryption products.
Title IV: Improvement of Governmental Technological Capability - Amends the National Institutes of Standards and Technology Act to direct NIST to: (1) obtain information regarding the most current information security hardware, software, telecommunications and other electronic capabilities; (2) research and develop new technologies to facilitate lawful access to such information and prevent unwanted intrusions; (3) provide assistance in responding to information security threats and vulnerabilities; and (4) facilitate the development and adoption of best information security practices by Federal entities and the private sector.
(Sec. 402) Requires the Computer System Security and Privacy Advisory Board to provide a forum between industry and the Federal Government on information security issues, and to foster the aggregation and dissemination of developments in information security technologies.
(Sec. 403) Authorizes appropriations to ensure that U.S. law enforcement agencies and agencies responsible for national security are able to complete any authorized missions or goals regardless of technological advancements in encryption and **digital technology.**
Title V: Export of Encryption Products - Gives the Secretary exclusive authority to control the exportation of encryption products.
(Sec. 502) Protects presidential authority to control the export of products, including encryption products, under the Trading With the Enemy Act and the International Emergency Economic Powers Act. Authorizes the Secretary to prohibit the export of an encryption product for reasons such as possible terrorist use or threats to the national security.
(Sec. 503) Authorizes the export, without an export license or export license exception, of any encryption product that utilizes a key length of 64 bits or less.
(Sec. 504) Identifies encryption products which shall be exportable under export license exceptions. Makes encryption products and related computer services eligible for such exception after a one- time technical review. Provides time limits for consideration of exporters' requests for such exceptions.
(Sec. 505) Provides conditions under which encryption products shall be exportable under license exceptions, including such product's general, public, or foreign availability. Establishes an Encryption Export Advisory Board to evaluate and make recommendations with respect to exception applications based on such availability. Allows: (1) judicial review of the Secretary's decision disapproving a Board's finding concerning such availability; and (2) the President to override any Board determination when such export or re-export would harm U.S. national security, including capabilities in fighting drug trafficking, terrorism, or espionage. Requires exporters' requests for

license exceptions, including the one-time technical review, to be processed within 15 days.
This bill can be viewed in its entirety at http://thomas.loc.gov/cgi-bin/query/z?c106:S.798:

Senate Actions

April 14, 1999: Read twice and referred to the Committee on Commerce.

Jun 10, 1999: Committee on Commerce. Hearings held.

June 23, 1999: Committee on Commerce. Ordered to be reported without amendment favorably.

S 921, Electronic Securities Transactions Act
S 921 would amend the Securities Exchange Act of 1934 and the Investment Advisers Act of 1940 to provide that brokers, dealers, transfer agents, and investment advisors by "may accept and rely upon an electronic signature" in their documents with customers and other parties, and that "such electronic signature shall not be denied legal effect, validity or enforceability solely because it is an electronic signature..."

The Securities and Exchange Commission would retain the authority to regulate the use of electronic signatures and to require the use of written signatures in some circumstances. However, the bill would bar the states from regulating the use of electronic signatures in securities transactions.
This bill can be viewed in its entirety at http://thomas.loc.gov/cgi-bin/query/z?c106:S.921
Status: S 921 was introduced on April 29, 1999. No action has been taken.

Title III: Privacy Protection for Library Loan and Book Sale Records - Provides criminal liability for a video tape service provider or book seller who knowingly discloses to any person personally identifiable information concerning any consumer of such provider or seller. Provides exceptions for disclosures: (1) to the consumer or to any person with the consumer's consent; (2) to a law enforcement agency pursuant to a Federal or State warrant or court order; (3) to any person if the provider or seller has provided the consumer with an opportunity to prohibit such disclosure; (4) which do not identify the title, description, or subject matter of the tape or book; (5) incident to the ordinary course of business of the provider or seller; or (6) pursuant to a court order showing a compelling need for such information that cannot be accommodated by any other means. Outlines procedures for the issue of a court order for disclosure to a law enforcement agency under (2), above.
Provides parallel liability, with similar exceptions, for any library that knowingly discloses to any person personally identifiable information concerning any patron of such library.
Title IV: Privacy Protection for Satellite Home Viewers - Amends the Communications Act of 1934 to require a satellite carrier (currently, only a cable operator or related service provider), at the time of entering into an agreement to provide satellite

home viewing service to a subscriber, to provide notification to such subscriber regarding the personally identifiable information to be collected concerning such subscriber and the nature, frequency, and purpose of any disclosure of such information (along with certain other related information). Prohibits the satellite carrier from collecting such information without the prior written or electronic consent of such subscriber, with exceptions for: (1) obtaining information necessary to provide the service; or (2) detecting unauthorized reception of such service. Requires such carrier to take necessary actions to prevent unauthorized access to such information, with exceptions. Authorizes a governmental entity to obtain such information pursuant to a court order only when the subject of the order is reasonably suspected of criminal activity and the information sought would be material evidence in the case.
Requires a satellite subscriber to be provided access to all personally identifiable information collected and maintained by such carrier. Requires such information to be destroyed by the carrier when no longer used for its intended purposes. Provides appropriate relief for any person alleging violations under this title.
This bill can be viewed in its entirety at http://thomas.loc.gov/cgi-bin/query/z?c106:S.854
This bill was introduced on April 21, 1999. No action has been taken.

HR 2991: Electronic Commerce Enhancement Act of 1997.
The Electronic Commerce Enhancement Act of 1997 directs the Assistant Secretary for Communications and Information (the head of the National Telecommunications and Information Administration) of the Department of Commerce to conduct an ongoing study of and report to specified committees concerning the enhancement of electronic commerce due to the use of digital signatures. The Act also directs the Director of the Office of Management and Budget to establish a method for each Federal agency to make its forms available electronically. The Act further provides for making payments electronically pursuant to such forms. The Act sets forth provisions concerning guidelines and standards for digital signatures and certificates. The Act permits employers to store forms electronically if such forms are submitted electronically. No action has been taken on this bill.

S 2107: Government Paperwork Elimination Act.
This bill would require federal agencies to make versions of their forms available online, and allow people to submit these forms with digital signatures as a standard. It also sets up a process by which commercially developed digital signatures can be used in submitting forms to the government. It also permits the digital storage of federal documents. One main purpose of the bill is to promote the development of electronic commerce by furthering the acceptance and use of digital signatures. For digital signatures to become fully accepted in the digital marketplace they must be used and accepted by the federal government. This bill mandates federal use of digital signatures. The Senate Commerce Committee approved a substitute version of the bill unanimously by voice vote on July 29, 1998. On October 2, it was attached to the Internet Tax Freedom Act.

HR 850, the Security and Freedom through Encryption (SAFE) Act.
Security and Freedom through Encryption (SAFE) Act - Amends the Federal criminal code to permit any person within any State and any U.S. person in a foreign country to use, and any person within any State to sell in interstate commerce, any encryption, regardless of the encryption algorithm selected, encryption key length chosen, or implementation technique or median use.
Provides that neither the Federal Government nor a State may require that, or condition any approval on a requirement that, a key, access to a key, key recovery information, or any other plain text access capability be: (1) built into computer hardware or software for any purpose; (2) given to any other person, including a Federal Government agency or an entity in the private sector that may be certified or approved by the Federal Government or any State to receive it; or (3) retained by the owner or user of an encryption key or any other person, other than for encryption products for use by the Federal Government or a State. Makes exceptions with respect to investigative or law enforcement officers and members of the intelligence community.
Provides that neither the Federal Government nor a State may require the use of encryption products, standards, or services (products) for: (1) confidentiality purposes, as a condition of the use of such products for authenticity or integrity purposes; or (2) authenticity or integrity purposes, as a condition of the use of such products for confidentiality purposes.
Sets penalties for the unlawful use of encryption in furtherance of a criminal act.
Specifies that the use of encryption shall not be the sole basis for establishing probable cause with respect to a criminal offense or a search warrant.
(Sec. 3) Amends the Export Administration Act of 1979 to grant the Secretary of Commerce exclusive authority to control exports of all computer hardware, software, computing devices, customer premises equipment, communications network equipment, and technology for information security (including encryption), except that which is specifically designed or modified for military use.
Provides that after a one time, 50-day technical review by the Secretary, no export license may be required (with exceptions) for or in the export of specified computer hardware, software, computing devices, telecommunication devices, technical assistance and data, and encryption hardware, software, or computing devices.
Authorizes the Secretary, after a one time, 15-day technical review, to authorize the export or re-export of computer hardware, software, or computing devices with encryption capabilities for nonmilitary and end uses in any country: (1) to which exports of computer hardware, software, or computing devices of comparable strength are permitted for use by financial institutions not controlled in fact by United States persons, unless there is substantial evidence that such computer equipment will be diverted to a military end-use or an end-use supporting international terrorism, modified for military or terrorist end-use, or re-exported WITHOUT authorization by the United States; or (2) if the Secretary determines that a computer hardware, software, or computing device offering comparable security is commercially available outside the United States from a foreign supplier, without effective restrictions.

Directs that any encryption product not requiring an export license as of this Act's enactment date, as a result of administrative decision or rulemaking, shall not require an export license on or after such date.
(Sec. 4) Directs: (1) the Attorney General to compile, and maintain in classified form, data on the instances in which encryption has interfered with, impeded, or obstructed the ability of the Department of Justice to enforce U.S. criminal laws; and (2) that such information be made available, upon request, to any Member of Congress.
There are two versions to this bill and can be viewed at
http://thomas.loc.gov/cgibin/query/z?c106:H.R.850:
HR 850 was re-introduced on February 25, 1999. The House Courts and Intellectual Property Subcommittee approved it on March 4. The House Judiciary Committee approved it on March 24.

S 854, the "Electronic Rights for the 21st Century Act
TABLE OF CONTENTS:

- Title I: Privacy Protection for Communications and Electronic Information
- Title II: Promoting Use of Encryption
- Title III: Privacy Protection for Library Loan and Book Sale Records
- Title IV: Privacy Protection for Satellite Home Viewers

Electronic Rights for the 21st Century Act - **Title I: Privacy Protection for Communications and Electronic Information** - Amends the Federal criminal code to authorize a governmental entity to require a provider of remote computing service to disclose the contents of any electronic communication made by subscribers only pursuant to a Federal or State warrant, or a Federal or State grand jury or trial subpoena.
(Sec. 102) Requires a provider of mobile electronic communication service to provide to a governmental entity information generated by and disclosing the current physical location of a subscriber's equipment only if the governmental entity obtains a court order issued upon a finding of probable cause that such equipment has been, is being, or is about to be used to commit a felony offense. Allows the disclosure of such information, without such conditions, after subscriber consent.
(Sec. 103) Authorizes the appropriate court to enter an ex parte order: (1) authorizing the installation and use of a pen register or trap and trace device if such court finds, upon certification, that the information likely to be obtained is relevant to an ongoing criminal investigation; and (2) directing that the use of such device be conducted so as to minimize the recording or decoding of any electronic or other impulses that are not related to the dialing and signaling information utilized in call processing by the service provider upon whom the order is served.
(Sec. 104) Requires the authorized interception of wire or electronic communications to be terminated when the facility identified in the intercept order is no longer being used, unless the judge determines that there is probable cause that an individual continuing as a party to the communication has committed or is about to commit an offense enumerated in the order and that such communication will be obtained through such continuing interception.

(Sec. 105) Requires a governmental entity authorized to install an interception device to use technology that restricts the recording or decoding of electronic impulses to the addressing information, in the case of a packet-switched network.
(Sec. 106) Provides limited conditions under which a provider of domain name registration (a service which assigns and manages domain names and Internet addresses) may disclose a record or other information pertaining to a subscriber or customer of such service.
(Sec. 107) Requires the Attorney General to report annually to Congress concerning government warrants, orders, and subpoenas applied for and granted relating to access to electronic communications.
(Sec. 108) Requires, in the grant of a roving wiretap (to follow a person, as opposed to one in a set location), the applicant to show that the person intends to thwart interception by changing facilities. States that the authorization to intercept applies only to communications to which the person believed to be committing the offense and named in the order is a party.
(Sec. 109) Amends the Communications Act of 1934 to allow telecommunications carriers to provide call location information concerning the user of a commercial mobile telephone service: (1) to a public safety answering point (emergency dispatcher) and other emergency officials or facilities; (2) to inform the user's legal guardian or family members of the user's location in an emergency situation involving the risk of death or serious physical harm; or (3) to providers of information or database management services solely to assist in the delivery of emergency services. Allows such carrier to also transmit automatic crash notification information as part of the operation of an automatic crash notification system. Prohibits otherwise the disclosure of a user's call location or crash information without the express authorization of the customer. Requires a telecommunications carrier that provides telephone exchange service to provide both listed and nonlisted subscriber information when such information is being used for emergency services.
(Sec. 110) Provides limited conditions under which a provider of electronic communication or remote computing service may disclose a record or other information pertaining to a subscriber or customer to any persons other than a governmental entity.
Title II: Promoting Use of Encryption - Authorizes any person within the United States, and any U.S. person in a foreign country, to use, develop, manufacture, sell, distribute, or import any encryption (scrambling) product. Prohibits any U.S. agency from requiring, compelling, setting standards for, conditioning approval on, or conditioning the receipt of any benefit on a requirement that a decryption key (descrambler), access to a decryption key, key recovery information, or other plain text access capability be: (1) required to be built into computer hardware or software for any purpose; (2) given to any other person; or (3) retained by any person using encryption. Prohibits any U.S. agency from requiring any person who is not an employee or agent of the United States or a State from using any key recovery or other plain text access features for communicating or transacting business with any U.S. agency. Makes such prohibition inapplicable to: (1) encryption used solely for the internal operations and telecommunications systems of the Federal Government; or (2) the authority of any

investigative or law enforcement officer or member of the intelligence community acting under law to gain access to encrypted communications or information.
(Sec. 202) Prohibits the Federal Government from purchasing any encryption product with a key recovery or other plain text access feature if such feature would interfere with the use of the full encryption capabilities of the product when inter-operating with other commercial encryption products.
(Sec. 203) Requires a Federal order authorizing the interception of a wire or electronic communication, upon request of the applicant, to direct that a provider of wire or electronic communication service, and any other person capable of decrypting such communication, promptly furnish the applicant with the necessary encryption assistance, if the court finds that such assistance is necessary for the decryption of a communication intercepted pursuant to the order. Limits such order to 30 days or the date on which the authorized objective is attained. Provides identical assistance requirements for an order authorizing a communication interception under foreign intelligence investigation provisions of the Foreign Surveillance Act of 1978.
Prohibits anyone from disclosing a decryption key or providing decryption assistance pertaining to the contents of stored electronic communications or records to a governmental entity, except: (1) pursuant to a Federal or State warrant or to a subpoena; or (2) with the consent of the person who created the communication or record. Authorizes delayed notification to such person for up to 90 days when earlier notification may have an adverse result.
Prohibits any investigative or law enforcement officer from releasing a decryption key or providing decryption assistance to a foreign government or law enforcement agency of a foreign government. Provides an exception in any case in which the United States has entered into a treaty or convention with a foreign government to provide mutual assistance with respect to providing decryption assistance, authorizing the Attorney General to apply for an order under certain requirements and conditions.

The Internet Tax Freedom Act (enacted in October of 1998)
The Internet Tax Freedom Act has undergone a number of changes since it was introduced by Rep. Christopher Cox (R-CA) and Sen. Ron Wyden (D-OR) in March 1997. Most of these changes are the result of months of intense negotiations with State and local government leaders. As a result, the legislation has been altered to reflect State and local concerns, and now reflects a balanced compromise between the national interest in protecting this burgeoning marketplace and the importance of guarding against erosion of the State and local treasuries.
Highlights of the law:

- ***3-year moratorium on special taxation of the Internet***. Bars state or local governments from taxing Internet access (i.e. the $19.95 or so that many Americans pay monthly to America Online, CompuServe, Erol's, or other similar services to access the Internet) from October 1, 1998 until October 21, 2001. A limited "grandfather" clause permits the handful of states already taking steps to tax Internet access--Connecticut, Wisconsin, Iowa, North Dakota, South Dakota, New Mexico, South Carolina, Tennessee, Texas, and Ohio--to continue to do so if they can demonstrate that their taxes had already been "generally imposed and

actually enforced" on Internet access providers prior to October 1, 1998. Nevertheless, it is not expected that all of these states will in fact choose to tax Internet access: Connecticut and South Carolina, for instance, have already indicated they intend to abide by the national moratorium.

- ***3-year moratorium on multiple and discriminatory taxes on electronic commerce***. Bars state or local governments from imposing taxes that would subject buyers and sellers of electronic commerce to taxation in multiple states. Also protects against the imposition of new tax liability for consumers and vendors involved in commercial transactions over the Internet, including the application of discriminatory tax collection requirements imposed on out-of-state businesses through strained interpretations of 'nexus.' It also protects from taxation, for the duration of the moratorium, goods or services that are sold exclusively over the Internet with no comparable offline equivalent.
- ***Establish commission to study question of remote sales***. A temporary Advisory Commission on Electronic Commerce will study electronic commerce tax issues and report back to Congress after 18 months on whether electronic commerce should be taxed, and if so, how they can be taxed in a manner that ensures such commerce won't be subject to special, multiple, or discriminatory taxes. State and local elected officials will be given a prominent voice on this commission. Congress, of course, retains full authority to change or discard the Commission's proposals.
- ***No federal taxes.*** Sense of Congress that there should be no federal taxes on Internet access or electronic commerce.
- ***Declares that the Internet should be tariff-free zone***. Calls on the Clinton Administration to work aggressively through the EU and WTO to keep electronic commerce free from tariffs and discriminatory taxes. Asks Commerce Department to report to Congress on barriers hindering the competitiveness of U.S. businesses engaged in electronic commerce abroad.

