

**CYBERSPACE: ITS IMPACT ON THE
PUBLIC RELATIONS FUNCTION
OF STATE DEPARTMENTS
OF TRANSPORTATION**

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The nature of services provided by
and overall efforts are consistent

CHAPTER I

INTRODUCTION

“Men are suddenly nomadic gatherers of knowledge, nomadic as never before, informed as never before, free from fragmentary specialism as never before — but also involved in the total social process as never before; since with electricity we extend our central nervous system globally, instantly interrelating every human experience.”

— Marshall McLuhan, *Understanding Media*, 1964

General

American technology has moved forward at an increasing pace in the past 25 years. A proliferation of cable television channels, mass production of videotape technology for home use, the appearance of cellular telephones and facsimile machines in business and personal settings, the implementation of fiber optics as a communications tool, and the development of the personal computer have combined to make a reality of Marshall McLuhan's 1964 prediction of an "information explosion."¹ The resulting "information society" is beginning to place great emphasis on, and deal in, an intangible commodity called knowledge harvested from an invisible field called "cyberspace."

Surviving in this new society is relatively easy for those who have the resources to take advantage of these technological miracles. Millions of Americans have moved into cyberspace and it appears they will continue to do so in coming years. As more Americans venture into cyberspace, opportunities for state government to provide information services have become more and more commonplace.

Many states have already taken the initiative to develop information locations for users of the World Wide Web. This thesis will look at the extent one agency common to all 50

state governments — transportation — uses cyberspace, the kinds of services provided by each state department of transportation and determine if their overall efforts are consistent with theories regarding public relations communication and the diffusion of innovations. The primary focus of this study is to determine what reasons (such as available technology, overall cost, competition with other states, public input and public relations processes) are influencing the entry of government agencies into cyberspace. It will also focus on how transportation departments are using the multimedia and interactive aspects of the World Wide Web, and to a lesser extent, the roles synchronicity and hypertextuality may play in making Internet use easier for citizens. This thesis will attempt to establish if cyberspace has a useful role in the operation of a government office, especially one at the state level.

Specifically, it will seek to determine the level state transportation departments are using the Internet to inform the public of agency policies and activities and determine if feedback from constituents was sought in the development of a website and its content. This study will also attempt to determine what offices within state transportation departments are responsible for development, implementing and monitoring the information placed on web pages (if they are one of the approximately 30 states who have sites).

Background

General

Cyberspace is divided along two diverse networks — one dealing with data processing and another used for communication. It is the latter, embodied by the Internet, which is the focus of this research.²

The Internet is a worldwide network of computers and subsidiary computer networks shared by universities and colleges, businesses, military and government departments, commercial providers, other institutions and private individuals. It is the world's largest computer network — a distinction stemming from the fact it is actually a "network of networks."³ It was developed by the U.S. Government in 1969 as an experiment to test how essential computer networks might survive nuclear attack, especially since a great deal of the federal government's military strategies and information sharing was being done through computer.

But the actual beginnings of the cyberspace infrastructure date back to the development of the electric telegraph in the 1830s.⁴ The development of a code of dots and dashes enabled individuals to send information across long distances instantly. This ability was enhanced by the invention of the telephone and radio in the early 1900s and took yet another massive step forward in the 1960s with the ability to connect computers to telephone lines. Department of Defense scientists first utilized this capability with its Advanced Research Projects Agency Network (ARPANET), to access data from remote locations.⁵ In 1990, ARPANET was phased out in favor of the National Science Foundation Internet (NSFNET). NSFNET was begun in 1986, connecting six supercomputers across the United States and providing information resources for roughly 100 academic research sites.⁶ Within five years the number of individual sites connected to this network had expanded to more than 3000.

While the Internet served sufficiently as a defense and data transfer tool, the government did not anticipate its use as a social communication tool. For two decades cyberspace operated relatively unknown to the public and undisturbed by it. The development of the home computer in the 1980s was the first of a chain of events bringing about today's increasing public use of the Internet.

First a novelty and then an expensive toy, the personal computer revolutionized both home and business life, making it possible for a few individuals to process more information at a faster pace. The development of telephone modems and fiber optics now make it possible for individuals to perform job tasks at home, communicate with friends and business associates worldwide, and access the vast information sources existing in cyberspace.⁷ The ability for the average user to access the Internet via modem prompted an explosion in the number of computer hosts linked to cyberspace — from approximately 1,000 in 1984 to more than 2 million in 1994.⁸

During this period the Internet had become a huge repository of data, most of it of interest only to statisticians, technologists and academia. To obtain this data, a user had to have access to several terminals connected to separate computers, each using a different language. In 1992 Swiss physicists developed an automated research system called the World Wide Web designed to standardize a user's ability to access information.⁹ It also

had the ability to link key words in computer documents to related documents at other Internet locations — even those thousands of miles away. This linking of “hypertext” into a huge web made research into subjects far more easier than had previously been possible. The World Wide Web had an added feature, as well. It could combine text, graphics and photos, moving video and sound into one multi-media document. All of this combined to make data on the Internet freely available to users linked to cyberspace.¹⁰

Even with these improvements, it was not until the staff of the University of Illinois created software for a web “browser” — or search tool — called “Mosaic” in 1993 that the Internet’s usefulness to the average consumer was created.¹¹ With this software, information on the Internet could now be downloaded to an individual’s computer. A year later Mark Andreessen, the creator of Mosaic, joined with James Clark to develop a browser called “Netscape” that quickly became the most popular software for use by cyberspace travelers.¹²

Ultimately, the commercialization of cyberspace gave it the necessary appeal to attract the average consumer. Although commercialization had long been frowned upon by the federal government and its regular users, once the business world was allowed entry into cyberspace, it was now possible for the government to reduce the amount of tax dollars it was allocating for support of the Internet. The World Wide Web’s ability to produce visually appealing websites convinced commercial entities cyberspace could be an entirely new consumer marketplace.

Various studies estimate 35 to 36 million households have home computers.¹³ As of May 1996, 5.8 million Americans have direct access to the Internet and 3.9 million have online service subscriptions. A study conducted late in 1995 indicates 17 million Americans had accessed the World Wide Web for information at least one time.¹⁴ Forecasts say that by the end of 1996, 15.7 million Americans will be connected to cyberspace.¹⁵ While this figure represents less than 10 percent of the total population of the United States, it serves as an indicator of the rapid growth of cyberspace users in an extremely short period of time. Recent surveys indicate more than 75 percent of U.S. Internet users are male, approximately two-thirds are age 35 or younger, and more than 60 percent are either college students or have received an undergraduate degree.¹⁶ It is

anticipated, however, that the male/female ratio and the average age of users will change drastically as cyberspace access becomes more commonplace.

The opportunity for state government to provide information via cyberspace was recognized by the nation's governors, who in 1994 developed a strategy for ensuring states played a role in the development of a national telecommunications system. Of the seven principles adopted as part of state involvement in the National Information Infrastructure (NII), four have a direct bearing on the topic of this thesis:

- 1) The NII is more than electronics and wires — it is a combination of physical, institutional and human infrastructure that will link homes, hospitals, schools, governments and businesses;
- 2) The foundation for the NII already exists;
- 3) The growth and diversification of the NII and its applications should respond to the identified needs and interest of current and potential users;
- 4) The benefits of the NII are not static, but change continuously with the introduction of new technologies and applications.¹⁷

In recognizing the importance of fully implementing the NII, the National Governors' Association also recognized technical considerations may not be the greatest barrier to implementation — it may be the willingness of government and industry to address existing institutional, economic, social and political barriers.¹⁸ It appears the federal government is willing to address those issues. President Bill Clinton asked major telecommunications providers in 1994 to wire schools, libraries, hospitals and clinics for Internet access by the turn of the century.¹⁹ A year later Speaker of the House Newt Gingrich proposed giving tax credits to those Americans who purchased home computers, providing a means for them to access cyberspace. This would be the beginning of a "Knowledge Age," he said, allowing Americans to take a more interactive role in guiding the country.²⁰ While both the Clinton and Gingrich plans have flaws, they show that government realizes the importance of access to cyberspace.

Anytime increased utilization of technology occurs, especially in the field of communication, it has the potential to alter society's habits, traditions and values.²¹ In the case of the information revolution, unless some form of access is provided for every American, regardless of socioeconomic status, what exists now is a recipe for widening the

gap between those who have access to cyberspace and those who have none.²²

The division between the "haves" and "have-nots" was not created by the information explosion, it was only enhanced. While this disparity has existed for many years, it was in the 1980s that the fight to close the gap seemed to weaken. A factory-based economy gave way to a service-oriented one, characterized by fast-food workers and investment bankers. Trade unions weakened, forcing American workers into direct competition with overseas workers who did the same job at a lower price. The federal government stopped trying to redistribute the economy by taxing the "haves" and giving it to the "have-nots."²³

But a proliferation of information technology in the workplace will not necessarily mean a better-skilled or better-paid society. The information revolution holds within it the danger of cementing American society into a modestly sized upper class, composed of those with access to information, and a much larger underclass of information "have-nots."²⁴ The information superhighway offers a mail system, an entertainment system with thousands of choices, and an education and research tool. It is "interactive," meaning more than just home shopping; each consumer can publish information reaching an audience almost as large as any newspaper's through "bulletin boards" along the Internet. But many costs are involved in each aspect of the superhighway — high equipment prices, subscriber fees and the time it takes to learn the system.

Racial and economic minorities are systematically underrepresented in computer use, according to surveys conducted by the Consumer Federation of America and the National Association for the Advancement of Colored People.²⁵ As recently as 1993, Census Bureau information indicates less than 14 percent of adult blacks and Hispanics have home computers, compared with nearly 27 percent of whites. More than 47 percent of whites use a computer at work, compared with 36.1 percent of blacks and 29.3 percent of Hispanics. Among older Americans, only 8.4 percent have home computers and only 20.3 percent use them at work.²⁶

Not only are age, sex, economics and race primary factors for this "information gap" — geography also plays a role. Cable and telephone companies roll out new services in areas where they are most likely to receive the fastest rate of return on their investments.²⁷ This means areas with a heavy concentration of the economically disadvantaged — or areas

of sparse population, such as rural America — will not have access to cyberspace as easily as urban areas. Access to telephone lines separates yet another group of Americans. An estimated seven percent of U.S. residents do not have telephones.²⁸ That figure ranges as high as 25 percent in some inner-city communities.²⁹

The result is what some American political leaders have described as an "Information Apartheid."³⁰ One group will be driven by increased use of computer networks; the other, shaped by lack of access, will see further increases in unemployment and dead-end service jobs. The "best and brightest" will be skimmed off as the information "elite."