Public Safety

HR 438 - Federal Wireless Communications and Public Safety Act of 1999
Amends the Communications Act of 1934 to direct the Federal Communications Commission (FCC) (and any other agency or entity to which the FCC has delegated such authority) to designate 911 as the universal emergency telephone number within the United States for reporting an emergency to appropriate authorities and requesting assistance. Applies such designation to both wireline and wireless telephone service. Requires the FCC to provide technical support to States for the deployment and functioning of a comprehensive emergency communications infrastructure, including enhanced wireless 911 service, on a coordinated statewide basis. (Sec. 4) Provides immunity from liability, to the same extent as provided to local telephone exchange companies, for providers of wireless 911 service. Provides immunity for users of wireless 911 service to the same extent as provided to users of 911 service that is not wireless. (Sec. 5) Authorizes telecommunications carriers to: (1) provide call location information concerning the user of a commercial mobile service to providers of emergency services,

to inform such user's legal guardian or family members of the user's location in an emergency situation involving the risk of death or serious bodily injury, or to providers of information services to assist in the delivery of emergency response services; and (2) transmit automatic crash notification system information as part of the operation of such a system. Requires the express prior customer authorization of the use of either of the above information for other than the stated purposes.
Requires a telecommunications carrier that provides telephone exchange service to provide subscriber list information (including information on unlisted subscribers) that is in its sole possession or control to providers of emergency services and emergency support services for use solely in delivering, or assisting in delivering, emergency services. Currently there are four versions of this and can be viewed in entirety at http://thomas.loc.gov/cgi-bin/query/z?c106:H.R.438

Status: introduced 2/2/99. Latest Action: 02/25/99 referred to Senate Committee on Commerce, Science, and Transportation.

APPENDIX B – SUMMARY OF STATES' WEB SITES

ANNOTATED DESCRIPTION OF EACH STATE SITE

Alaska
http://www.state.ak.us/ State of Alaska home page. It has a link to:
http://www.state.ak.us/local/akpages/ADMIN/

This is the Online Information Technology Training for Alaska State Employees.

http://www.gg.alaska.edu/

This is a Gartner Group Web site. They have online computer courses that allow state employees access to computer training in several programs and applications courses such as Windows 95/98, Oracle, and UNIX. A password is needed to access these courses.

California
http://www.ca.gov/s/ State of California site

http://www.e-commerce.ca.gov/

Electronic Commerce Advisory Council report.
This paper, REPORT OF THE ELECTRONIC COMMERCE ADVISORY COUNCIL STATE OF CALIFORNIA, NOVEMBER 1998, says, in part: "By Executive Order, Governor Pete Wilson created the Electronic Commerce Advisory Council. He asked us to recommend how government at the local, state, and federal levels should 'further engender the development of electronic commerce by clarifying, modifying, or removing existing policies and practices, or implementing new ones.'" This is a good paper and makes several points and recommendations that apply to all states.

Colorado
http://www.state.ct.us/ The official Colorado homepage. It has links to the following site: http://www.newpeaks.com/

This Web site is for a company called Newpeaks.com. It states, "The Education Connection, created and produced by Leading Edge Consulting for the Office of Adult Education, Colorado Department of Education. Designed for adult educators who want to expand their professional skills through interaction with their peers." This provides training through telephone conference calls, the Internet, and e-mail,

http://www.state.co.us/gov_dir/revenue_dir/taxstatutesregs/incomebksection9.html#39-32-102. Legislation declaration.

This is the COLORADO REVISED STATUTES RURAL TECHNOLOGY ENTERPRISE ZONE ACT, 39-32-105. (Credit against tax-investment in technology infrastructure.) It says, "(1) There shall be allowed to any person as a credit against the tax imposed by article 22 of this title, for income tax years commencing on or after January 1, 1999, but prior to January 1, 2005, an amount equal to ten percent of the amount of the total investment made during such years in technology infrastructure required to provide internet access in rural technology enterprise zones."

Connecticut

http://www.state.ct.us/ The official Connecticut homepage. It has links to the following sites: http://www.cpec.org/article.cfm?section=ppr%2F%5C&page=efiling%2Ehtml

Connecticut Policy and Economic Council. The Board advises the Governor and General Assembly on the strength and direction of the economy. This is a recommendation that the courts adopt an electronic filing system for lawsuits.

http://208.217.0.181:8082/pages/pgcontent.asp?p=ab

Connecticut Technology council. Their Mission is to stimulate and facilitate the growth and awareness of technology business. The council is an advocate for technology businesses, and the science, technology, business, education and public policy issues relevant to the interests of its members.

Florida

http://fcn.state.fl.us/gsd/ Florida government services site. This site has links to the following sites:

http://www.state.fl.us/dms/dfm/videotele/vthome.html

Florida Government teleconferencing network. This is a state sponsored teleconferencing system. There are eight sites throughout Florida. Each site can be rented by the hour. The sites can be linked to each other as well as to other sites around the world. Rates are by the hour and depend on the number of sites needed.

http://suncom.state.fl.us/

Suncom Portfolio Services

The Florida State Legislature has mandated that the Department of Management Services produce a Portfolio of Services. Thus, the SUNCOM Portfolio of Services was created and will be utilized for the following: Establishing technical standards to ensure the interconnectivity of telecommunications systems, designing and implementing telecommunications systems and services to satisfy those needs, and developing policies and guidelines for use by state agencies in obtaining telecommunications equipment and services. This Web site contains a 127-page document that describes the services and the direction that the electronic infrastructure is expected to take. This is an excellent document and contains a lot of information that applies to all the states.

http://fcn.state.fl.us/ats/ats2/whatisats.html

This is the site for the Florida Advanced Telecommunications Services. According to them this is "Network-based or wireless services that provide additional communications capabilities enabling the use of application such as distance learning, video conferencing, data communications, and access to the Internet."

Hawaii
http://www.state.hi.us/ Hawaii State Web page, This has a link to:
http://www.hawaii.htdc.org/ High Technology Development Corporation

This site claims, "we've invested $1.5 billion over the past decade to expand and modernize the state's telecommunications network. Our network is more than 90 percent digital, which makes Hawaii a national leader in telecommunications, providing advanced services that businesses and customers demand."

Idaho
http://www.state.id.us/ Idaho state Web page has link to:
http://www.state.id.us/ec/ the electronic commerce page.

Their stated mission is, "promote the research and development of electronic commerce in Idaho through collaborative private and public partnerships resulting in enhancement of statewide economic development. They promote EDI, EFT (electronic funds transfer) and e-mail. But no real program was found and apparently no funds are dedicated.

Illinois
http://www.state.il.us/ Illinois official homepage

http://www.state.il.us/gov/press/99/Jun/ilcntpr.htm

Governor Creates Illinois Century Network.
HB 2088 calls for the creation of a vast network where information can be exchanged and created. Universities, colleges, schools, libraries, government agencies, museums and businesses will be able to utilize the expanded capacity of the Illinois Century Network in an interactive and collaborative environment. This is a network that links all the schools in Illinois.

Kentucky
http://www.state.ky.us/ Kentucky Homepage. This has a link to:
http://www.state.ky.us/kirm/kih.htm

Web site for the Kentucky Information Highway. It says: "The Kentucky Information Highway is a statewide, integrated communications and information network. This major state initiative puts Kentucky in the forefront in developing its telecommunications infrastructure and breaking the barriers traditionally imposed by geography,

demographics or economics." This is a site that says that Kentucky has a network that can be used by local governments, colleges and universities, school districts, planning districts, and other public entities.

Maine
http://janus.state.me.us/homepage.asp State of Maine government Web site. It has links to the following:

http://www.mdf.org/megc/growth99/home.htm

Maine Economic Growth Council
Measures of Growth 1999, is a report that says for the year of the report 55% of Maine business used the Internet. There were several other statistics, but this is the only one that applies to electronic commerce.

http://janus.state.me.us/ec/edi.htm

Maine Electronic commerce home page
This site explains the benefits and promotes electronic commerce within the state. This specifically explains the benefits of doing business with the state electronically. They define electronic commerce (EC) as a combination of electronic data interchange (EDI) and the Internet.

Michigan
http://www.state.mi.us/ Michigan government Web page. It has a link to the following site: http://www.state.mi.us/medc/medc.htm

STATE SMART: MICHIGAN:
This report outlines a strategy to attract "Gold Collar" jobs, those defined as 1) high skill, 2), high wage and 3) in high demand. This strategy proposes investment in the three most critical factors for advanced technology businesses: 1) smart ideas, smart people, and smart capital. The report spells out their plan to attract high tech businesses to Michigan. To this end they have started an ad campaign that explains the virtues of doing business in Michigan. In addition they are proposing changes to the tax laws that would allow high tech companies to take advantage of state laws that are currently only available to manufacturing firms. In addition, Michigan's educational system is seen as key to the success of this program. Technology centers will be created to act as training centers for the high tech work force. Colleges and universities will help train and attract high tech managers.

Minnesota
http://www.state.mn.us/ North Star Minnesota's Web Site. It ha links to the following site: http://www.ot.state.mn.us/masterplan/masterplan.html

Minnesota's Master Plan
Charting the Course to Minnesota's Digital Future: Master Plan for Information and Communications Technology in Minnesota. According to this paper, Minnesota already is making huge investments in information and communications technologies. The State of Minnesota spent $326 million on information technology in fiscal 1997, or 8.3 percent of its total operating expenditures. Since 1991, the state has invested more than $2 billion in technology. This paper contains 72 recommendations for the future development of IT in the future. Most of the details of this master plan appear to be implemented by the Minnesota Office of Technology,

http://www.ot.state.mn.us/ot_files/content/bud_pol/2000-01/2000-01fund.html Minnesota Office of Technology. This site has several areas, including the states telecommuting plan, budget and expenditure information.

New Jersey
http://www.state.nj.us/ The State of New Jersey Web Site

http://www2.state.nj.us/njvu/about.htm

New Jersey Virtual University (NJVU)
This site provides an index of over 800 credit and non-credit courses offered via distance learning by 42 participating public and independent colleges and universities. Also included are over 40 complete certificate and degree programs. The courses and programs include both undergraduate and graduate offerings.

North Carolina
http://www.state.nc.us/ North Carolina state Web site

http://www.state.nc.us/IRMC/ecwg/

North Carolina Electronic Commerce Work Group
This site has a report which says in part: "the e-commerce work group was formed to provide the overall leadership and coordination required for successfully implementing electronic commerce in North Carolina State Government. The purpose is to improve the way government operates, so the state may offer a more competitive environment for economic development to increase the prosperity and enhance the quality of life for its citizens. This is accomplished by developing a comprehensive statewide strategy for the installation and use of Web-enabled technology and Internet-based communications for allowing the state to exchange information and conduct business-related transactions electronically with its employees, private and corporate citizens, federal and local governments, and business partners."

http://www.ncga.state.nc.us/gascripts/billnumber/billnumber.pl?Session=1997&BillID=S1170 North Carolina

Senate Bill 1170
The stated purpose of this bill is, "This Article shall be known and may be cited as the Electronic Commerce Act. The purpose of this Article is to facilitate electronic commerce with and by public entities of the State by recognizing the validity of electronic signatures, and by providing for the regulation of electronic signatures and certification authorities."

Oregon
http://www.state.or.us/ Oregon online. It has a link to the following site:
http://irmd.das.state.or.us/ITPFinal.html

In 1995, the legislature passed Senate Bill 994. This statute directed the Oregon Department of Administrative Services (DAS) to "…coordinate the consolidation and operation of all telecommunications systems used by the state and state agencies." It also asked DAS and the Assistant to the Governor for Telecommunications Policy to "…seek methods for using state resources and investments to bring the benefits of advanced telecommunications to rural communities and to increase the use of telecommunications in commerce in the state.

Pennsylvania
http://www.state.pa.us/ Pennsylvania Home page. It has links to the following site:
http://www.state.pa.us/PA_Exec/OIT/graphics/pa_electronic_transactions_act.rtf

Pennsylvania Electronic Transactions Act
Regulating electronic records and electronic signatures; providing for their security and for their use by governmental entities…. One of the stated goals of this act is: "to facilitate and promote electronic commerce, by eliminating barriers resulting from uncertainties over writing and signature requirements and by promoting the development of the legal and business infrastructure necessary to implement secure electronic commerce.

http://ltl10.sis.pitt.edu/TA96.HTM

Telecommunications Act of 1996
The telecommunications Industry, and Link to Learn.
Draft version 1.3, June 1997 by James G. Williams & Kenneth Sochats
This is a pretty good explanation of the electronic infrastructure, and electronic infrastructure as a market.

http://www.state.pa.us/PA_Exec/OIT/atlas/atlas.htm

The infrastructure investment project provides state funds as seed capital to foster sustainable technology investments that address educational goals. The funding initiative is conducted less as a grant program than as a commonwealth investment in the development of self-sustaining educational and community-based networks, services, and applications.

Tennessee
http://www.state.tn.us/ Tennessee Home page. It has links to the following site:
http://www.utenn.edu/tnii/

Tennessee Information Infrastructure (TNII)
It says, "recognizing the need for cooperation and consolidation among the various statewide telecommunications networks operated and managed by the state of Tennessee, Office of Information Resources (OIR), the Tennessee Board of Regents (TBR), and the University of Tennessee (UT), the Tennessee Information Infrastructure (TNII) consortium was formed." The goal of the TNII consortium is "to create an interoperable network of networks for all the state's citizens."

http://www.state.tn.us/finance/oir/tnii/masterwk.pdf

State of Tennessee Electronic Commerce Proposal
It says, "The State of Tennessee has launched a comprehensive planning effort for the Tennessee Information Infrastructure (TNII), which will capitalize on existing assets to create an interoperable 'network or networks' for all the state's citizens with a grant from the Telecommunications and Information Infrastructure."

Texas
http://www.state.tx.us/ Texas home page it has a link to the following site:
http://www.gsc.state.tx.us/elec_comm/ectf.html

Texas General Services Commission - Electronic Commerce
The goals and objectives of this project are to: understand the current state procurement process; investigate current electronic commerce technologies; define a feasible infrastructure for electronic commerce in Texas; develop an implementation strategy for electronic commerce; and recommend modification of statutes, rules, policies and procedures as necessary.

Utah
http://www.state.ut.us/ Utah home page. It has a link to the following sites:
http://www.dced.state.ut.us/techdev/welcome.htm

Office Of Technology Development.
The Utah Centers of Excellence Program is a state funded grant program which supports selected research programs at Utah's universities. The primary objective is to encourage the commercialization of leading edge technologies. No specific mention of E-commerce was made. However, there are some programs that could aid E-commerce in the future.

Washington
http://www.state.wa.us/
http://www.technology-alliance.com/

The Technology Alliance is a consortium of Washington State technology-based businesses, their trade associations, the state's leading research institutions, and other cooperating organizations.

SUMMARY LISTING OF EACH STATE WEB SITE

AlaWeb, Alabama information network, Alabama State Web site. Available online 9/22/99, http://www.state.al.us/

Alabama Department of Revenue Web site, Available online 9/22/99, http://www.ador.state.al.us/

State of Alabama Department of Finance, Department of Purchasing Web site, Available online 9/22/99, http://www.purchasing.state.al.us/

Alaska State Web site, Available online 9/22/99, http://www.state.ak.us/

Alaska Department of revenue, Available online 9/22/99, http://www.revenue.state.ak.us/

Alaska Administration Department, Procurement Unit Web page, Available online 9/22/99, http://www.state.ak.us/local/akpages/ADMIN/das/pu/homepu.htm

Arizona State Web site, Available online 9/22/99, http://www.state.az.us

Arizona Department of Revenue Tax Form and Tax information System, Available online 9/22/99, http://www.revenue.state.az.us/#Top

AriZona Procurement Information Exchange, Available online 9/22/99, http://sporas.ad.state.az.us/

Arkansas State Web site, Available online 9/22/99, http://www.state.ar.us/

Arkansas Department of Finance and Administration Business and Personal Taxes, Available online 9/22/99, http://www.state.ar.us/dfa/taxes/index.html

Arkansas Department of Finance and Administration Office of State Purchasing, Available online 9/22/99, http://www.state.ar.us/dfa/purchasing/

California State Web site, Available online 9/22/99, http://www.ca.gov/s/

California Doing Business Tax Forms and Information, Available on line 9/22/99, http://www.ca.gov/s/business/biztax.html

California Department of General Services Procurement Division, Available online 9/22/99, http://www.pd.dgs.ca.gov/

Colorado State Web site, Available online 9/22/99, http://www.state.co.us/

Colorado Department of Revenue, Available online 9/22/99, http://www.state.co.us/gov_dir/revenue_dir/home_rev.html

Colorado Department of Personnel, General Support Services (GSS), Available online, 9/22/99, http://www.gssa.state.co.us/purchasi.nsf/informational+pages/purchasing+home+page?opendocument

Connecticut State Web site, Available online 9/22/99, http://www.state.ct.us/

Connecticut Department of Revenue Services, Available online 9/22/99, http://www.state.ct.us/drs/

Connecticut Department of Administrative Services Procurement/Purchasing, Available online, http://www.das.state.ct.us/busopp.htm

Delaware State Web site, Available online 9/22/99, http://www.state.de.us/

State of Delaware Division of Purchasing, Available online 9/22/99, http://www.state.de.us/purchase/index.htm

State of Delaware Department of Finance Division of Revenue, Available online 9/22/99, http://www.state.de.us/revenue/index.htm

Florida State Web site, Available online 9/22/99, http://fcn.state.fl.us/gsd/

State of Florida Purchasing Direct, Available online 9/22/99, http://purchasing.state.fl.us/

State of Florida Department of Revenue, Available online 9/22/99, http://sun6.dms.state.fl.us/dor/

Georgia State Web site, Available online 9/22/99, http://www.state.ga.us/

Georgia Department of Administrative Services – Procurement, available online 9/22/99, http://www2.state.ga.us/departments/doas/

Georgia Department of Revenue Homepage, Available online 9/22/99, http://www2.state.ga.us/Departments/DOR/

Hawaii State Government web page, Available online 9/22/99, http://www.state.hi.us/

State of Hawaii notice to Bidders and Offers, Available online 9/23/99, http://www.state.hi.us/bids/notice01.htm

State of Hawaii Department of Taxation, Available online9/23/99, http://www.state.hi.us/tax/tax.html

Doing Business With The State Of Hawaii: A Vendor Guide, Available online, http://www.state.hi.us/tax/tax.html

Idaho State Web site, Available online 9/22/99, http://www.state.id.us/

The State of Idaho Department of revenue and Taxation, Available online, http://www.state.id.us/HOME/revenuetax.htm