One of the complicating factors of access is brought about by fear of the unknown. Unlike frontiers with well-defined and precise boundaries, the Internet is in a constant state of flux and renewal. As a virtual space of software, networking and computers, cyberspace grows and changes every day.³¹

Smith and Gibbs predict the Internet will become the "information backbone" of the world in the 21st Century. Isolation will be the penalty for those who choose not to participate.³² The same fate faces those who cannot participate.

Magid notes, regardless of differences Internet users may have with the political philosophy of Bill Clinton, the President deserves credit for being proactive in his handling of universal access for all Americans. During his term in the White House, Clinton instituted a plan allowing citizens to send the President e-mail and access government documents.³³ In addition, he has called on major telecommunications companies to wire local libraries, schools and health facilities for cyberspace access by the turn of the century. If this is successfully completed, the average citizen who cannot afford or does not wish to invest in a home computer, software and modem can still have a means of accessing Internet information. The implementation of this proposal, called the National Research and Education Network (NREN) calls for a substantial investment on the part of telecommunications companies — an investment they may not choose to undertake without government subsidies.³⁴ NREN is not universally supported, drawing opposition from some taxpayers who ultimately will foot the bill, and by some researchers concerned about allowing unrestricted access to data.

Just as business and industry is feeling the pressure to go online, state governments

are also experiencing a need to deliver more citizen services online. Newcombe explains it with this illustration: an airline passenger traveling 600 mph at 30,000 feet in the dead of night can choose an item out of the airliner's gift catalog, pick up a seatback telephone, give a credit card number and his order, then pick the item up when he lands. But when it comes time to renew his dog license, he has to take time off work because his local government only serves the public at one location weekdays from 8:30 a.m. until 5 p.m. The citizen wonders why private companies can provide services at his convenience, but his tax dollars cannot produce the same results.³⁵ The fact is, states are working toward this end, although cautiously. Since much of state and local governments' service involves financial transactions, the security of the Internet remains in question, at least for now. Computer experts with both Netscape, the Internet's largest supplier of browser software, and with the federal government both admit that no security system is 100 percent impregnable.³⁶ The key appears to be the placement of "firewalls" to minimize the risk of intruders compromising security to obtain credit card or account numbers. Meanwhile, technologists are developing such systems as Electronic Benefits Transfer (EBT), Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT) to make it possible for government to deliver services via the Internet. EBT is currently being studied to see if it can replace paper food stamps now in use.³⁷ If perfected, recipients would be issued debit cards to obtain services. The government would save money through reduced printing, storage and administrative costs. Embarrassment to users of food stamps would also be reduced through the new system, which would work similar to ATM machines. Eventually this same system could be adapted to more standard government transactions, such as ordering birth certificates, paying traffic fines and renewing vehicle registrations.

The use of advanced telecommunication in government or business is not a new idea. Runge lists the benefits of telecommunications in businesses as these: 1) reduced cost of operation by allowing consolidation of key resources and faster communications; 2) better information for decision making through aggregation of data; and 3) creation of a competitive edge by allowing suppliers to deliver services faster.³⁸ If the NREN or the National Information Infrastructure (NII) is developed carefully so that education, research and public access sites (such as libraries) are properly represented, telecommunications can

create an "information bazaar" resulting in positive social and economic consequences.³⁹

The federal government, as the initiator of the Internet, had an early "leg up" on other organizations seeking to establish themselves as information sources in cyberspace. Legislative updates, current policies, available services and addresses of government officials and lawmakers are just a sample of information offered on websites operated by the federal government. The public has shown a great deal of interest in the government service and political aspects of cyberspace. One survey indicates a third of those using the World Wide Web had done so to obtain information about government agencies or political candidates.⁴⁰ Sites such as the White House home page have been successful in introducing the U.S. public to government information. The Office of Technology Assessment reported in 1994 that 46 million recipients of Social Security benefits were obtaining them via advanced telecommunications.⁴¹ The U.S. Department of Labor's "America's Job Bank" website has been accessed more than three million times a month by citizens who use it as a job-service directory, making it the fifth most visited site on the World Wide Web.⁴²

In contrast, state governments have been much slower in establishing themselves as information sources and are now struggling to catch up, although some states recognized the importance of the Internet and have taken the initiative to develop information locations for users. Texas was the first state to go "online" with a "website" — or electronic resource location — in May 1993. By early 1996, 55 state agencies had linked themselves to the State of Texas' website and were reporting as many as 400,000 monthly visits from users.⁴³ Oklahoma voters in 1992 approved the setting aside of millions of dollars for use in capital improvement projects. An outgrowth of this effort was "OneNet," a statewide telecommunications network designed for use by Oklahoma citizens.⁴⁴ More than 30 regional hubsites are being set up in 1996 to relay information to 3,000 user locations. Test communities will have up to five user sites — at public libraries, schools, health care facilities, cooperative extension offices and local government offices (very similar locations to those proposed by President Clinton) — giving residents easier access to educational facilities, government agencies and cyberspace information. The State of Minnesota, another of the early entrants onto the "information superhighway," recognized the

possibility of increasing usage by its citizens and developed a six-point set of guidelines for its agencies to use when deciding what type of information should be developed into websites.⁴⁵