State of Idaho Division of Purchasing, Available online 9/23/99, http://www2.state.id.us/adm/purchasing/default.htm

Illinois State Web site, Available online 9/22/99, http://www.state.il.us/

Illinois Department of Revenue Home page, Available online 9/23/99, http://www.revenue.state.il.us/

Illinois Procurement Code, Illinois H.B. 1633 Enrolled P.A. 90-572 as amended by P.A. 91-0146, Available online 9/23/99, http://www.state.il.us/idns/lawsregs/procure.htm

Indiana State Web site, Available online 9/22/99, http://www.state.in.us/

Indiana Department of Revenue, Available online 9/23/99, http://www.state.in.us/dor/

Indiana Department if Administration Procurement Division, Available online 9/23/99, http://www.ai.org/idoa/proc/index.html

Iowa State Web site, Available online 9/22/99, http://www.state.ia.us/

Iowa Department of General Services home page, Available online 9/25/99, http://www.state.ia.us/government/dgs/index.html

Iowa Department of Revenue and Finance home page, Available online 9/25/99, http://www.state.ia.us/government/drf/index.html

Kansas State Web site, Available online 9/22/99, http://www.state.ks.us/

Kansas Department if Administration, Available online 9/23/99, http://da.state.ks.us/

Kansas Department of revenue, Available online 9/23/99, http://www.ink.org/public/kdor/

Kentucky State Web site, Available online 9/22/99, http://www.state.ky.us/

Commonwealth of Kentucky Finance and Administration Cabinet Division of Material & Procurement Services, Available online 9/23/99, http://www.state.ky.us/agencies/purch/frame2.htm

Kentucky Revenue Cabinet Online Taxpayer Service Center, Available online 9/23/99, http://www.state.ky.us/agencies/revenue/revhome.htm

Louisiana State Web site, Available online 9/22/99, http://www.state.la.us/

Maine State Web site, Available online 9/22/99, http://janus.state.me.us/homepage.asp

Maine Division of Purchases Web page, Available online 9/23/99, http://janus.state.me.us/purchase/homepage.htm

Maine Revenue Services Home page, Available online 9/23/99, http://janus.state.me.us/revenue/homepage.htm

Maryland State Web site, Available online 9/22/99, http://www.state.md.us/

Maryland Comptroller of the Treasury Home page, Available online, http://www.comp.state.md.us/default.asp

Maryland Department of General Services Office of Procurement and Logistics, Available online 9/23/99, http://www.dgs.state.md.us/overview/procure2.htm

Massachusetts State Web site, Available online 9/22/99, http://www.state.ma.us/

Commonwealth of Massachusetts Taxes/Revenue Home page, Available online 9/23/99, http://www.state.ma.us/tax.htm

Commonwealth of Massachusetts Executive Office for Administration and Finance Operational Services Division (OSD), Available online 9/23/99, http://www.state.ma.us/osd/

Michigan State Web site, Available online 9/22/99, http://www.state.mi.us/

Michigan department of Management and Budget Office of Purchasing, Available online, http://www.state.mi.us/dmb/oop/

Michigan Department of Treasury, Available online 9/23/99, http://www.treas.state.mi.us/

North Star, Minnesota State Web site, Available online 9/22/99, http://www.state.mn.us/

Minnesota's Material Management Division Web site, Available online 9/23/99, http://www.mmd.admin.state.mn.us/

Minnesota Department of Revenue, Available online 9/23/99, http://www.taxes.state.mn.us/

Mississippi State Web site, Available online 9/22/99, http://www.state.ms.us

Mississipi Department of Finance and Administration, Available online 9/23/99, http://www.dfa.state.ms.us/

Mississippi State Tax Commissioner, Available online 9/23/99, http://www.mstc.state.ms.us/

Missouri State Web site, Available online 9/22/99, http://www.state.mo.us/

Missouri Office of Administration Division of Purchasing and Materials Management, Available online 9/23/99, http://www.oa.state.mo.us/purch/vendor.html

Missouri Department of Revenue Division of Taxation and Collection Web page, Available online 9/23/99, http://dor.state.mo.us/tax/

Montana State Web site, Available online 9/22/99, http://www.state.mt.us/

State of Montana Department of Administration Procurement and Printing Division, Available online 9/23/99, http://www.state.mt.us/doa/ppd/index.htm

Montana Department of Revenue, Available online 9/23/99, http://www.state.mt.us/revenue/index.htm

Nebraska State Web site, Available online 9/22/99, http://www.state.ne.us/

State of Nebraska Material Division, Available online 9/23/99, http://www.nol.org/home/DASMAT/

Nebraska Department of Revenue home page, Available online 9/23/99, http://nol.org/revenue/index.html

Nevada State Web site, Available online 9/22/99, http://www.state.nv.us/

State of Nevada Department of Administration Purchasing Division, Available online 9/23/99, http://www.state.nv.us/purchasing/

Nevada Department of Taxation home page, Available online 9/23/99, http://www.state.nv.us/taxation/

New Hampshire State Web site, Available online 9/22/99, http://www.state.nh.us/

State of New Hampshire Department of Administrative Services Division of Plant and Property Management, Available online 9/23/99, http://www.state.nh.us/das/purchasing/index.html

State of New Hampshire Department of Revenue, Available online 9/23/99, http://www.state.nh.us/revenue/revenue.htm

New Jersey State Web site, Available online 9/22/99, http://www.state.nj.us/

New Jersey Division of Purchase and Property Purchase Bureau, Available online 9/23/99, http://www.state.nj.us/treasury/purchase/index.html

New Jersey Department of Treasury Division of Taxation, Available online 9/23/99, http://www.state.nj.us/treasury/taxation/

New Mexico State Web site, Available online 9/22/99, http://www.state.nm.us/

New Mexico State Purchasing Division Home page, Available online, http://www.state.nm.us/spd/

New Mexico Taxation and Revenue Department, Available online 9/23/99, http://www.state.nm.us/tax/trd_form.htm

New York State Web site, Available online 9/22/99, http://www.state.ny.us/

New York State Offices of General Services Procurement Services, Available online 9/23/99, http://www.ogs.state.ny.us/purchase/default.asp

New York Department of Tax and Finance home page, Available online, http://www.tax.state.ny.us/

North Carolina State Web site, Available online 9/22/99, http://www.state.nc.us/

North Carolina Department of Administration Purchase and Contract, Available online 9/23/99, http://www.state.nc.us/

North Carolina Department of Revenue Home page, Available online 9/23/99, http://www.dor.state.nc.us/DOR/

North Dakota State Web site, Available online 9/22/99, http://www.state.nd.us/

North Dakota State Procurement Office Home page, Available online, http://www.state.nd.us/centserv/purchase.html

North Dakota State Tax Department home page, Available online 9/23/99, http://www.state.nd.us/taxdpt/

Ohio State Web site, Available online 9/22/99, http://www.state.oh.us/

Ohio State Procurement Resources, Available online 9/23/99, http://www.state.oh.us/ohio/procurement.htm

Ohio Department of Taxation home page, Available online 9/23/99, http://www.state.oh.us/tax/

Oklahoma State Web site, Available online 9/22/99, http://www.state.ok.us/

State of Oklahoma Department of Central Services, Available online 9/23/99, http://www.dcs.state.ok.us/OKDCS.NSF/htmlmedia/index.html

Oklahoma Tax Commission on the World Wide Web, Available online 9/2399, http://www.oktax.state.ok.us/oktax/

Oregon State Web site, Available online 9/22/99, http://www.state.or.us/

Oregon Department of Administrative Services Procurement Section home page, Available online, http://tpps.das.state.or.us/purchasing/

Oregon Department of Revenue Home page, Available online 9/23/99, http://www.dor.state.or.us/

Pennsylvania State Web site, Available online 9/22/99, http://www.state.pa.us/

How to Secure Contracts With Pennsylvania Agencies, Available online 9/23/99, http://www.state.pa.us/PA_Exec/DCED/business/guide/entsec.htm

Pennsylvania Department of Revenue Home page, Available online 9/23/99, http://www.revenue.state.pa.us/

Rhode Island State Web site, Available online 9/22/99, http://www.state.ri.us/

Rhode Island Department of Administration Division of Purchases, Available online 9/23/99, http://www.state.ri.us/

State of Rhode Island Division of Taxation home page, Available online 9/23/99, http://www.tax.state.ri.us/index.html

South Carolina State Web site, Available online 9/22/99, http://www.state.sc.us/

South Dakota State Web site, Available online 9/22/99, http://www.state.sd.us/

South Dakota Office of Purchasing and Printing Home page, Available online 9/23/99, http://www.state.sd.us/boa/pp.htm

South Dakota Department of Revenue home page, Available online 9/23/99, http://www.state.sd.us/revenue/revenue.html

Tennessee State Web site, Available online 9/22/99, http://www.state.tn.us/

Tennessee Department of Economic and Community Development, Available online 9/25/99, http://www.state.tn.us/ecd/tax_info.htm

Tennessee Department of General Services Purchasing Division , Available online 9/25/99, http://www.state.tn.us/generalserv/purchasing/purhome.htm

Texas State Web site, Available online 9/22/99, http://www.state.tx.us/

Texas Business Information home page, Available online 9/25/99, http://www.state.tx.us/Business/

Utah State Web site, Available online 9/22/99, http://www.state.ut.us/

State of Utah Division of Purchasing & General Services, Available online 9/25/99, http://www.purchasing.state.ut.us/

Utah State Tax Commission – Forms, Brochures and Publications, Available online 9/25/99, http://www.tax.ex.state.ut.us/pubs/form&pub.htm

Vermont State Web site, Available online 9/22/99, http://www.state.vt.us/

Vermont Business Assistance Network – Bid opportunities System, Available online 9/25/99, http://www.dca.state.vt.us/dcabid/bidbegingr.htm

Vermont Department of Taxes home page, Available online 9/25/99, http://www.state.vt.us/tax/

Virginia State Web site, Available online 9/22/99, http://www.state.va.us/

Virginia Procurement Pipeline, Available online 9/25/99, http://www.virginiabusiness.org/

Virginia Department of Taxation home page, Available online 9/25/99, http://www.tax.state.va.us/index.htm

Washington State Web site, Available online 9/22/99, http://access.wa.gov/

State of Washington Department of General Administration, Available online 9/25/99, http://www.ga.wa.gov/

Washington Department of Revenue, Available online 9/25/99, http://dor.wa.gov/

West Virginia State Web site, Available online 9/22/99, http://www.state.wv.us/

West Virginia Purchasing Department Home page, Available online 9/25/99, http://www.state.wv.us/admin/purchase/

West Virginia State Tax Department Home Page, Available online 9/25/99, http://www.state.wv.us/taxdiv/

Wisconsin State Web site, Available online 9/22/99, http://www.state.wi.us/

Wisconsin Bureau of Procurement Vendor net, Available online 9/23/99, http://vendornet.state.wi.us/vendornet/

Wisconsin Department of Revenue home page, Available online 9/23/99, http://www.dor.state.wi.us/html/formpub.html

Wyoming State Web site, Available online 9/22/99, http://www.state.wy.us/

Wyoming Department of Revenue home page, Available online 9/23/99, http://revenue.state.wy.us/

Wyoming Department of Procurement home page, Available online 9/23/99, http://www.state.wy.us/ai/gen_serv/procurement.html

APPENDIX C – HEALTH-CARE INDUSTRY TRENDS

Appendix C is adapted from Chapter 9 of "1998 Information Systems Spending — HealthCare" by Computer Economics (http://www.computereconomics.com/new4/benchhome/ch4.html#).

Budget Allocations

Figure C-1 depicts IS budget allocators within the U.S. health-care industry. The largest spending area for IS in healthcare is hardware. The second highest category is staffing. Health care organizations generally assign an unusually high percentage of their IS budgets to maintaining their facilities and overhead. This may indicate that there are still a lot of large systems in place that require expensive support to function properly. Health care organizations dedicate much less of their budget to outside services than many other industry sectors. The average allocation is half that for all industries (Anonymous, 1998). One of the key reasons for this low allocation is that health care organizations are not inclined to outsource their central data-center operations. Software spending in health care is comparable to that in other industry sectors as is health care's allocation to consumable supplies. With the exception of the differences in allocations to facilities and overhead and outside services, health care organizations are very representative of the IS budget patterns found in many other industry sectors.

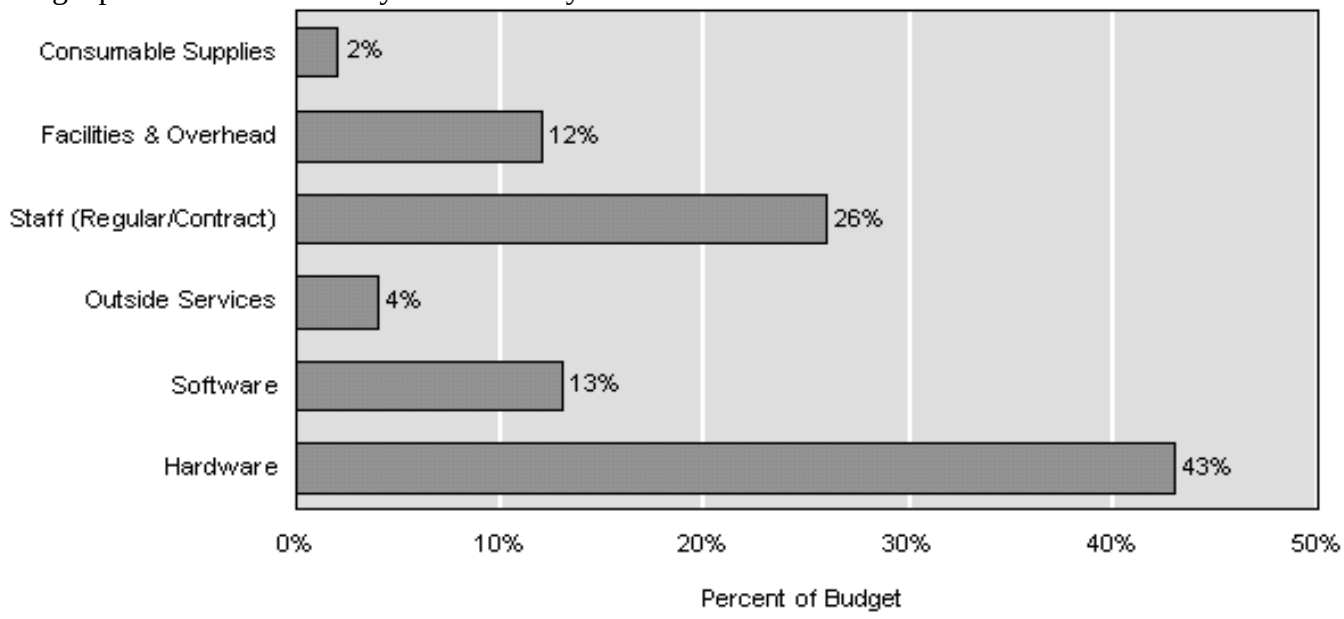

Figure C-1: Average IS Budget Allocations in the Health Care Industry
(Source: Figure 9-1 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")

(http://www.computereconomics.com/new4/benchhome/fig9-1.html)

Business Reorganization Trends

Corporate reorganization trends either employed by, or directly affecting, IS organizations in the health care industry are shown in Figure C-2 (http://www.computereconomics.com/new4/benchhome/ch4.html#). Health care organizations are more aggressive in their application of some reorganization trends than other industry groups. However, health care organizations are well below the norm in some areas including outsourcing central IS operations and downsizing. Total quality management (TQM) is in use in almost 70% of the IS organizations in health care companies; this exceeds the average rate observed across all other industry groups. Outsourcing IS functions, outside of the central IS operation, is also a very common trend in health care companies and is above the composite for all industries. Reengineering is being used in health care in nearly half of all IS shops, which is slightly below the all industry composite. While downsizing initiatives are roughly half as likely to occur in health care IS shops as in the "typical" sector, mergers and acquisitions are considerably higher than the norm for this industry. This means that IS shops in health care are often saddled with the difficult task of merging two or more data centers and their associated IS staffs into an integrated and efficient operation.

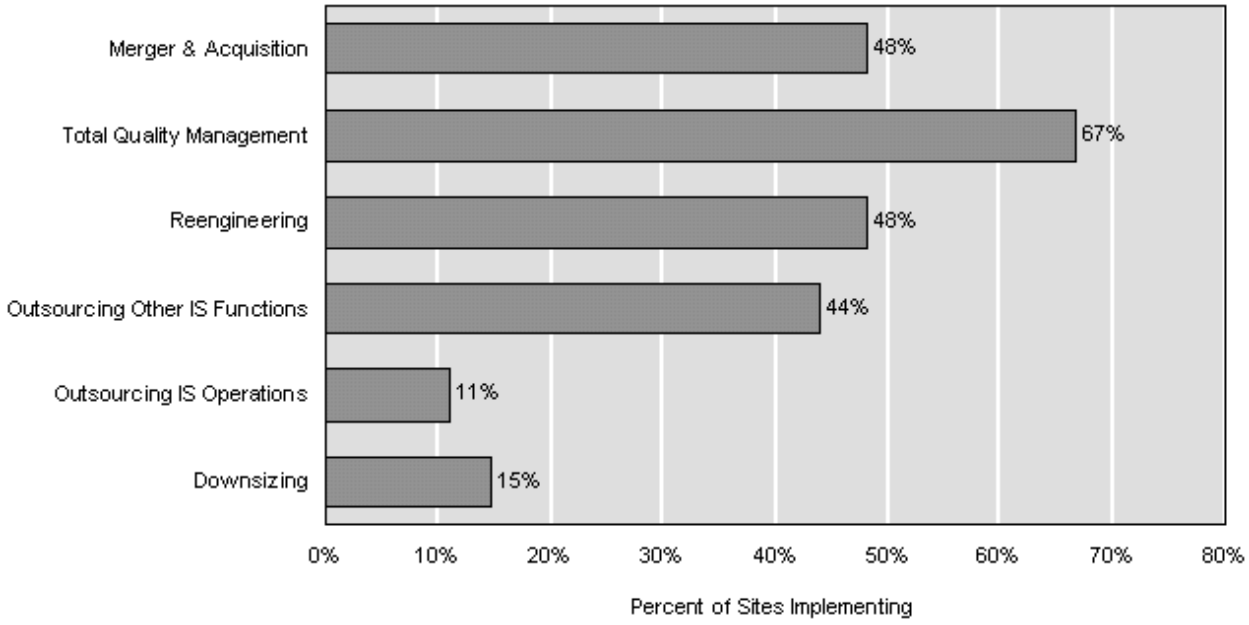

Figure C-2: Business Reengineering Trends in Health Care
(Source: Figure 9-2 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-2.html)

Like those in other industries, IT architectures in health care organizations are moving toward a balance of decentralized and centralized systems. Today, over 40% of all health care IS shops are managing an even mixture environment and only about 25% are still

using a mostly centralized architectural infrastructure. By the end of 1999 more than half of all health care organizations are projected to have a balanced environment. However, the presence of purely centralized systems is more pronounced in the health care industry than in other industries.