However, not all states exhibited this foresight in getting government agencies online. Although 49 of the 50 state governments are represented with home pages on the World Wide Web, many of these efforts are still in their formative stages. Sixty percent of states with websites have established information sources operated by their departments of transportation — most of these within the past year — and it appears a large portion of the remainder will implement sites within the next 12 months.

Theoretical Framework

Public relations theory: An important aspect of this research will focus on Grunig's public relations models. Most government relations functions fit into the public information model of his communication theory, characterized as the dissemination of factual information with little emphasis on public feedback.⁴⁶ This thesis will test that theory to determine if the two-way nature of cyberspace has changed the function of government public information from Grunig's original assumption. The question may be this: Is government public relations now best characterized by one of Grunig's other models — or has cyberspace played a role in the evolution of a completely new model?

Cyberspace, including the Internet and its World Wide Web, offers public relations professionals working for state government a huge opportunity to interact with the public as they help their agencies develop programs and policies sensitive to public needs. The one-on-one interaction possible through innovations such as electronic mail (e-mail) make it possible for public relations practitioners to test ideas more easily before implementation and utilize the communication process more effectively than they may now be doing. The use of this new medium also allows them to find and target groups with special interests relative to their agency's mission.

By its very nature, cyberspace fosters two-way communication.⁴⁷ It takes a citizen only the click of a mouse to send e-mail queries and criticisms to government agencies. The constant likelihood of instant public feedback forces state employees to be even more

diligent in the performance of their jobs, thus improving the quality and speed of service given taxpayers.

Public relations trade magazines are urging members of their profession to familiarize themselves with cyberspace if they want to remain efficient and competitive.⁴⁸ With the recent explosion of interest in and use of cyberspace, many state agencies and private corporations are finding they need personnel with Internet experience. Where two years ago, virtually no company or state agency placed any emphasis on Internet experience among employees, today, people with those qualifications are in high demand.⁴⁹

The Internet gives professionals in the public relations field a forum for unfiltered communications — possibly the best way to economically get a message to a target public without dealing with media “gatekeepers” who are certain to edit or modify the message.⁵⁰ Internet communication is instantaneous and is just one step removed from physical person-to-person contact. One public relations expert interviewed in 1995 about the future of public relations in cyberspace had this qualified comment about the new medium:

Any vehicle that delivers information directly to the consumer, can accommodate an educational, long-form message that reaches highly targeted audiences, is going to be embraced as a new and valuable media environment. However, it is the art of relationship-building that sets the PR pro apart and, for this reason, in media relations, technology cannot replace the value of one-on-one communication.⁵¹

Diffusion theory: Another aspect of this research will focus on how the spread of Internet usage by state departments of transportation have been influenced by Rogers’ diffusion theory.

Rogers described the personalities or the five “ideal types” of individuals participating in the diffusion process. These people he described as “innovators,” “early adopters,” the “early majority,” the “late majority” and “laggards.” The innovators are described as venturesome types who are eager to try the innovation and have sufficient financial resources to absorb unprofitable decisions. Early adopters are usually the opinion leaders or role models of the local society and is pictured by his or her peers as someone who is successful and discrete in his use of new technology. The early majority legitimizes the

diffusion of the innovation. They are seldom leaders and may deliberate for a significant length of time before adopting the innovation. The late majority usually adopts the innovation more often as a result of economic necessity or in response to social pressure. The weight of public opinion must certainly favor the innovation before they opt to adopt it. Finally, the laggards are those who possess almost no opinion leadership and are the last to adopt an innovation — often adopting the original innovation long after others are using technologically improved versions of it. Rogers described the laggards as individuals who base their decisions on the past and have their attention “fixed on the rearview mirror.”⁵²

Cyberspace appears to have the elements Rogers considered necessary for diffusion: 1) an innovation, 2) communication, 3) the existence of a social system, and 4) time.⁵³ Research questions will attempt to determine the factors leading states to go online with transportation web pages and content analysis will be used to seek out possible patterns indicating Rogers’ theories may have contributed to the spread of cyberspace use.

Rogers defines a social system as a population of individuals who are “functionally differentiated and engaged in collective problem-solving behavior.”⁵⁴ All the farmers in a county, for example, or all the members of a Native American tribe, are illustrations of this definition. How an individual deals with an innovation is closely linked with how his social system deals with it. They may decide individually if they will deal with the new innovation, regardless of how their social system opts to deal with it. The decision may originate with communication from another individual, but ultimately the choice regarding the innovation is up to the individual. Or it is possible the individual would like to take advantage of the innovation, but lacks the resources to do so. As an example of this situation, Rogers uses electricity in rural areas. It is highly unlikely that one farm family could possess the fiscal resources to make rural electricity a reality, but when several farmers band together and seek the innovation, everyone becomes familiar with and implements it. Some innovations, however, diffuse in spite of wishes by the individual to the contrary. For example, the fluoridation of drinking water in the early 1960s was done for the benefit of all citizens, yet few possessed the financial means or authority to accomplish the process, and many had no interest in seeing the implementation proceed. Water fluoridation was prompted by an emphasis by government health officials and likely

would not have occurred in a great many communities if left up to the residents themselves.