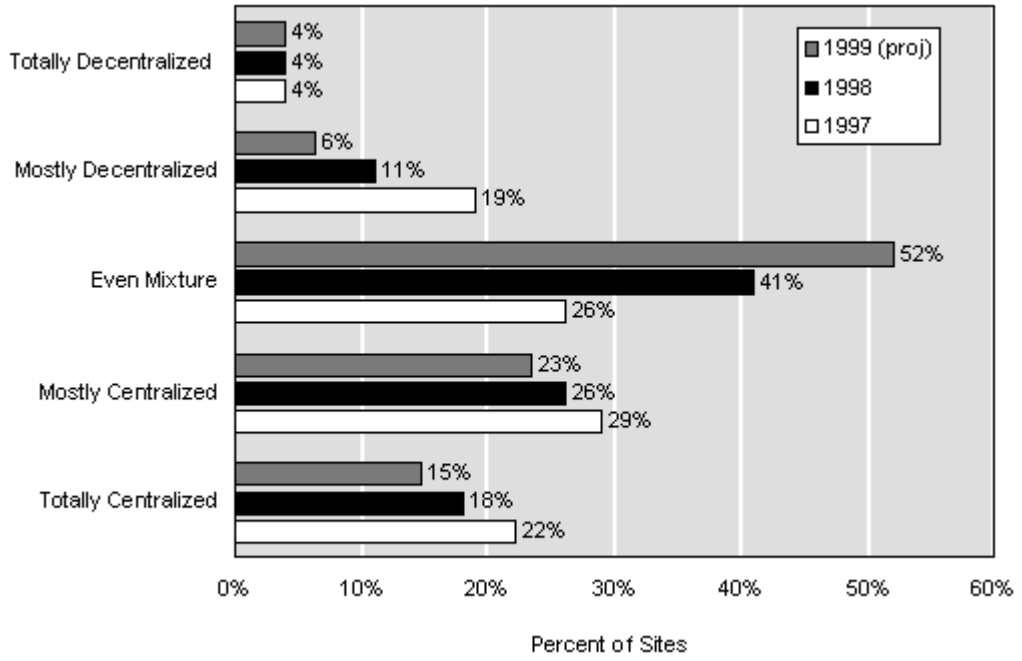

Figure C-3: IS Architectures in Health Care Organizations
(Source: Figure 9-3 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")

(http://www.computereconomics.com/new4/benchhome/fig9-3.html)

Like organizations in other industries, health care organizations are experiencing increases in the use of desktop systems, (see figure C-4) Internet and intranet server deployment is, however, lagging behind in health care organizations. This indicates that there is still a lot of indecision in these organizations regarding the utility of Internet technology in their environments.

Heath care organizations are consistent with the norm for all industries in terms of deploying LAN servers and are demonstrating increased interest in midrange systems. Two other categories where health care organizations illustrate a more aggressive deployment pattern than other industry sectors is in network computer and symmetric multiprocessor additions.

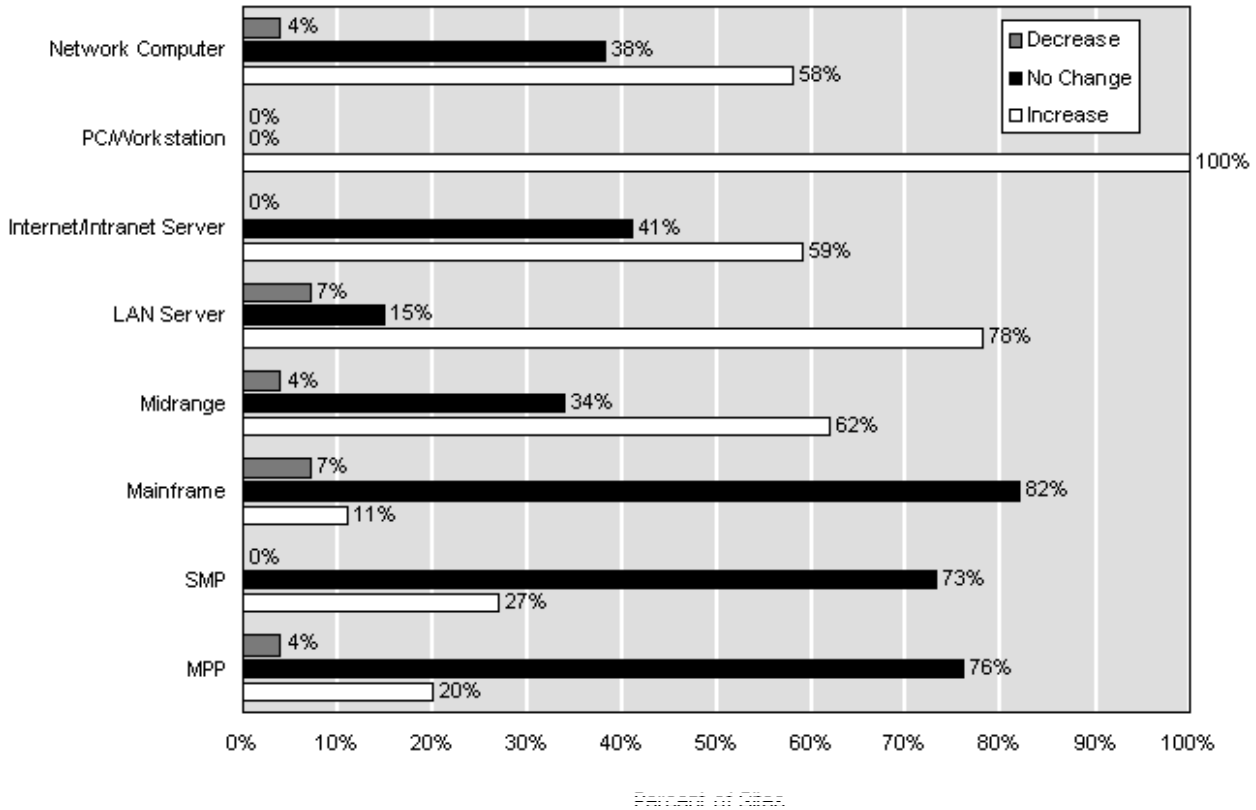

Figure C-4: Hardware Platforms in Health Care Organizations
(Source: Figure 9-4 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-3.html)

The overriding system availability requirement in health care by 24 by 7 (see Figure C-5), the most expensive availability environment required by any organization. This means that most IS shops in health care are saddled with providing a virtually 100% uptime environment, requiring redundant systems and a high degree of fault tolerance.

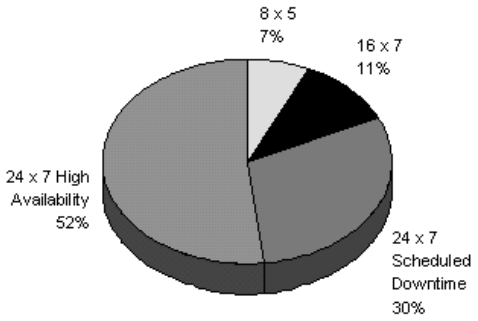

Figure C-5: System Availability Requirements in Health Care Organizations
(Source: Figure 9-5 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-5.html)

Budget Trends

Representative budget decreases and increases in health care for 1998 are illustrated in the results of the Computer Economics study. (See Figure C-6) The majority of health care organizations are experiencing increases in their IS budgets. According to Computer Economics, only 15% of all health care organizations experienced a budget cut from 1997 to 1998.

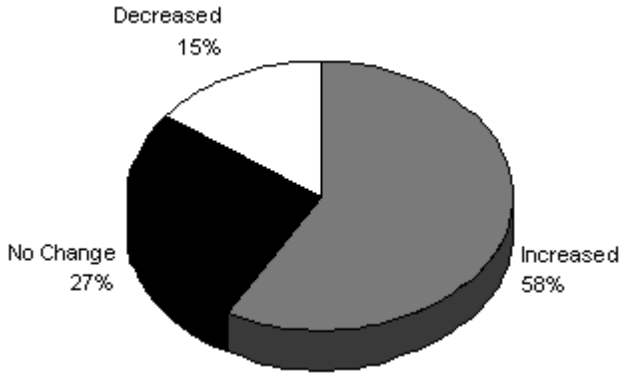

Figure C-6: Health Care Organizations' IS Budget Changes from 1997 to 1998
(Source: Figure 9-6 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")

(http://www.computereconomics.com/new4/benchhome/fig9-6.html)

Figure C-7 is representative of how much of the total IT spending in health care organizations is under the control of the IS department. Like other industries, there is considerable variation among health care organizations in IS control and tracking of total IS spending.

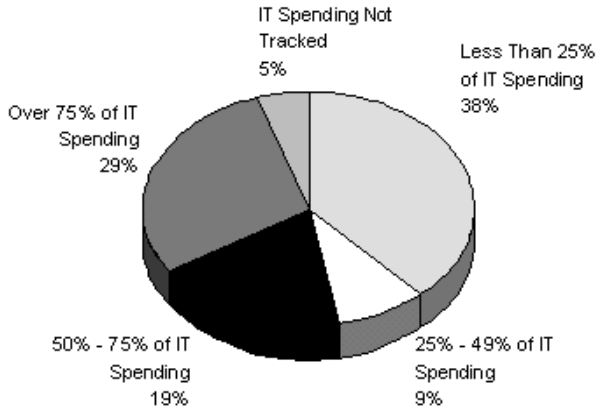

Figure C-7: IS Control of IT Budgets in Health Care Organizations
(Source: Figure 9-7 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-7.html)

One of the most commonly used measurements of the effectiveness and economic impact of the IS organization is the ratio of IS spending to corporate revenue. The health care figures for this category are illustrated in Figure C-8. According to Computer Economic, within the health care industry, the median IS budget as a percentage of revenues is approximately 1.8%. This is significantly higher than the median figure for all industries combined, which is slightly over one percent.

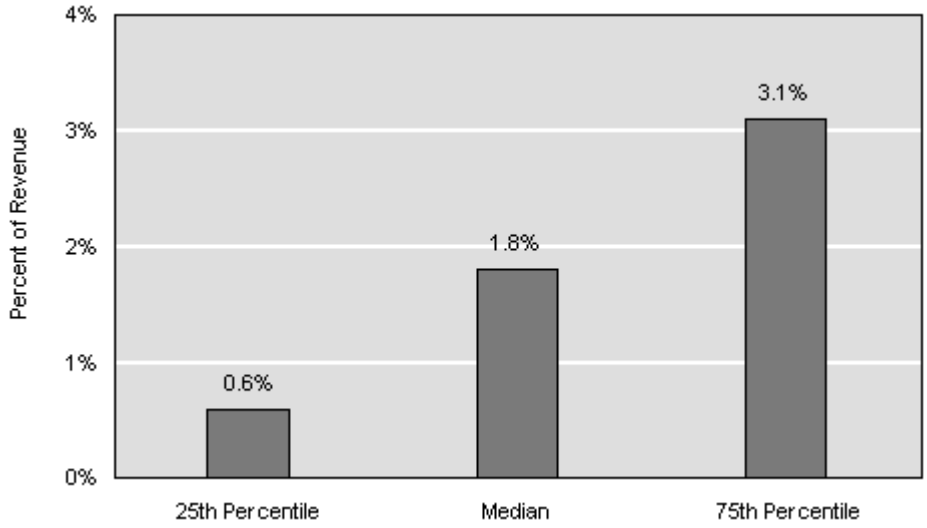

Figure C-8: Percent of Total Budget Devoted to IT in Health Care Organizations
(Source: Figure 9-8 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-8.html)

A representative example of IS budget breakdown by line item for health care organizations is shown in Figure C-9. The highest IS cost area in health care companies is personnel, which accounts for nearly a fourth of the IS budget.

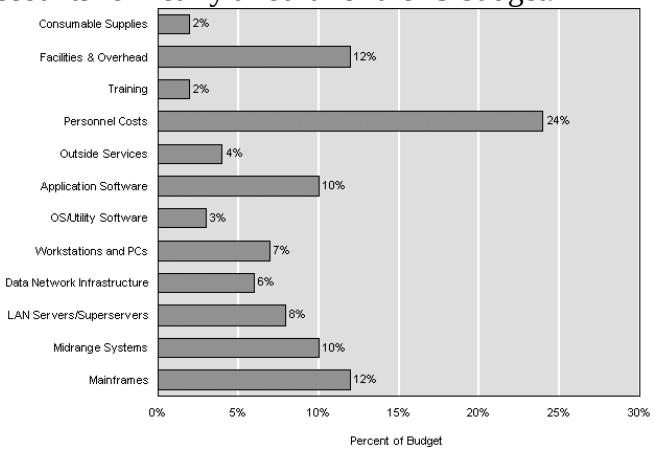

Figure C-9: IS Budget Allocations in Health Care Organizations
(Source: Figure 9-9 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")

Technology investments for health care organizations, are shown in Figure C-10. While other industry sector devote the largest portion of their investment dollar to new application development, health care companies are currently spending the highest portion of their investment dollars on Y2K compliance initiatives. According to Computer Economics, the average healthcare organization devotes about $2.2 million to new development, while the norm is approximately half of the average across all other industries. Internet- and intranet-related initiatives in health care companies are currently taking a back seat to Y2K compliance and application development. In general, health care e-commerce initiatives are lagging well behind those in other industries.

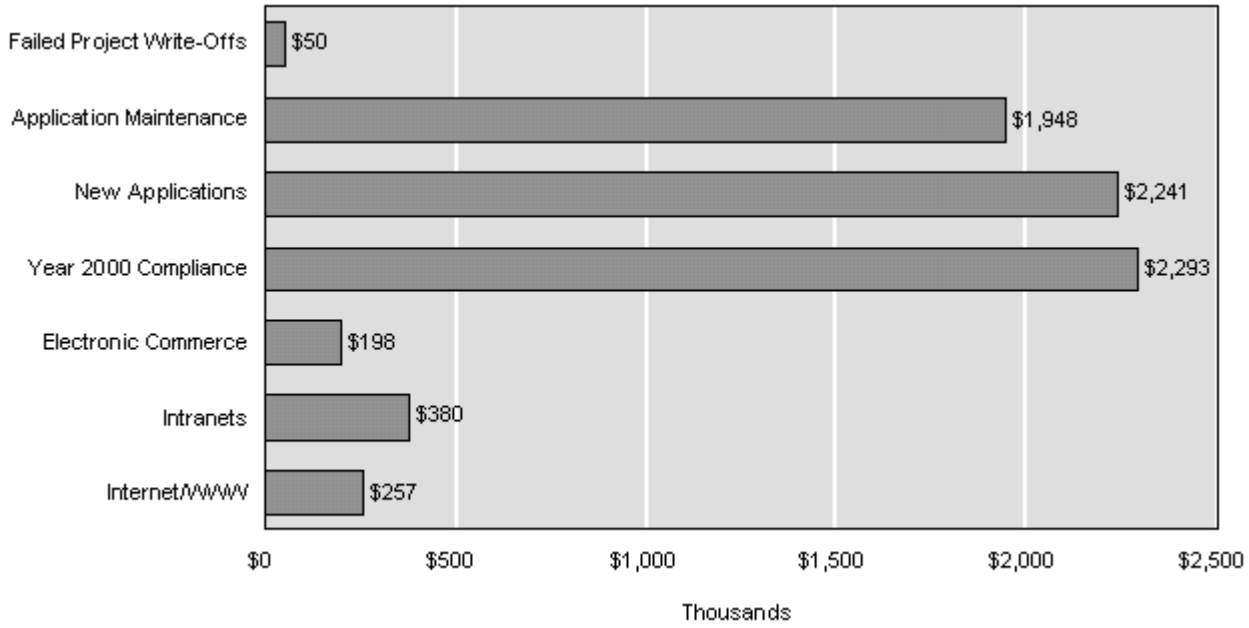

Figure C-10: Application Spending Patterns in Health Care Organizations
(Source: Figure 9-10 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")

(http://www.computereconomics.com/new4/benchhome/fig9-10.html)

IS Staffing Trends

Representative data about IS spending per employee in health care organizations is shown in Figure C-11. The median IS spending per employee in this sector is less than $2000, which less than half the median across all industries.

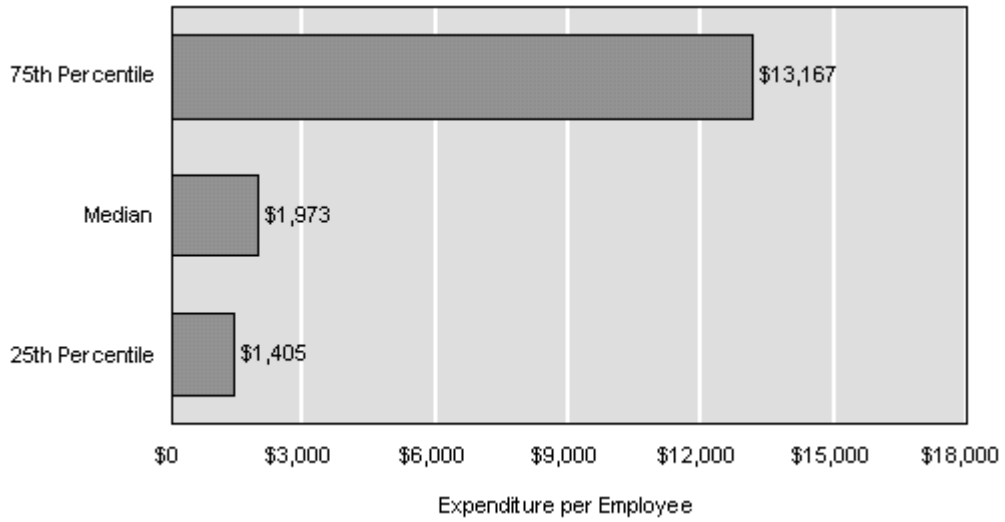

Figure C-11: IS Expenditures Per Employee in Health Care Organizations
(Source: Figure 9-11 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-11.html)

The number of workers supported per IS employee in the health care industry is illustrated in Figure C-12. IS employees in health care organizations generally support more employees than other IS professionals in other industry sectors. At the median level, each IS employee in health care support approximately 40 end users, while IS professionals in other industries support a median of slightly more than 25 employees.