Closely tied to diffusion is the adoption process. Adoption concerns the individual's acceptance of an innovation, ultimately affecting diffusion, or the spread of a new idea within a society.⁵⁵ The adoption process is seldom smooth nor are its results certain. Sometimes the innovation is rejected by the individual; sometimes it is adopted and then later discontinued. This is another aspect affecting cyberspace — there are already predictions that poor personal and business judgment has overshadowed the realism of cyberspace and by mid-1997 will result in a major rejection of cyberspace as a viable commercial communication channel.⁵⁶

Democratic theory: By definition, a democracy operates with the approval and participation of its public. As far back as the 1940s, in the midst of World War II, government publications noted that keeping the public interested and active occurred by keeping it informed.⁵⁷ A reluctance to do the public will, or a lack of flexibility in adjusting policies to conform to public demand can result in failure.⁵⁸ Mladenka's analysis of public sector responsiveness indicates some citizens feel government has a responsibility to respond to each opinion voiced by the public, while others feel that to do so puts government at risk to every special interest group or extremist faction in its jurisdiction.⁵⁹ In reality, he says, the obligation of government to respond — whether it be at the local, county, state, or federal level — lies somewhere between. Freiderich's research on effective government-citizen communication shows that the adoption of bureaucratic policy without some degree of regard to knowledge of circumstances, technical problems or will of the majority, indicates it is made irresponsibly.⁶⁰

With this degree of emphasis placed on the need to work well with print and broadcast media, it is apparent the media is a prime factor in successful government communication. This is an area where the Internet will become increasingly useful. Journalists also appear to be using cyberspace as an information resource site in increasing numbers. A Columbia University/Middleberg and Associates research study reveals that 91 percent of magazine and newspaper editors say their staffs use the Internet at least once a month for online services, communication, to expand their range of sources, to download raw data for analysis and to check facts.⁶¹ More than half of reporters say that within five years, they

will want all media relations submissions online. An Internet web site featuring an e-mail address can serve as a tool to allow the public to send questions and comments about transportation issues to agency management.

Statement of the Problem

It is suspected the belated rush of state governments to get online has resulted in poor choices of services offered and overall poor quality of some information provided. It is also suspected states are not directly communicating with their counterparts already established on the Internet to get the advice they need to save time and public funds in offering the appropriate services. And, it is suspected that these efforts have been so rushed (in most cases) that adherence to established public relations processes (such as Grunig's four public relations models) have been ignored.

Purpose of Study

This study will focus on the methods state departments of transportation utilized to develop and initiate websites, including determining the person(s) responsible for authorizing development of a World Wide Web page, the individual responsible for operating the website and their experience in the field, the level of communication with other states already operating websites, and level of public input sought in development of the electronic resource site, and the utilization of such feedback devices as electronic mail, website counters and other methods to establish channels of two-way communication. Results from this endeavor will be used as indicators of the continued validity of Grunig's historical methods of public relations, of the application of the diffusion of innovations to cyberspace technology and of government use of this technology to promote democratic interaction with the public.

Methodology

General

Rather than deal with the technical aspects of cyberspace, this thesis will deal with communication and social aspects from the viewpoint of the public sector — how it can

assist government agencies in meeting the needs of the public, ways to get the public more involved, and describing the problems common to establishing a suitable electronic resource site. This will be accomplished through a mail survey of 50 state departments of transportation and a content analysis of state DOT websites during the period of January-May 1996.

Research Questions

Specific questions this research will attempt to answer are 1) when and why state transportation agencies decided to go online, 2) who made the decision to establish an electronic resource site on the Internet, 3) if there were any special considerations (cost, geographic concerns, specific public demands, manpower, etc.) affecting processes followed to establish Internet service 4) who is responsible for maintaining information, 5) whether the public input was received regarding the services it felt was needed and 6) the type of information that transportation agencies are offering the public via the World Wide Web.

Research Objectives

The product of this research will be a report which chronicles early efforts of state government agencies to establish resource locations on the Internet. Through this research, a tool will be developed which measures adherence to the theories of public relations, diffusion of innovations and democratic theory, and is objective and uniform in nature so that it is applicable for use among all local, county, state or federal agencies using the Internet as a channel of communication with the public.

Significance of the Study

This thesis will attempt to determine how orderly and thoroughly government agencies are educating themselves about the Internet and implementing services actually meeting the public's needs. The question of how closely transportation departments are communicating with their adjacent and regional counterparts is particularly significant, since national organizations such as the American Association of State Highway and Transportation

Officials have placed a great deal of emphasis in recent years on cultivating closer communication between states and between its members and the federal government.⁶²

Ideally, this thesis will provide information vital to other state agencies and public-oriented organizations to help them establish themselves as Internet service sources without repeating some of the mistakes made by their predecessors. This benefits the agencies themselves and the citizens they serve by conserving financial resources which can then be devoted to other aspects of the agency's mission.