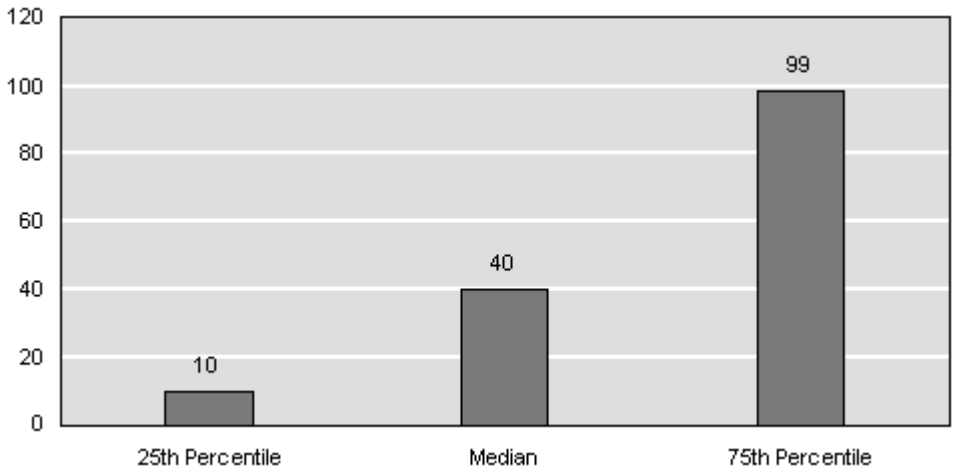

Figure C-12: Average Number of Employees Supported Per IS Worker in Health Care Organizations
(Source: Figure 9-12 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-12.html)

Hiring trends are shown in Figure C-13. There is a great deal of variance in the staffing trends in health care with significant numbers of health care organizations either increasing or decreasing their IS staff.

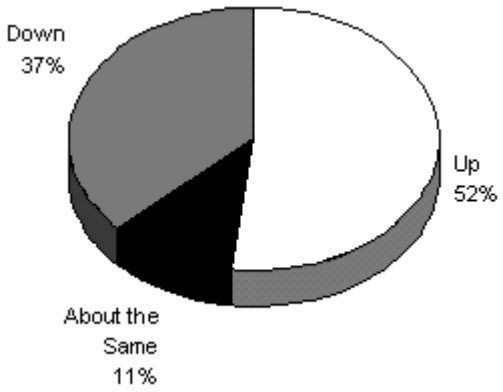

Figure C-13: IS Staffing Trends in Health Care Organizations
(Source: Figure 9-13 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-13.html)

Figure C-14 illustrates the use of contractors and temporary IT talent to augment the internal IS department staff in health care organizations. As noted previously, health care organizations have been less inclined to use outsourcing and/or use contract sources, including contract programmers to fulfill their staffing and application development needs.

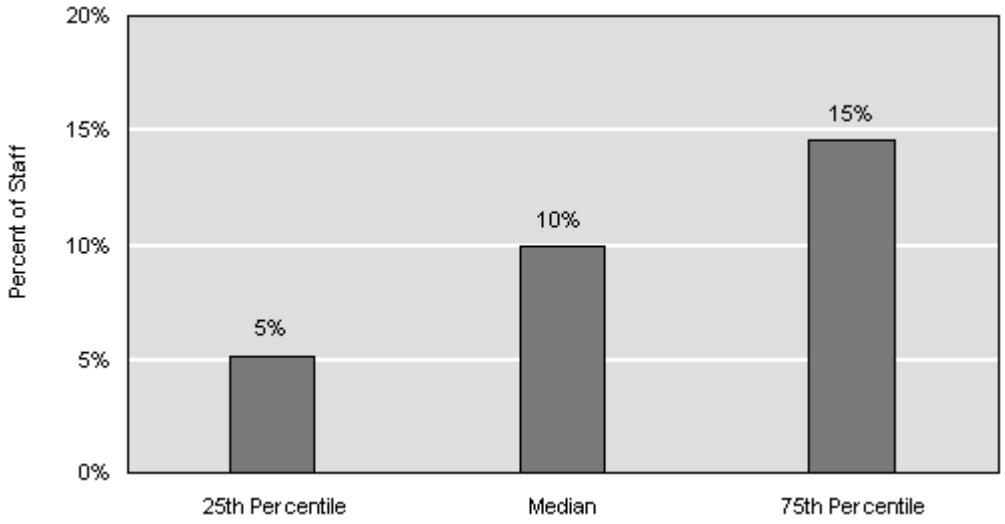

Figure C-14: Average Use of Contract and Temporary IT Workers in Health Care Organizations
(Source: Figure 9-10 in Chapter 9 of Computer Economics' "1998 Information Systems Spending---Health Care")
(http://www.computereconomics.com/new4/benchhome/fig9-14.html)

ELECTRONIC MEDICAL INITIATIVES IN OTHER STATES

The following is a list of legislation passed by other states on telemedicine. As you will see, Georgia has not passed any legislation dealing with telemedicine in 1999. Legislation by other states can be viewed as a guide for Georgia.

Arizona
1999 AZ S.B. 1260: requires full licensure for out of state physicians who make treatment decisions such as interpreting X-rays.
1/28/99 Introduced.

Arkansas
1999 AR S.B. 28: an act to adopt the Interstate Nurse Licensure Compact
1/11/99 Introduced. To Senate Committee on Public Health, Welfare and Labor.
1/25/99 Passed Senate. To House.
2/16/99 Passed House. To Senate for concurrence.
2/17/99 Senate concurred in House amendments.
2/23/99 Signed by Governor.

1999 AR S.B. 345: appropriates to the Department of Information Systems a sum of $6,000,000 for the 1999-2001 biennium to fund grants to public and/or non-profit entities for the development of a statewide distance learning network, telemedicine network, and other related technology projects.
2/4/99 Introduced.
2/19/99 Passed Senate. To House.
2/24/99 Passed House.
3/1/99 Signed by Governor.

1999 AR H.B. 1368: re-appropriates $1,256,190.00 to the Department of Information Systems for distance learning and telemedicine activities.
2/1/99 Introduced.

Colorado
1999 CO S.B. 19: permits the Colorado Board of Medical Examiners to issue a limited Colorado medical license to physicians who are affiliated with Shriners Hospital for Children and licensed to practice medicine in another state to treat Shriners' patients either in the state or via telemedicine.
1/6/99 Introduced.
1/25/99 Passed Senate. To House.

Florida
1999 FL H.B. 965: defines "telehealth," for the purpose of the Nurse Practice Act, as "the use of telecommunication technologies to deliver health care services. . .to a patient by transporting the patient to a licensed health care practitioner's office by use of telecommunications. The site of service for such health care services is the location of the

practitioner when practicing through the use of telecommunication technologies, so long as the practitioner has an active license to practice in that location."
3/2/99 Introduced

1999 FL HB 1703: requires any physician, wherever located, who has primary authority over the care or diagnosis of a patient located in the state to hold a Florida license. A physician who provides, through electronic transmission of radiographic images, official authenticated interpretations of radiographs to any practitioner or patient in Florida is regarded as exercising primary authority over the diagnosis and is subject to licensure.
3/9/99 Introduced

Iowa
1999 IA H.S.B. 143: adopts the nurse licensure compact.
2/17/99 Introduced. 1999 IA S.S.B. 1145: adopts the nurse licensure compact.
2/23/99 Introduced

Maryland
1999 MD S.B. 401: authorizes the creation of a State Debt to the Board of Directors of the Washington County Hospital Association for the acquisition, construction, reconstruction, renovation, repair, and capital equipping of a center to meet the primary health care needs of the under served community of downtown Hagerstown by providing space for adequate clinical services and outreach staff and to allow for the addition of mental health, dental, and telemedicine services, etc.
02/05/99 Introduced.
02/05/99 To Senate Committee on Budget and Taxation.

1999 MD H.B. 429: enters the State of Maryland into the Nurse Multi-state Licensure Compact; provides for the regulation of nurses under the Compact, and for the enforcement of the Compact.
02/10/99 Introduced.
02/10/99 To House Committee on Environmental Matters.

1999 MD S.B. 590: enters the State into the Nurse Multi-state Licensure Compact; provides for the regulation of nurses under the compact; establishes jurisdictional requirements for members of the compact.
02/05/99 Introduced.
02/05/99 To Senate Committee on Economic and Environmental Affairs.

Minnesota
1999 MN H.B. 807: permits rural hospital grant funding to be used to develop or enhance telemedicine services. Also, expands medical assistance program coverage to telemedicine consultations. Coverage is limited to payment for both the referring provider and the consulting physician specialist, at the same rate as face-to-face services.
2/18/99 Introduced

1999 MN S.B. 839: permits rural hospital grant funding to be used to develop or enhance telemedicine services. Also, expands medical assistance program coverage to telemedicine consultations. Coverage is limited to payment for both the referring provider and the consulting physician specialist, at the same rate as face-to-face services.
2/18/99 Introduced.

Montana
1999 MT H.B. 399: prohibits practice of telemedicine without a telemedicine certificate issued by Board of Medical Examiners; provides Legislative findings; provides definition and exceptions; provides qualifications for telemedicine certificate; specifies powers and duties of Board; provides for disciplinary action by Board; establishes jurisdiction for Medical Legal Panel and the Courts.
1/27/99 Introduced.
2/22/99 Passed House. To Senate.

Nebraska
1999 NE L.B. 523: adopts the Nurse Licensure Compact (PDF Version)
1/19/99 Introduced.
2/25/99 From Legislative Committee on Health and Human Services: Placed on General File.

NE L.B. 559: adopts the Medicaid Telehealth Development Act which defines "telehealth," eliminates in-person contact between a health care professional and a patient for Medicaid reimbursement, and implements informed consent requirements.
1/19/99 Introduced.
3/1/99 From Legislative Committee on Health and Human Services: Placed on General File as amended.

1999 NE L.B. 698: amends the Nurse Practice Act to authorize the Board of Nursing to participate in the Nurse Licensure Compact.
1/20/99 Introduced.
1/22/99 To Legislative Committee on Health and Human Services.

1999 NE L.B. 797: amends the state Uniform Licensing Act to include a definition of "telehealth." Under the Act telehealth will mean the distance practice of a healing art by which the practitioner engages in one of the aspects of the scope of practice of such healing art at a site other than where the patient is located. Telehealth does not include professional consultation between practitioners or didactic training of practitioners or students if no patient contact occurs.
1/20/99 Introduced.
1/25/99 To Legislative Committee on Health and Human Services.

New Hampshire
1999 NH S.B. 53: requires New Hampshire licensure of physicians who provide contractual regular or frequent teleradiology services in the state.

2/4/99 Introduced.
2/4/99 To Senate Committee on Public Affairs.

New Mexico
1999 NM S.B. 1: appropriates $60,000 from Miner's Fund to Miner's Colfax Medical Center for teleradiology upgrades.
1/19/99 Introduced.

1999 NM S.B. 5: appropriates money to the Department of Health for videoconferencing hardware for telemedical services for department of health facilities.
1/26/99 Introduced.

North Carolina
1999 NC S.B. 194: creates the nurse-licensing compact.
3/1/99 Introduced.

North Dakota
1999 ND H.B. 1158: Requires full licensure for out-state-physicians who treat North Dakota patients. A license is not required where the out-of-state physician is in consultation with a licensed physician physically located in North Dakota and who is primarily responsible for the care of the patient.
1/5/99 Introduced.
1/5/99 To House Committee on Human Services.

Oklahoma
1999 OK H.B. 1133: Requires full licensure for out-of-state homeopathic physicians who treat Oklahoma patients.
1/6/99 Introduced.

1999 OK H.B. 1344: amends the Oklahoma Veterinary Practice Act to include the practice of telemedicine within the definition of the practice of veterinary medicine and require an Oklahoma license. The act provides a broad consultation exception.
1/7/99 Profiled.
3/4/99 Passed House. To Senate.

1999 OK H.B. 1767: shifts responsibility for the Oklahoma Telemedicine Network to the State Department of Health.
2/1/99 Introduced.
2/19/99 From House Committee on Appropriations and Budget: Do pass as substituted.

Oregon
1999 OR S.B. 600: requires special telemedicine licensure for out-of-state physicians practicing on Oregon patients. The license issued is not considered a limited license, but still does not permit the out-of-state physician to practice medicine in the state, except when engaging in practice across state lines. The licensure requirement does not apply to

out-of-state physicians who render care across state lines in an emergency or who consult on informal basis without compensation or the expectation of compensation and who do not undertake responsibility for diagnosing or rendering treatment to a patient.
1/11/99 Introduced.

Tennessee
1999 TN S.B.652: amends the medical and osteopathic medical practice acts to include the transfer of patient medical information via electronic means to a person in another state who is not licensed to practice in Tennessee as grounds for license denial, suspension or revocation, except in certain enumerated instances.
2/11/99 Introduced.

1999 TN H.B. 1088: amends the Medical Practice Act to establish that the transfer of patient medical information via telecommunication technology to a person in another state who is not licensed to practice medicine or osteopathy in Tennessee for the purpose of diagnosing or treating persons physically located in Tennessee is grounds for license suspension or revocation. The provision does not apply to second opinions requested by a Tennessee licensed physician provided no charges are assessed for the opinion or when such information is used to treat a person seeking treatment outside of Tennessee, to determine insurance coverage, to provide an occasional academic consultation, or to execute a risk evaluation or utilization
review program by an insurer.
2/17/99 Introduced.
2/25/99 In House Committee Health and Human Resources: Referred to Subcommittee on Public and Consumer Health.

Texas
1999 TX H.B. 517: expands Medicaid reimbursement for telemedicine consultations by eliminating the restriction to rural services.
1/12/99 Introduced.

1999 TX H.B. 518: expands Medicaid reimbursement to include medical or dental consultations provided via telemedicine in conjunction with the Early and Periodic Screening, Diagnosis, and Treatment Program (EPSDT).
1/12/99 Introduced.

1999 TX H.B. 519: creates a regional workers' compensation telemedical center pilot project to be operated by the University of Texas Medical Branch at Galveston.
1/12/99 Introduced.

1999 TX S.B. 806: mandates the development and implementation of a comprehensive plan for expanding use of telemedicine within the correctional system. Further, permits the use of correctional telemedicine resources for rural health care initiatives and for purposes of rural health care education.
3/2/99 Introduced.

1999 TX H.B. 1342: enacts the Nurse Licensure Compact.
2/10/99 Introduced.

1999 TX H.B. 1489: mandates the development and implementation of a comprehensive plan for expanding use of telemedicine within the correctional system. Further, permits the use of correctional telemedicine resources for rural health care initiatives and for purposes of rural health care education.
2/15/99 Introduced

1999 TX H.B. 1653: establishes a task force to create a statewide telemedicine plan to increase access to medical care.
2/19/99 Introduced.

Utah
1999 UT S.B. 26: amends the Nurse Licensure Compact already enacted by the state in the 1998 session by making conforming corrections.
1/18/99 Introduced.
2/17/99 Passed Senate. To House.
3/1/99 Passed House.

Virginia
1999 VA S.B. 1214: requires the Commissioner of Health to report to the Governor and General Assembly by 10/1 of each year on the status of telemedicine initiatives by State agencies.
1/21/99/ Introduced.
02/09/99 Passed Senate. To House.
2/19/99 Passed House.
2/19/99 Eligible for Governor's desk.

1999 VA H.J.R. 683: requests the Secretary of Technology to develop guidelines to ensure compatibility, to the extent feasible, among the telemedicine equipment purchased by state agencies involved in telemedicine.
01/21/99 Introduced.
02/07/99 Passed House. To Senate.
2/23/99 Passed Senate.

West Virginia
1999 WV H.B. 2082: requires state licensure for the practice of telemedicine. A physician is not subject to the licensure requirements in the following consultative situations: a physician located at a tertiary care or university hospital outside the state and engaged in the practice of telemedicine, who acts in a consulting capacity at the request of a treating physician engaged in the practice of medicine and surgery within the borders of the state; or a physician located outside the state who treats a patient when the patient is physically located at an out-of-state location, and who then through the practice of

telemedicine consults with a physician located within the state for the purpose of follow-up or consultation related to a treatment plan developed at the out-of-state location. Any other physician located outside the state and engaged in the practice of telemedicine who consults, or who renders a second opinion, concerning diagnosis or treatment of a patient within the state, who consults or renders the opinion (I) in an emergency or without compensation or expectation of compensation; or (II) on an irregular or infrequent basis which occurs less than once a month or less than twelve times in a calendar year is exempt from licensure.

APPENDIX D - GENERAL INFORMATION TECHNOLOGY TRENDS

Appendix D is adapted from Chapter 4 of "1998 Information Systems Spending — HealthCare" by Computer Economics (http://www.computereconomics.com/new4/benchhome/ch4.html#)

IS Budget Allocations

As Figure D-1 illustrates, hardware is consuming the largest portion of the IS budget (a composite of 43%) in most organizations. After coming in low last year at 38% of the budget, hardware spending showed a noticeable increase and widened its lead over staffing as the largest budget line item by a few percentage points. Much of the increase in hardware spending is directly attributable to the deployment of powerful new servers and sophisticated and expensive network hardware. In fact, by segregating servers and network hardware into a single category (a logical grouping considering the trend toward network-centric architectures), a clearer picture of hardware spending trends is revealed. This "single" network-centric hardware category represents one-third of all hardware spending expected in the typical IS departmental budget. In comparison, the next two largest subcategories within hardware are PCs/workstations and mainframes, each of which accounts for approximately 25% of the IS budget annually. Viewing hardware spending on a geographical basis shows only minimal variations. IS organizations from the Pacific and Mountain regions are spending slightly more on hardware than IS organizations from the Central and East regions. However, the percentage differences are moderate enough to be almost solely attributable to the difference in the total cost of procurement from the Pacific to the East regions rather than any real difference in hardware spending focus.