Information technology holds great promise — and many challenges — for communicators in state government attempting to broaden their agency's presence in an increasingly electronic world. The citizen, who before could only access information from a state agency during weekday business hours by telephone or by making an in-person visit to that agency, or by waiting the days or weeks written correspondence entails, can now access important data around the clock from the comfort of their home — or from anywhere in the world, for that matter.⁶³

As cyberspace and other forms of information media continue to evolve, many of the barriers to communication will vanish. In many ways, this will benefit both taxpayer and state employee. E-mail will enhance one-on-one contact between the two groups and has the potential to make each one more aware, if not more sympathetic, to the needs and problems of the other. An agency successful in providing each of its employees cyberspace access will be able to communicate with them more quickly and efficiently through e-mail than it can through today's more standard forms of communication, such as memo, telephone or newsletter.

But as the National Governors' Association recognized in its development of the National Information Infrastructure policy statement, as communications barriers fall, others, such as those rooted in economic and cultural differences, will be far more difficult to breach. No one has, as of yet, been able to successfully provide a way for every American to have cyberspace access — or can guarantee that if it was available, it would be regularly used. It is more than just economics. Age, race and geography have combined with it to create a divided American society — the "haves" versus the "have nots." The information explosion McLuhan predicted 30 years ago cannot be blamed for this division

for it existed long before the technology was developed. But cyberspace holds the ability to enhance this gap — or to eliminate some of the barriers.⁶⁴ Because we cannot see each other in cyberspace, characteristics such as gender, age, national origin and physical appearance are not apparent unless the person wants to make those details public. Without these cues, each person's ideas must stand on merit alone — a noble concept.⁶⁵ But if no plan is successfully implemented to give truly equal public access to the Internet, there will be large segments of the U.S. population who have to opportunity to offer ideas. Those who have access will continue to grow in knowledge, influence and power, while those without access will lag farther behind.

If there is an importance in research into what processes are influencing the development of the Internet — whether it involves delivery of services to the public, availability of information for academia, or simply for its entertainment value — how it can be used to close the gap between the “haves” and the “have nots” must be one of its most important goals. It is hoped this thesis is useful in that regard.

Scope and Limitations

This research will focus on a specific agency within government and during a specific time period. Because Internet use is expanding rapidly and the technology governing its use is expanding at an equally rapid rate, it is recognized that future developments will greatly affect the timeliness of the information contained in this thesis. It is expected, however, that this research will be an accurate reflection of the state of American cyberspace technology and mass communication processes during the period of study.

Organization of the Study

For the benefit of the reader, the organization of the remainder of this thesis is as follows:

Chapter II: This review of the literature focuses on cyberspace as a channel of communication, the public information function in the realm of democratic theory, the elements contained in Grunig's historical models of public relations, research into Rogers' theories of diffusion of innovations, an understanding of the technology which created

cyberspace, and the effects information technology is having on government.

Chapter III: This chapter is an explanation of the methodology used in this research, consisting primarily of a mail survey of all 50 departments of transportation and a content analysis of the 28 state departments of transportation with websites currently online.

Chapter IV: This chapter contains the results of the mail survey and content analysis.

Chapter V: This chapter contains a summary of results and conclusions derived from research findings.

Appendix: Included in the appendix of this thesis are the Internet addresses of all state websites online as of May 1996 and examples of the homepages of each of these websites.

End Notes

1. Bob Cotton and Richard Oliver, *The Cyberspace Lexicon: An Illustrated Dictionary of Terms from Multimedia to Virtual Reality* (London: Phaidon Press, Ltd., 1994), 7.
2. David S. Bennahum, "Mr. Gingrich's Cyber-Revolution," *New York Times*, 17 Jan. 1995, sec. A, p. 19.
3. Bennett Falk, *The Internet Roadmap*, 2nd ed. (San Francisco: SYBEX, 1994), 4.
4. Cotton and Oliver, 54.
5. April Marine, et al., *Internet: Getting Started*, (Englewood Cliffs, N.J.: PTR Prentice Hall, 1994), 139.
6. Daniel C. Lynch and Marshall T. Rose, *Internet System Handbook* (Reading, Mass.: Addison-Wesley Publishing Co., Inc., 1993), 720.
7. Bennahum.
8. K.A. Oostendorp, W.F. Punch and R.W. Wiggins, "A Tool for Individualizing the Web," Intelligent Systems Lab, submitted to *Journal of Computer Mediated Communication*, 1994, <http://www.ncsa.uiuc.edu/SDG/IT94/Proceedings/Agents/oostendorp/oostendorp.html> (19 Feb. 1996).
9. "W3 Concepts," CERN, <http://www.w3.org/pub/WWW/Talks/General/Concepts.html>, (9 March 1996).
10. Marine, et al., 237.
11. Ron Solberg, "Is the Information Superhighway Really all that Super?" (Multi-media presentation at the Oklahoma City Chapter of the Public Relations Society of

America's professional development seminar, Oklahoma City, Okla., 23 Jan. 1996).