The second highest category in the 1998 IS budget breakdown is staffing. Although staffing dropped a few percentage points from a study performed by Computer Economic's last year (from a composite of 32% to 28%), the change does not mean that staffing is less of an expense factor. In actuality IS staffing costs continue to grow for most organizations. The decrease from last year's study can be attributed to a temporary increased focus on hardware spending and the current skills shortage rather than a decreased emphasis on staffing. Viewing staffing trends on a regional basis shows a slightly more pronounced pattern than the trends evident in the hardware budget category. Also, the pattern is completely reversed from the hardware category with the East and Central IS organizations allocating a larger portion of their budgets to staffing than the IS organizations from the Mountain and Pacific regions. The variation from East to Pacific (30% vs. 26%) is, at least partially, due to the high cost of attracting and retaining talent in the northeastern metro areas, which are subject to more climate extremes and higher cost of living indexes than most other areas. Software spending represents the third largest budget item at 12%. Once again, this figure represents a slight drop from last year's budgets (14%), which can also be traced to the increased focus on the hardware infrastructure. In spite of the moderate decrease over last year, we expect this category to show an upward trend over the next several years. On a geographical basis, software spending is moderately higher in IS organizations in the Mountain region.

This appears to correlate to the Mountain region's significantly lower dependence on outside services. These IS organizations tend to keep more IT-related services and functions in-house, which translates into a higher requirement for in-house software systems and suites.

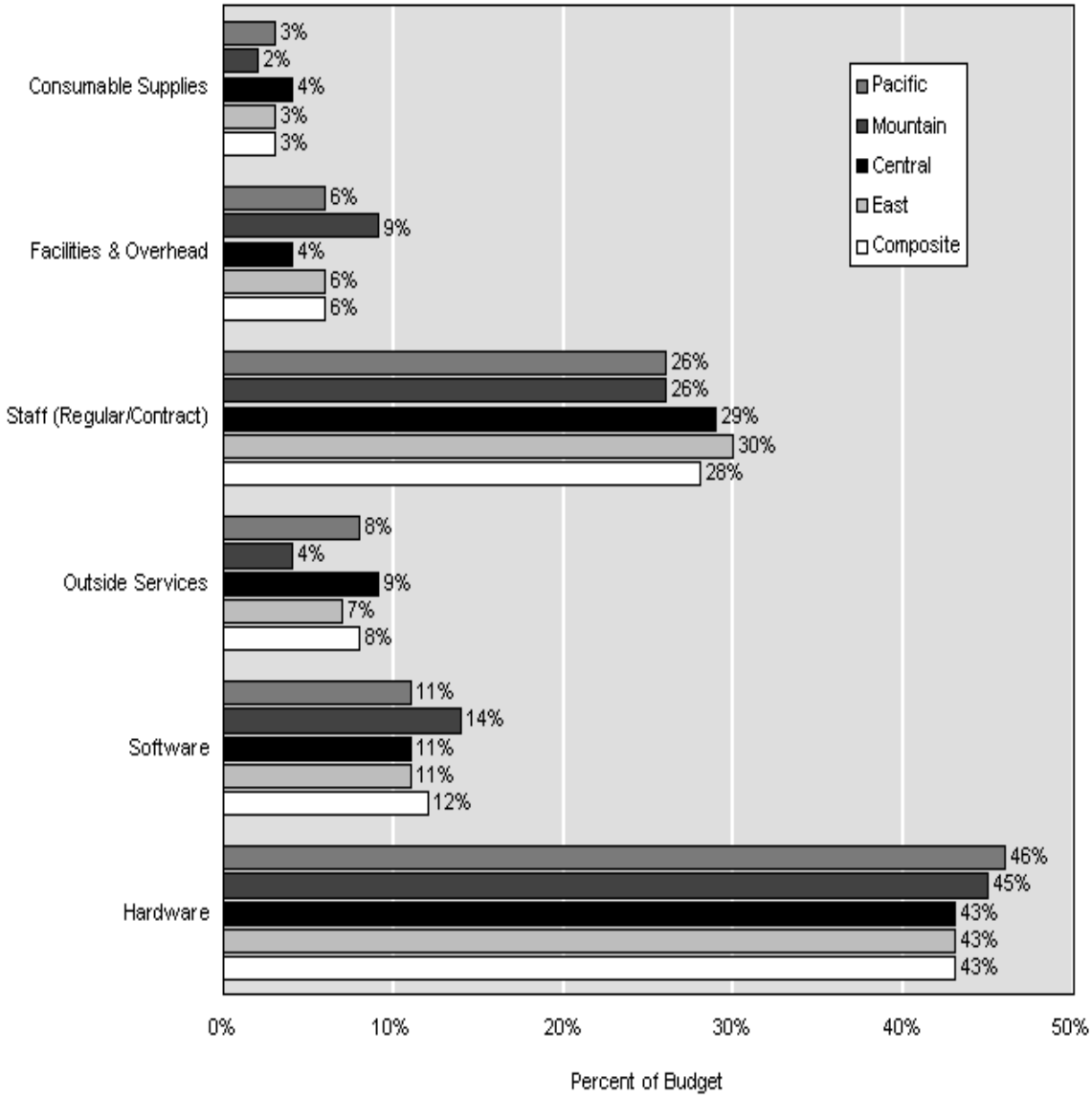

Figure D-1 IS Budget Allocations
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

INFORMATION SYSTEM TRENDS

BUSINESS REORGANIZATIONS

The business reorganization trends illustrated in Figure D-2 can have a major impact on the IS departmental structure, efficiency, and ultimate success. Total quality management

(TQM) and reengineering can be classified as techniques that are used to repair and modernize the existing infrastructure and processes. Outsourcing and downsizing techniques are often the by-products of this renovating process. When outsourcing and downsizing suggestions are correctly applied, the IS organization can better focus on its key deliverables, while shedding support functions more appropriately and efficiently handled by an outside organization. The remaining reorganizational trend, mergers and acquisitions, often represents the single most disruptive force acting on the stability of the IS department. This typically unwanted trend is becoming a reality for more and more organizations.

Of all the reorganizational trends covered in this survey, reengineering is the most ubiquitous, with over half of all organizations actively involved in reengineering efforts. Organizations in the East region reported the highest use of this management technique (57%), while organizations in the Mountain region reported the lowest (49%). As it did in last year's report, TQM ranked second with just under half (48%) of all organizations stating that this technique was being employed to help manage the IS organization. With the exception of the Mountain region at 43%, there is little geographic variation in the use of TQM. Outsourcing continues to be employed by a growing number of IS organizations in an effort to focus on core competencies, improve efficiencies, overcome staffing shortages, and/or to reduce the total cost of IT to the enterprise.

Outsourcing other IS functions, such as application maintenance or development, is maintaining only a slight edge over outsourcing IS operations (37% vs. 36%). Once again, the Mountain region shows the largest variation in terms of outsourcing IS functions outside of the data center, while the Central region is the least inclined to outsource the central IS operations function.

Mergers and acquisitions are impacting the IS department in almost one-third (32%) of the organizations in our survey. This represents a significant increase from a study done last year by Computer Economics, which showed mergers and acquisitions affecting only one-fourth of all organizations. CIOs and other senior IS managers in these organizations face a very difficult transition period as they attempt to build a homogenous infrastructure often based on incompatible systems, protocols, hardware, and corporate cultures.

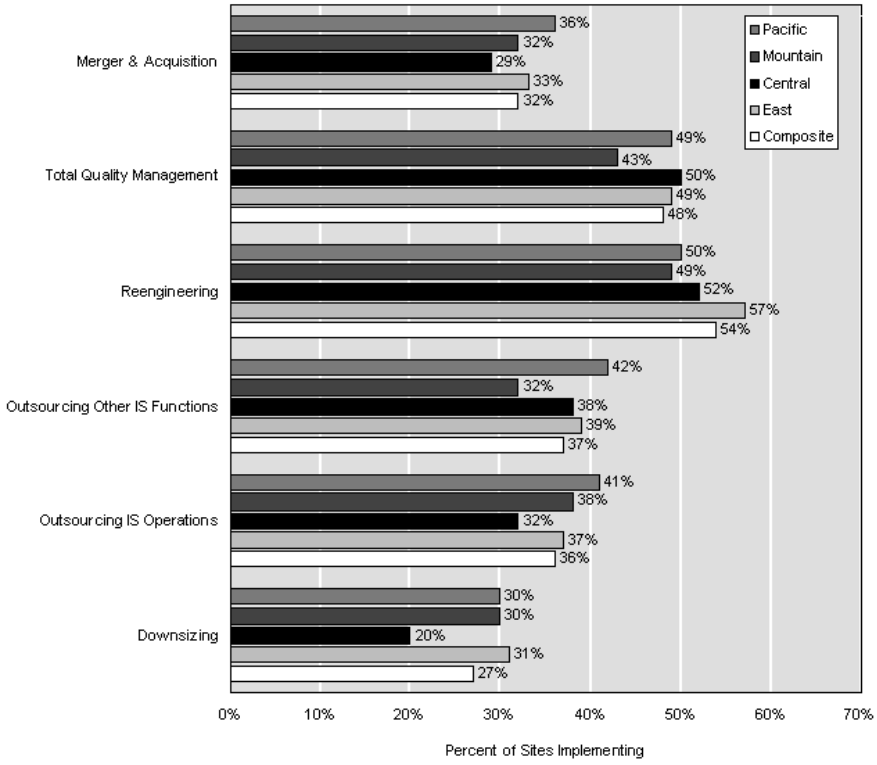

Figure D-2 Reorganization Trends
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

IS ARCHITECTURE TRENDS

The trend toward a balanced IT architectural infrastructure has grown steadily over the past few years. Figure D-3 illustrates the IS architectural environments that the organizations in the study done by Computer Economics had in 1997 and their estimates for 1998 and then Computer Economics' projections for 1999. Only 33% stated that they were managing an even mixture of centralized and decentralized systems during 1997, but that is changing dramatically. Over 40% of the IS shops are reporting a move to an even mixture this year, with Computer Economics projecting that by 1999 almost half of them will be in an even mixture environment of centralized and decentralized systems. A mostly centralized IT architectural environment is gradually losing favor. In 1997, 35% of the organizations surveyed were mostly centralized, but that figure dropped to only 33% this year. This trend is expected to continue as Computer Economics projects that only 30% of sites will remain in a mostly centralized environment next year.

For those organizations operating in the extremes (totally centralized or totally decentralized) the trend is to gradually move toward the middle. In 1997, 12% of the IS organizations were totally decentralized, while only 9% expect to remain in that environment during 1998. IS shops reporting a totally decentralized environment dropped from 5% in 1997 to 4% in 1998. By 1999, Computer Economics expects 7% will remain in a totally centralized environment, while only 3% are expecting to stay totally

decentralized. The widespread movement to consolidate servers should not be viewed as being contrary to our survey results. Server proliferation is a major problem for most large organizations, and over the past twelve months many organizations have reduced costs and significantly streamlined the management and operation of their server environments by replacing less-efficient servers with the latest generation of large, powerful servers and superservers. However, combining many smaller boxes onto a few larger more efficient boxes does not necessarily constitute a trend toward recentralization of the architectural infrastructure. These larger servers are often left in widely dispersed geographic locations, representing a physically decentralized architectural model. At the same time, IS is wielding more authority over the care and feeding of these systems in an effort to lower the spiraling costs of distributed, client/server architecture. In the end, the result is that the physical architecture is an even mixture of centralized and decentralized systems, while IS management control over these systems is generally becoming more centralized.

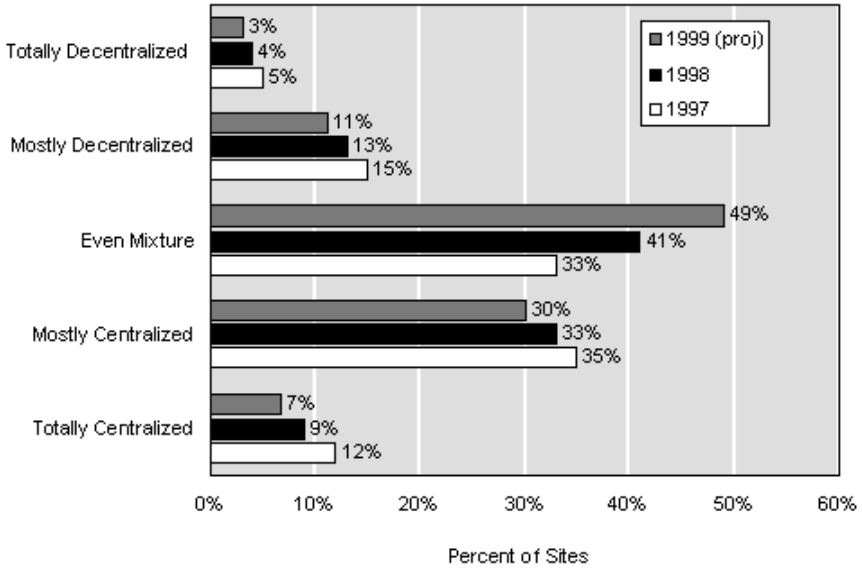

Figure D-3 IS Architectural Trends
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

COMPUTER POWER TRENDS BY PLATFORM

Every large IS organization is faced with managing a “mixed bag” of computing platforms that requires a diverse team of technical experts to design and manage it. The various platform environments of the organizations in this report must support are shown in Figure D-4. Hardware platforms supporting client/server and Web-based infrastructures continue to enjoy the highest level of deployment. The number PCs and workstations increased in almost 85% of the organizations polled, while new LAN servers were deployed by 80% of these organizations. Internet/intranet servers were added by 70% of the organizations as well. These figures compare closely with our

results from last year's report, which showed the following increases: 87% for PCs and workstations, 79% for LAN servers, and 65% for Internet and intranet server systems. Midrange horsepower decreases and increases were almost exactly the same from 1997 to 1998. In both years, 7% of the IS shops reported a decrease in midrange processing power, while increases were reported by 35% in 1997 and 36% in 1998. These powerful and versatile platforms continue to enjoy a loyal and devoted following and we expect this trend to stay relatively consistent for the next few years. Mainframe power trends also showed little variation between our 1998 and 1997 studies. A moderate increase in the percentage of organizations increasing their mainframe horsepower was evident (9% in 1997 vs. 11% in 1998), while those organizations decreasing their mainframe capacity took a slight jump from 9% in 1997 to 10% in 1998.

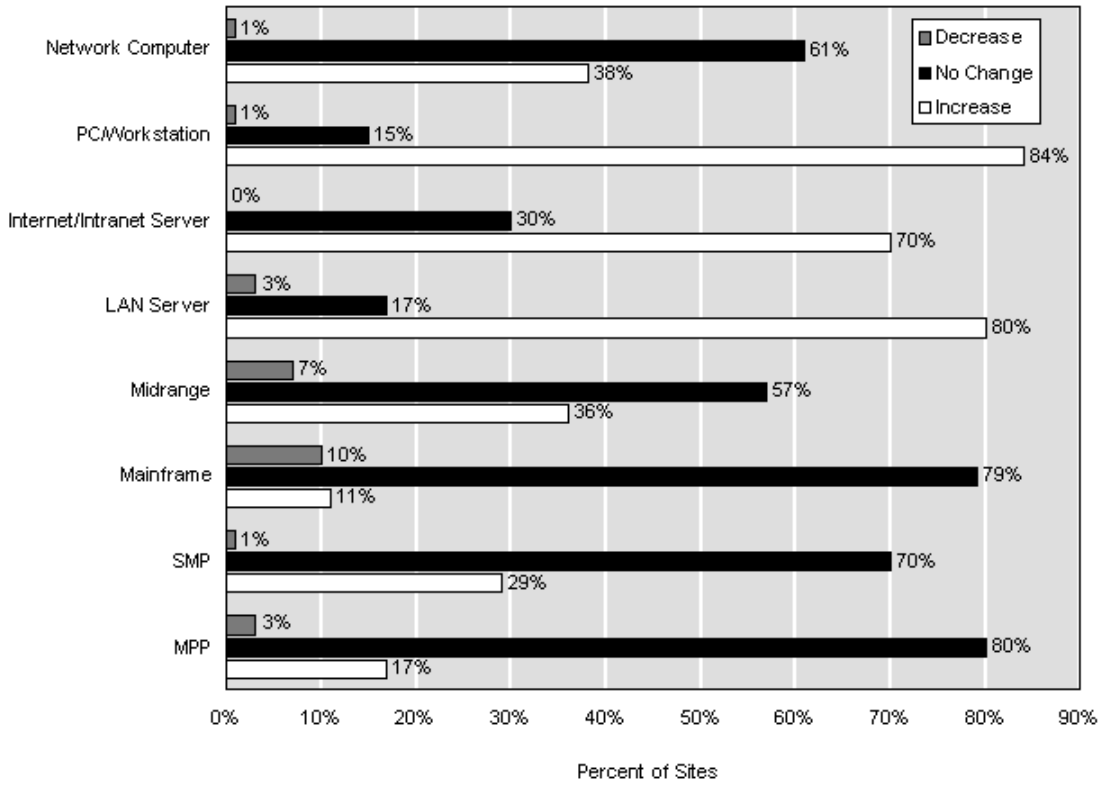

Figure D-4 Computing Power
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

The mainframe continues to redefine itself as a processing platform. CMOS mainframe engines are constantly increasing in processing power while at the same time decreasing the total cost of mainframe ownership. Having repeatedly survived its death notices over the past several years, the mainframe continues to have a very loyal following, but its future remains unclear. For the near term, however, there doesn't appear to be a viable alternative for large organizations that must support thousands of concurrent users or for organizations that cannot afford to abandon enterprise-level, mission-critical applications

systems that represent an investment of millions of dollars and were designed exclusively for the mainframe. Symmetric multiprocessor (SMP) usage increased in 29% of the organizations surveyed, while massively parallel processor (MPP) capacity was on the increase at 17% of the organizations we polled. In our 1997 report, processing capacity increases in these two categories were 25% and 9% respectively. The increasing demand for these processors is a good indicator that they are being accepted into the mainstream of IT infrastructures. Much of the increase in use is due to the availability of new applications and system tools tailored specifically for these environments. The growth in these platforms is expected to steadily increase over the next several years.

System Availability Requirements

System availability requirements are an important barometer of the enterprise's dependence on its information technology-based systems. The system availability requirements trends shown in Figure D-5, illustrates that most organizations are moving toward a higher dependence on IT systems. The most common system availability requirements (55% of the IS shops in our survey) is 24 by 7 with some scheduled downtime. Basically this means that these systems are either offering an online environment to users or are engaged in batch processing every day of the year. The typical scenario would be an online window available from 6 A.M. to as late as 8 P.M. or 9 P.M., with batch systems and backups being processed during the early hours of the morning. Some scheduled downtime may take place either on a daily, weekly, or monthly schedule. The next most common requirement is 24 by 7 high availability. IS shops facing this requirement must build redundant systems and fault tolerance to ensure that the online and batch environments are available virtually all of the time. This requirement can increase the operational costs of the data center by a very significant margin.

The remaining system availability requirements range from 7, 6, or 5 days per week and either 16 or 8 hours per day. These requirements account for 22% of the availability environments we encountered.

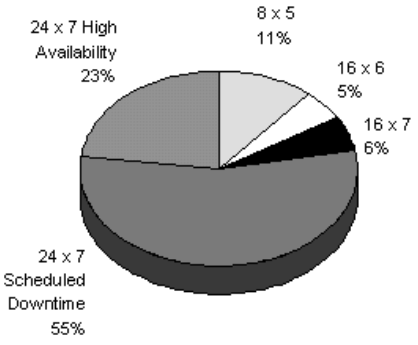

Figure D-5 Composite System Availability Requirements
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

IS BUDGET TRENDS

IS budget trends were generally favorable as shown in the Figure D-6. The majority of organizations (54%) enjoyed at least moderate increases in their overall budgets. However, the number of organizations reporting an increase dropped slightly from last year, which came in at 57%. Even though organizations were slightly less inclined to open the purse strings than they were last year, fewer companies reported a decrease this year (21%) over the decreases reported last year (27%).

When the budget changes are reviewed on a geographic basis, Central region organizations came out the best, while Pacific region organizations fared the worst. Sixty-one percent of the Central region IS shops realized an increase in their budgets and only 46% of the Pacific region organizations saw their budgets go up. The Central region also claimed to have the lowest number of organizations, which were forced into a budget cut. Both the Pacific and Mountain region organizations saw budgets decrease at the most sites.

How much of the total IT spending is included in the IS budget? Obviously, much of the technology spending going on in the typical organization is outside of the budget responsibility of the central IS department. Regardless of where the monies are tracked and managed, however, many wise organizations have brought IS back into the decision process and are forcing end-user departments to channel their technology spending through IS to ensure that systems are in compliance with the corporate IT architectural model.

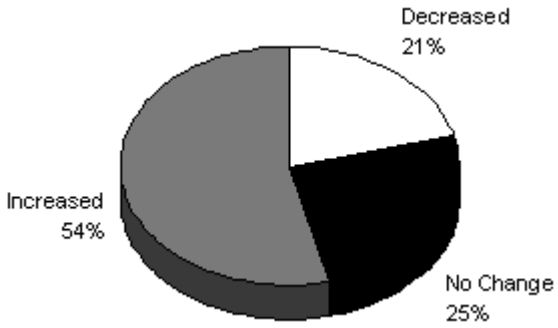

Figure D-6 IS Budget Trends
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

Figures D-7 through D-11 illustrate how much of corporate IT spending is the budget responsibility of the IS central department. Last year, it was found that 8% of the organizations polled were not tracking this important statistic. It is alarming to see this figure increase to 11% this year. Over 75% of all corporate IT spending is included in the central IS budgets of 33% of the organizations we surveyed. Another 33% reported that less than 25% of all IT spending is included in their central IS department budgets. Tallied as a single category, 42% of the organizations reported that less than 50% of all IT spending is tracked in their IS budgets. The Central region of the U.S. ranked first in terms of IS organizations managing the lion's share of IT spending. Thirty-eight percent

of the organizations in this region are budgeting over 75% of all corporate IT spending. Pacific region organizations ranked the lowest with only 22% of those organizations accounting for over 75% of all budgeted information technology spending. Organizations in the Mountain region are less likely to have a handle on these statistics than any other region as 16% of these organizations reported they are not tracking their overall IT spending in a manner that allows them to identify this trend.

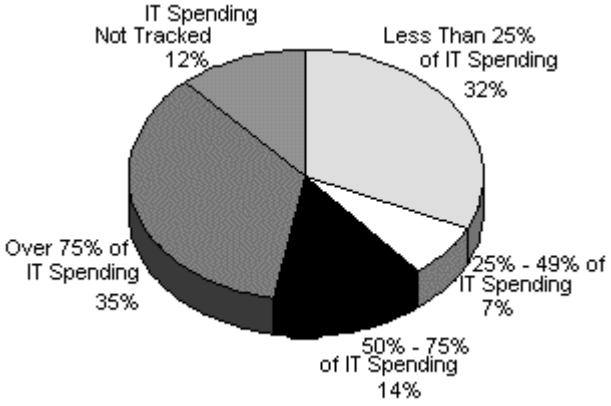

Figure D-7 U.S. Eastern Region

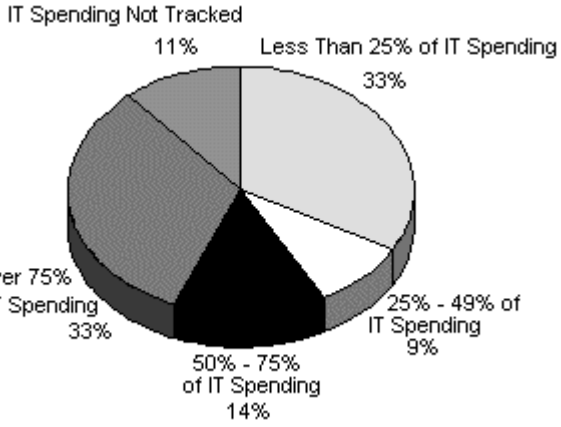

Figure D-8 Composite of Regions

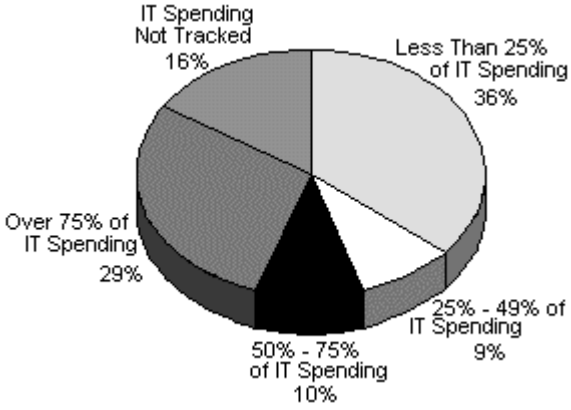

Figure D-9 U.S. Mountain Regions

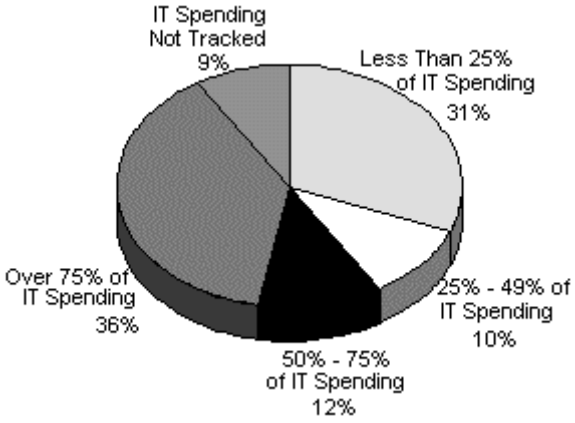

Figure D-10 U.S. Central Region

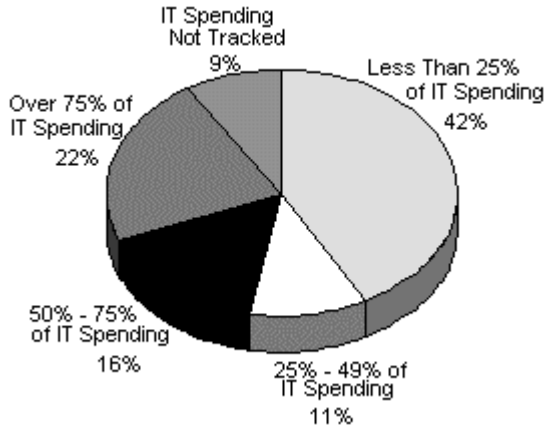

Figure D-11 U.S. Pacific Region
(Source for D7-D11: http://www.computereconomics.com/new4/benchhome/index.html)

IS BUDGETS RELATED TO REVENUE

As just identified, the IS budget may not signify all or even most of the IT spending that occurs within the corporation. This should be remembered when examining the IS budget's relationship to corporate revenues. The median, composite figure in this category for 1998 is 1.1%, as shown in Figure D-12. This represents a noticeable drop from last year. The decrease can be attributed to a combination of factors including the variation in companies in the report on a year-to-year basis, budget tightening, revenue increases outpacing budget increases, and variations in reporting methodology. When individual sectors are examined, a great deal of variation exists in this area. As one would expect, banking and financial organizations with their heavy reliance on technology reported a median IS budget to revenue ratio of 7.5%, while distribution organizations, which are much less technology-oriented, reported a very low 0.5%. At the high end, some companies are enjoying substantial IS budget-to-revenue ratios. Companies at the

75th percentile are reporting IS budget as a percentage of revenues at 3%. At the other extreme, some IS shops are having a difficult go. Companies at the 25th percentile are reporting IS budget-to-revenue ratios of only 0.3%.

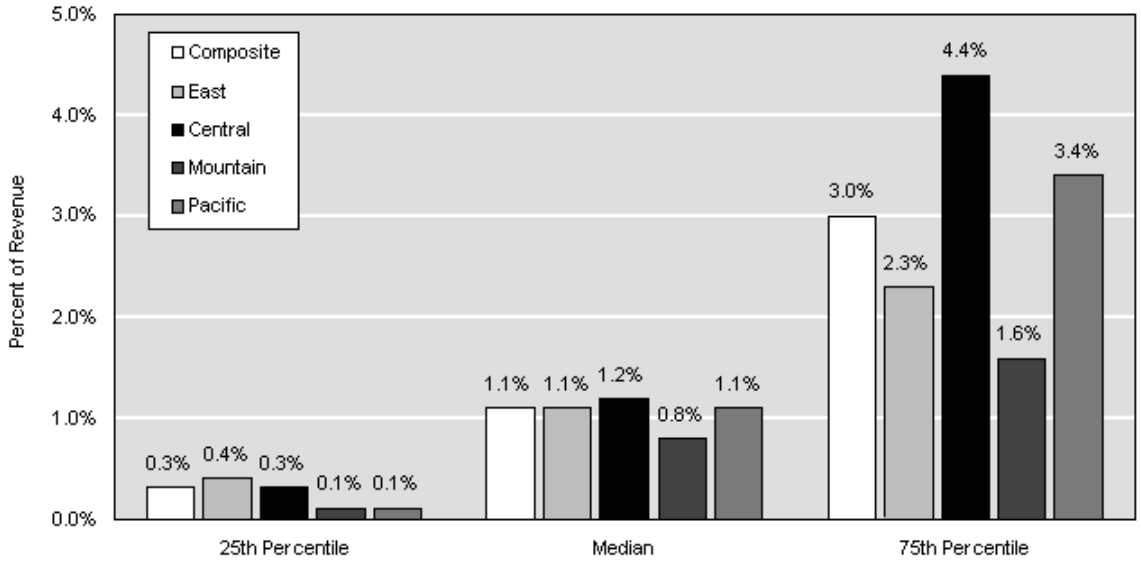

Figure D-12 IS Budget as a Percent of Revenue by Region
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

TECHNOLOGY AREA SPENDING

Figure D-13 provides a detailed breakdown by line item regarding how the IS budget is doled out. When observed in this manner, personnel becomes the single highest line item at 25%. However, when grouped together, all of the various hardware categories represent a larger portion of the budget.. The personnel cost burden on the IS budget shows a considerable amount of variation from region to region. It comes as no surprise the highest personnel budgets are found in the East region. This is a direct result of the high cost of living in the northeastern metro areas, combined with the need to offer higher cash incentives to keep people on board in that area. It may be somewhat surprising to note that the lowest personnel budgets were found in the Pacific region. When salary data is reviewed from the many regional surveys that are conducted each year, the explanation for the lower Pacific budgets becomes clearer. Even with its relatively high cost of living, Pacific metro areas often show lower-than-expected total compensation packages than other regional metro areas. For instance programmers in Los Angeles typically draw lower salaries than programmers in Chicago.

The highest single hardware line item is workstations and PCs at 11% of the total budget. This is followed closely by mainframes at 10% of the total budget. Midrange systems come in third, followed by LAN servers and superservers, and data network hardware. In examining the geographic spending habits on hardware, the Pacific and Mountain regions show marked variations from the rest of the U.S. The Mountain region devotes a much higher percentage of their IS budget dollar to mainframes systems, while the Pacific

region devotes a larger percentage to midrange systems than any other region. When these two exceptions are removed from view, there is little variation in terms of geographic hardware spending patterns. Application software is tied with LAN servers and superservers and network hardware with each of these line items consuming 7% of the IS budget. However, when OS and utility software are combined with application software, this category jumps to third on the list of IS budget line items.

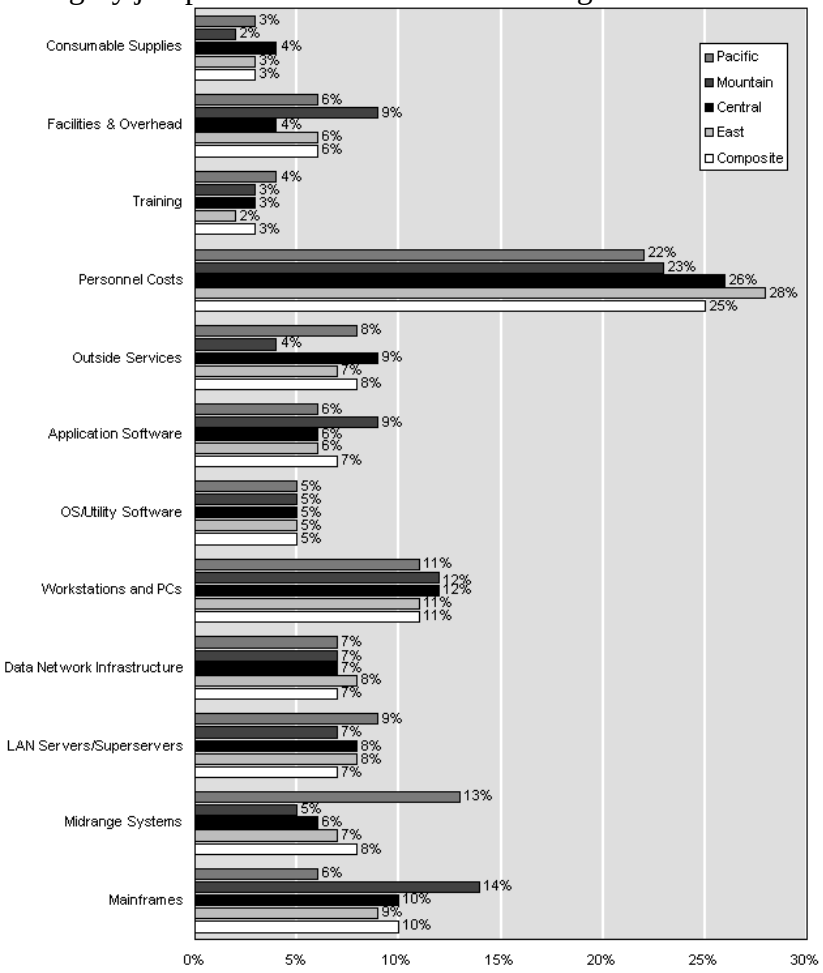

Figure D-13 Breakdown of Technology Spending
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

The amount of money earmarked for specific technology areas, as illustrated in Figure D-14, helps identify what technologies are important within most organizations. As it did last year, new application development received the highest portion of the monies being allocated for spending on IS systems. Application maintenance came in second, as was the case in our spending survey last year. However, this year Y2K compliance jumped significantly. In 1997, Y2K compliance received only a third of the monies that application maintenance received and less than a fourth of the monies targeted to new development. This year, Y2K almost pulled even with maintenance spending and jumped to approximately one-half of new application spending. This year (1998) should represent the peak spending year in terms of Y2K efforts. However, 1999 will not see any

noticeable downturn and could produce a slight increase in Y2K spending depending on how successful corporations are in dealing with Y2K in 1998. The Y2K spending downturn will become noticeable in 2000, but spending in this area will not completely go away until 2002 or beyond. This spending trend is one that literally every company maintaining an information system will be required to deal with. When the clock strikes midnight on December 31, 1999, those organizations not adequately prepared are in real danger of losing everything. However, the Y2K problem is not isolated to that single moment in time. Many companies have been dealing with the ramifications of their two-digit date codes for the past several years.