12. James Evans, "Internet Security: Imperfect, but Improving," *Government Technology* 9, no. 2 (February 1996): 1.

13. James Coats, "From On-Line Hangout to Data Superhighway," *Chicago Tribune*, 15 Jan. 1994, sec. 7, p. 1.

14. "Survey Doubles Estimate of Web Use to 17 Million American Adults," Associated Press, <http://www.boston.com/globe/cgi-bin/globe.cgi?ap/apnat.htm> (15 Feb. 1996).

15. Sara B. Ivry, "Town Hall On-Line," *Media Studies Journal* 9, no. 3 (Summer 1995): 170.

16. Mike Perry, "Internet Survey No. 1," <http://www.wisdom.com/sv/>, (1995).

17. Tod Newcombe, "Governors Push State Role in Information Highway," *Government Technology* 7, no. 11 (November 1994): 387.

18. Ibid.

19. Daniel Pearl, "Debate Over Universal Access Rights Will Shape Rules Governing the Future of Communications," *Wall Street Journal*, 14 Jan. 1994, sec. A, p. 12.

20. Bennahum.

21. Jarice Hanson, *Connections: Technologies of Communication* (New York: HarperCollins College Publishers, 1994), 367.

22. Bennahum.

23. Bob Kuttner, "The Divided Information Superhighway," *Boston Globe*, 21 Jan. 1994, p. 15.

24. Michael J. Berlin, "Information Superhighway: Keeping Access Open to All," *Christian Science Monitor*, 7 Feb. 1994, p. 22.

25. "Access to Data Highway," *Christian Science Monitor*, 7 June 1994, p. 18.

26. Jube Shiver Jr., "Busting the Barriers to Cyberspace," *Los Angeles Times*, 29 March 1995, p. 1.

27. Amy Harmon, "Last Off-Ramp on Information Highway," *Los Angeles Times*, 7 May 1994, sec. D, p. 2.

28. Thomas R. Black, *Evaluating Social Science Research: An Introduction* (London: Sage Publications, 1993), 51.

29. Shiver.

30. Tom Soto, "Redlining the Information Superhighway," *Los Angeles Times*, 18 April 1995, sec. B, p. 13.

31. Vinton G. Cerf, foreword to *The Internet Navigator* by Paul Gilster (New York: John Wiley and Sons, Inc., 1993), xix.
32. Richard J. Smith and Mark Gibbs, *Navigating the Internet* (Indianapolis: Sams Publishing 1994), xxvii.
33. Lawrence J. Magid, *Cruising Online* (New York: Random House, 1994), 268.
34. Paul Gilster, *The Internet Navigator* (New York: John Wylie and Sons, Inc., 1993), 406.
35. Tod Newcombe, "Technology Advances Electronic Services," *Government Technology*, February 1996, 1.
36. Evans, 44.
37. Wayne Hanson, "Wiring the Wallet: Electronic Commerce, the Internet and Government," *Emerging Technologies*, 1995, 42.
38. David A. Runge, *Winning with Telecommunications* (Washington, D.C.: International Center for Information Technologies, 1988), 15-16.
39. Computer Science and Telecommunications Board, *Realizing the Information Future* (Washington, D.C.: National Academy Press, 1994), 208.
40. Associated Press.
41. Soto.
42. Mike Nevins, "America's Job Bank," *Government Technology* 9, no. 3 (March 1996): 34.
43. Mike Nevins, "Texas: Pioneers on the WWW," *Government Technology* 9, no. 2 (February 1996): 30.
44. Jim Bob Carson, "OneNet to Link State," *The Daily O'Collegian*, 5 Feb. 1996, p. 1.
45. "Policy in Practice: Making Public Information Electronically Accessible," *Mn/DOT News*, 16 Jan. 1996, 3.
46. James E. Grunig and Larissa A. Grunig, "Models of Public Relations and Communication" in *Excellence in Public Relations and Communication Management*, ed. James E. Grunig (Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1992), 288.
47. Richard Cahill, "Lost in Cyberspace: The New Media Communications Challenge," *Communique*, February 1996, 3.
48. "New Times, New Media," *Public Relations Tactics*, December 1994, 3.
49. "The Internet: Industry Watchers Say a Basic Proficiency is Required," *Executive Strategies* 10 (1995): 8.

50. "Will the Internet be the Next Great PR Tool?" *Public Relations Tactics*, June 1995, 25.
51. Claudia Gaines, quoted in "Will the Internet be the Next Great PR Tool?" *Public Relations Tactics*, June 1995, 25.
52. Everett M. Rogers, *Diffusion of Innovations* (New York: The Free Press, 1962), 172-182.
53. Ibid, 12.
54. Ibid.
55. Ibid.
56. Chip Bayers, "The Great Web Wipeout," *Wired*, April 1996, 126-128.
57. Committee on Public Relations of Public Personnel Agencies, *Public Relations of Public Personnel Agencies* (Chicago: Civil Service Assembly of U.S. and Canada, 1941), 61.
58. Ibid., 63.
59. Kenneth R. Mladenka, "Responsive Performance by Public Officials," in *The Public Encounter*, ed. Charles T. Goodsell (Bloomington: Indiana University Press, 1981), 144.
60. Carl J. Friedrich, "Public Policy and the Nature of Administrative Responsibility," *Public Policy* 1 (1940): 3-24.
61. "Reporters Use of Internet on Rise," *PR Tactics*, March 1996, 15.
62. American Association of State Highway and Transportation Officials, *AASHTO Strategic Plan* (Washington, D.C.: 1995) 7.
63. Brian Croft, "Through the Looking Glass," *Communication World*, November 1995, 28.
64. Bennahum.
65. Brian Croft, "Opening Windows to the World," *Communication World*, November 1995, 19.