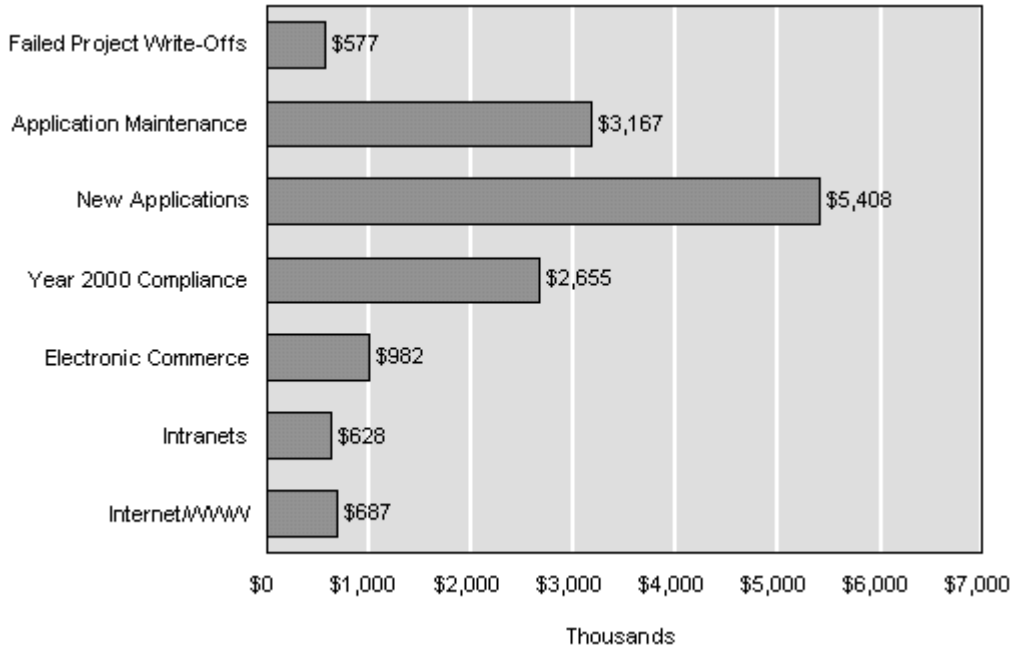

Figure D-14 Importance of Technology Projects
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

E-commerce, intranet, and Internet initiatives are definitely on the increase. All three of these categories showed significant spending growth over last year. E-commerce spending grew by a factor of four, intranet and Internet and WWW spending increased by a factor of three. As Figure D-15 illustrates, Web sites have become an essential part of most organizations. This year, 87% of the organizations polled said that they now have an active Web site in place. Unfortunately, failed project write-offs also grew this year by a considerable amount. It is obvious that much still needs to be done in guaranteeing that development projects are properly chosen, managed, supported, and executed.

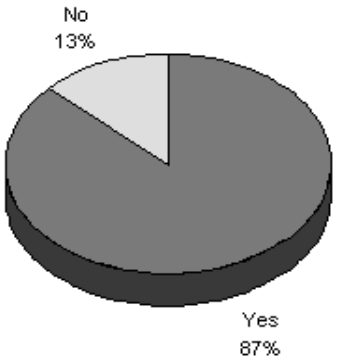

Figure D-15 1998 IS Web Site Expenditures
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

CONCURRENT USERS SUPPORTED

The number of concurrent users that information systems must support continues to show an upward trend. The average number of concurrent users supported by the IS department this year is 1,234, as shown in Figure D-16. The IS managers interviewed, pointed out that this number is expected to grow considerably each year for the foreseeable future. At the current rate of growth, this figure will exceed 1,500 concurrent users sometime in the year 2000. As this concurrent user base continues to grow, servers and networks will need to become more powerful and flexible to accommodate this concurrent load.

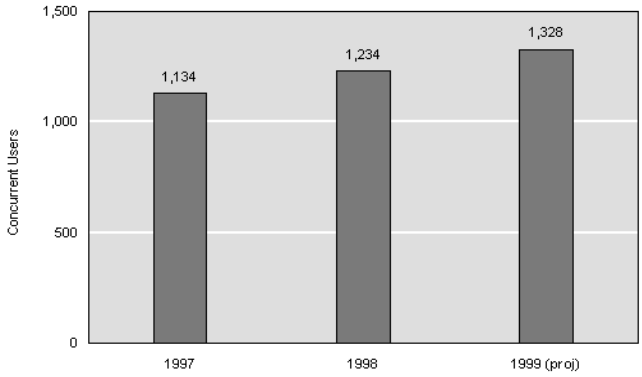

Figure D-16 Concurrent Users Requiring IS Support
(Source: http://www.computereconomics.com/new4/benchhome/index.html)

XML – A STANDARD FOR ELECTRONIC COMMERCE

Electronic Data Interchange, or EDI, has been the established means of linking business to business computer communications. As Internet technologies become more established, newer protocols have been created to facilitate these same inter-organizational computer connections. One such solution is known as E**x**tensible Markup Language (XML).

Because XML is an open standard, meaning the language definitions are non-proprietary with anyone welcome to suggest improvements, it offers great flexibility. For example, if a manufacturer needs a specific part from a trading partner by a certain date and the delivery date is not met, the company can use XML to add an information field to its electronic purchase order to reflect its use of an alternate supplier. Such an option is not available with EDI protocols. A browser capable of reading XML code can determine whether an extra data field has been added to a document, then if it has, interpret and store it correctly in the manufacturer's database.

To make business-to-business solutions easier to implement, several consortium, standards bodies, organizations, and steering committees are focusing on providing information to companies that use XMLS. One such group, headed by Microsoft, has created the "BizTalk Framework" (http://www.biztalk.org/).

By using XML, BizTalk technology allows those implementing XML solutions to be more innovative then they could be if they were only using EDI. Essentially, the BizTalk Framework provides a method for migrating existing EDI standards to XML. One key element for this framework is its focus on a means to interchange data between the older and newer standard. This approach is more practical than some other frameworks which attempt to make organizational infrastructures compatible. The BizTalk committee works with software vendors, industry standards groups, developers, and consumers to create the XML standards that allow for the interchange of information between applications.

Currently, BizTalk's members include such organizations as the Data Interchange Standards Association (DISA) (http://www.disa.org/), which was a founding committee for the development of the EDI standard; the Open Applications Group (OAG) (http://www.openapplications.org/), which was founded to aid in the interoperability of enterprise software; and many leading firms such as Microsoft, IBM, Boeing, Merrill Lynch, and United Parcel Service.

APPENDIX E - SALES TAXES FOR OUT-OF-STATE INTERNET MERCHANTS

MEMO

TO: Jim Flowers
FROM: Richard Keck
DATE: September 27, 1999
RE: Voluntary Sales/Use Tax System for Remote Sellers

At your request, I participated in last week's meeting of state tax representatives sponsored by the National Governors' Association. This memorandum summarizes the proceedings and suggests next steps for Georgia. As you know, a follow-up meeting has been scheduled in Washington, DC, on October 13-14. Decisions must be made as soon as possible if Georgia is going to participate in a meaningful way.

Background

The Internet Tax Freedom Act placed a three-year moratorium on new or discriminatory taxes on Internet access and electronic commerce beginning October 1, 1998. It does not prohibit states from enforcing and collecting existing sales and use taxes applicable to remote sales. However, the U.S. Supreme Court's 1992 decision in *Quill Corporation v. North Dakota* restricts a state or local authority from imposing an obligation to collect sales or use taxes on remote sellers with no physical presence in the jurisdiction.

Currently, 46 states impose sales or use taxes. In many states, local governments also impose sales or use taxes. Under the *Quill* decision, a seller may only be required to collect and remit sales or use taxes from buyers in jurisdictions where the seller has a physical nexus. A seller with nexus must add sales tax to every sale, collect it from the buyer, and remit it to the tax authority. Many jurisdictions, including Georgia, also impose a use tax on an in-state buyer whose out-of-state seller was not required to collect sales tax.

The recent growth of Internet sales to consumers is alarming state and local revenue authorities that they may soon face significant erosion of their sales and use tax revenues. Relying on *Quill*, out-of-state Internet merchants frequently do not collect sales taxes. Typically unaware of their obligation to pay use taxes in such situations, consumers believe the absence of sales tax means their Internet purchases are tax free. This misperception is exacerbated by the inability of state revenue authorities to enforce consumer use taxes. While compliance with use taxes is fairly good in the business-to-business context, where audits are worthwhile, it is virtually nil in the business-to-consumer context, where audits are not cost-effective.

The Internet Tax Freedom Act established the Advisory Commission on Electronic Commerce to study solutions to Internet tax issues, including the anticipated decline in

sales and use tax revenues. Composed of representatives from federal, state, and local government and industry and consumer advocates, the Advisory Commission has met only twice and has scheduled a third meeting for mid-December.

In addition, several bills have recently been introduced in Congress to address the state sales and use tax issue. These proposals assume that the states will be unable to solve the problem themselves and anticipate that federal intervention will be required. None of the current proposals would permit Georgia to apply its existing system of state and local sales and use taxes to out-of-state Internet merchants.

The Internet Tax Freedom Act also directed the Advisory Commission to ensure that its work does not undermine the efforts of the National Tax Association Communications and Electronic Commerce Tax Project. At the end of August, that project issued a draft report that suggested one possible solution to the sales and use tax issue is for the states to act cooperatively to develop a real-time approach to sales and use taxes.

In anticipation of this recommendation in the National Tax Association's report, when the governors met in St. Louis this summer, they agreed to schedule a later meeting here in Atlanta to discuss the option of developing state legislation to provide incentives for remote sellers voluntarily to collect and remit state and local sales and use taxes. That meeting took place last Wednesday and Thursday, September 22 and 23. Over 30 states participated.

Proposed Action Plan

Following the summer meeting, but prior to last week's Atlanta meeting, the National Governors' Association staff and representatives of three northwestern states (Idaho, Utah, and Washington) had begun work on a proposal. The Atlanta meeting included presentations about the concept and a group discussion of many nuts and bolts issues.

On the first day of the Atlanta meeting, Governor Leavitt of Utah urged all states present to join in the effort with a sense of urgency. He suggested that this initiative was the last opportunity for the states to avert federal preemption of sales and use taxes on remote sales.

The concept behind this initiative is simple. The initiative intends to head off the prospect of federal preemptive legislation that would deprive state and local governments of some or all of their current sovereign authority to establish and administer their own sales and use taxes. This would be accomplished through a cooperative effort of all states that impose sales and use taxes.

The central idea underlying the initiative, which the NGA has dubbed the "Voluntary Zero Burden Collection System," is that states and localities would assume, for remote sales, the cost of administering the sales and use tax to encourage remote sellers to volunteer for sales and use tax collection. According to the working draft distributed at

last week's meeting, the long-term policy goal of the Zero Burden Collection System is to modernize the existing sales and use tax so that comparable purchases are treated equally, interstate commerce is not burdened with collection costs, the sovereignty of the states is preserved, and the privacy of buyers is protected.

Details of the Proposed Zero Burden Collection System

Though the purpose of the upcoming meeting in Washington is to work through many of the detail and issues of the proposed Zero Burden Collection System, the working draft distributed at last week's meeting provides a relatively thorough introduction to the proposed system. Accordingly, I have summarized it below.

States and localities would implement the system through a combination of the following:

- Creating a technology-oriented business model in which primary responsibility for calculating, collecting, reporting, and paying the tax is lodged with "certified sales tax service providers" instead of sellers.

- Simplifying sales and use tax laws and administrative practices in key areas necessary to enable the technology and new business model to operate properly.

- Assuming the costs of the system by reimbursing (1) certified sales tax providers for their costs of providing no-cost software and operating services to sellers and (2) sellers for any residual costs not covered by the no-cost services they receive from service providers.

A group of states would develop this system and offer it initially to remote sellers in two categories:

- Sellers making sales over the Internet regardless of their nexus status in a state.

- Catalog sellers without nexus with a state.

As experience is gained and technology is enhanced, states would at their option offer the system to additional sellers — including those already collecting the tax — as those sellers became technically able to participate. Further, the initial states would invite additional states to participate, thus extending the geographic scope of the system. If successful, this system could become the basis for states to move from existing sales tax systems to a modern, universal system that works smoothly with the flow of commerce.

Within the technology-oriented business model, sales and use tax laws would be embedded in the software operated by certified sales tax providers and, in part, by sellers. The model would operate through links from the service providers to sellers, payment systems, and state tax agencies.

The following are some key features of phase one of the proposed system:

- Rate simplification
- Streamlined, convenient registration
- Electronic tax system for electronic commerce and other remote businesses with comparable systems
- Streamlined exemption administration
- Protection of purchaser privacy
- Additional uniform laws and practices
- Cost reimbursement for sellers
- Early participation incentives, such as relief from back sales tax liability or financial bonuses for early sign-up

The following is a tentative timetable for phase one of the system as proposed at the Atlanta meeting last week:

- In late 1999, Governors and tax agencies of participating states would sign and announce an "Interstate Sales Tax Protocol to Develop a 21st Century Sales Tax Administrative System." The protocol would commit those states to steps implementing the Voluntary Zero Burden Collection System.
- Tax agencies, assisted by Taxnet Governmental Communications Corporation, would issue a request for information ("RFI") for electronic tax collection systems sometime this Fall.
- In cooperation with the states issuing the RFI for the electronic tax collection system, the Multistate Tax Commission would issue a RFI for a joint, multistate registration system.
- Participating tax agencies would draft legislation establishing privacy protections, tax simplification, cost reimbursement, and early participation incentives, and authorizing expenditures for operating the automated systems out of revenues collected.
- Funds for planning necessary adjustments to agency automated systems would be included in budgets in late 1999.

- Based on responses to the two RFIs, tax agencies would develop requests for proposals ("RFPs") from potential certified sales tax service providers by March 15, 2000. The Multistate Tax Commission would follow a similar timetable for a joint, multistate registration system.

- RFPs would be issued by April 1, 2000, and responses would be requested by July 15, 2000.

- Systems would be certified and offered for voluntary compliance and registration procedures would be in place as early as January 1, 2001, and no later than July 1, 2001.

The initial system would be refined in three dimensions. First, the participating states would further streamline and reduce the costs of the system through working on uniform definitions for defining the tax base and streamlining the review and auditing procedures to verify the accurate operation of the system. Each state would continue to determine what is taxable or exempt in the state, but in accordance with a common system defining and classifying products and services. Coordinated review and auditing systems would be developed to ensure that the technology used to operated the system did so accurately and was being used in a proper manner. Second, the initial participating states would expand the geographic scope of the system by inviting additional states to join. Third, the economic scope of the system would be expanded by making the system's features more attractive and adaptable to a wider group of businesses selling into the states. If the system proves successful, then it could serve as the basis for states to move to a universal system of sales taxation that progressively incorporates uniform features and works smoothly with the flow of commerce.

As technology improves, the states would also reduce the costs of the system by periodically re-certifying "sales tax service providers" and updating the terms of their cost reimbursement. In other words, certifications of these providers would be set for time periods to be periodically reviewed.

Next Steps for Georgia

At the Atlanta meeting, approximately 25 states, including Georgia, volunteered to attend a second working meeting in Washington, DC, on October 13 and 14. A number of these states, again including Georgia, were not represented in Atlanta by someone with the authority to commit their state to go forward with implementation of the initiative. Such states committed to participate in the next meeting, but could make no further commitments. The NGA staff implored the representatives of such states to work with their governors to get a firmer commitment as soon as possible. The view of NGA, which was reinforced by Governor Leavitt and others, is that this effort will whither on the vine and have little or no impact on the deliberations of the Advisory Commission or the Congress unless a critical mass of states firmly commit in very short order.

I believe it is important for you to brief Governor Barnes and get some feel for where Georgia will go with this initiative as soon as possible, and in any case before our delegation goes to Washington. Phil Embry has informed me that he intends to attend the DC meeting on behalf of the Department of Revenue and you have asked me to attend on your behalf.

In addition to participating in this meeting and in the NGA-led work teams, I suggest we take advantage of the existing working group on Internet taxes of the Georgia Electronic Commerce Association. This group already includes the Department of Revenue, the Georgia Municipal Association, the Association of County Commissioners of Georgia, and representatives of a number of relevant private sector organizations in addition to myself, including several Big-Five accounting firms, First Data, Equifax, and Third Millennium Communications. Through this group, we could consider the issues raised by the initiative from a variety of Georgia perspectives and therefore better represent Georgia's interests at the NGA meeting in Washington and throughout the entire process.

If Georgia decides to participate in this initiative, then we also need to begin considering how to gently improve public awareness to avert confusion and misinformation about this sensitive subject. One possibility might be for the Georgia Electronic Commerce Association to conduct a seminar or workshop for the public. Carefully controlled communications with the press from the Governor's office will also be important.

Pros and Cons

In considering whether and how Georgia will participate in this initiative, you may want to consider the following pros and cons, and how I believe they come out on balance.

Pros:

- protect Georgia's existing tax base against erosion
- defend state sovereignty
- protect the right of Georgians to determine the rate at which they tax themselves
- protect Georgia's brick-and-mortar sellers from the currently unfair practice of having to withhold sales taxes while remote Internet sellers do not
- avoid the prospect of revenue agents imposing collection activities to collect use taxes from buyers
- even if the initiative fails, the process itself should achieve some progress toward simplification and harmonization and should have a positive impact on any preemptive federal legislation that is ultimately crafted

Cons:

The potential negatives of the initiative derive more from public perception than reality. However, adverse public opinion is itself a reality that must be contained for the initiative to succeed.

- The initiative might be **seen as imposing new taxes** — on the Internet. Even though Georgia residents are already liable for a Georgia use tax on any out-of-state purchases that do not include a Georgia sales tax, the public is generally unaware of this fact and does not pay use taxes. Instead, many consumers believe Internet sales are entirely tax free. Hence, the state's enlisting of merchants to collect the Georgia use tax might be seen as an attempt to impose a new tax. The National Governors' Association staff and other participating states are aware of this issue, and the effort to avert it will be a major element of the upcoming work effort.

- The initiative may be **seen as deterring companies from locating their business in Georgia**. However, this is again a misconception. Any merchant with a physical presence in Georgia is already required to collect sales tax on sales made to Georgia residents. As an anecdote, this situation did not deter Amazon.com from its recent decision to locate a distribution facility in Georgia.

- Our current system of sales and use taxes is **unduly burdensome on sellers**. This is the criticism that the voluntary system seeks to correct.

On balance:

Though supporting this initiative is not risk free, the risk from doing nothing is probably greater. Georgia currently depends heavily on state and local sales tax revenues. The wide variation among voter approved county sales tax rates also popular support for this pure form of democracy. Both practices will be threatened if the federal government enacts preempting national sales tax legislation. Participating in the voluntary initiative offers a reasonable prospect of thwarting such legislation. Through proper handling, the potential pitfalls can be managed and shown to be misconceptions.