CHAPTER II

LITERATURE REVIEW

Introduction

Because interest in the Internet is relatively new, few studies with regard to it have been done. In fact, the entire Winter 1996 issue of the *Journal of Communication* devoted itself to the Internet as a potential research subject and suggested reasons for study and possible units of analysis. In doing research into this topic, it was quickly noted that most information regarding the Internet (and cyberspace in general) prior to 1996 appeared in newspapers and magazines, trade publications and a growing number of “how to” books designed to explain the Internet to new users. The reader will note there is a dearth of scholarly studies done about cyberspace; at this point, they simply do not exist.

Before any study is done on how state agencies use the Internet for public communication, several areas must be reviewed for their relationship. The examination will focus on the relevance of cyberspace as a channel of communication, the public information function of government, the elements of public relations (including Grunig’s four models), the diffusion of innovations (specifically the process of technology diffusion), an understanding of the technology creating cyberspace and the effect on government of the implementation of telecommunications technology into society.

Much of the research in this review addresses the government-public relationship, but few studies pertain to states themselves. Only one study addresses ways a governing body can be pro-active in being responsive to the needs of the public, encouraging contact and using self-promotion by its officials. The remainder of the sources reviewed in this chapter address the theoretical aspects of public information — its relationship to the shaping of public opinion, its role in the process of democracy, and how the existence of the public information function can improve citizen involvement. Nearly all literature addressed these

issues at the national level. The few discussing these functions at local levels were not specific to a geographic area.

No study defined the role of public information representatives in state departments of transportation or how the Internet can be utilized to respond to taxpayer needs.

Review of the Literature

Cyberspace as a Channel of Communication

At this point, the use of cyberspace as a channel of communication has not been a subject of study. Rafaeli (1996) proposes five defining qualities of cyberspace communication appropriate for study: multimedia, hypertextuality, packet switching, synchronicity and interactivity.¹

These qualities differentiate cyberspace from other channels of communication. The multimedia aspect of the Internet combines all forms of previous media in a manner creating “an unprecedented sensory vastness,” according to Rafaeli. No guidelines govern web page design in the mid-1990s and much of what appears on the Internet is overshadowed quickly by continuing advancements in technology and design.

The hypertext environment of the World Wide Web has eliminated what Rafaeli calls the “tyranny of writer over reader” allowing the reader to enjoy the freedom of following his interests wherever the hyperlinked text leads.

Packet switching is the Internet’s response to efforts to regulate messages in cyberspace. It is the answer to the media’s “gatekeeping” and the “turn taking” of interpersonal communication. The Internet has evolved as a medium with no organization and one which, by its nature, fights regulation. Censorship is seen as “noise” and the Internet finds ways to work around it. This typifies a guiding principle of the scientists who developed the Internet — it was designed to avoid disruption of communication in a nuclear attack. If something interrupted the message the sender attempted to convey, the channel rerouted the message so it arrived at its destination unchanged.

Technological advancements over the past few decades have created a communication medium thriving on widespread and quick delivery of information. This “synchronicity” — or timeliness — has been carried to new heights by the Internet, making possible

immediate mass distribution of time-sensitive information. Rafaeli's findings suggest once society becomes used to this synchronicity, they will demand it and disdain more asynchronous channels of communication.

Interactivity is a quality unique to cyberspace, but one which can be included or intentionally omitted from web sites, depending upon the desire of the sender. Interactivity is the source of success behind use groups, "chat rooms" and e-mail. It is a key to determining how well local, state and federal governments can respond to its citizens.

The Public Information Function in Government

The public expects leadership in government. Hiebert's (1981) model of government communication stipulates that effective leadership, regardless of whether it is local or national — requires effective communication.² Mladenka (1981) concurs, stating effective communication allows a government to be aware of citizens' desires, make an effort to deal with priorities, and successfully implement policy.³ Effective communication enables government to know the will of the people and make sure citizenry is aware of its efforts.

Research has also found that communication helps improve the public's perception of government, especially in the areas of effectiveness and honesty. A 1989 survey by the National Commission on the State and Local Public Service showed only 13 percent of the public felt federal government officials were honest. Only 11 percent saw honesty in state government. While one-third of the public felt municipal officials were honest, 25 percent believed no public official possessed that quality.⁴ These statistics indicate that in the eyes of a portion of the public, government is failing to carry out its biggest responsibility — to honestly and effectively serve them. Hiebert's research adds that government in the United States frequently fails to realize communication is a two-way process.⁵ Some officials understand their role in informing the masses, yet few realize the importance of feedback. Much of this realization comes locally, where elected officials have more personal contact with citizens. This probably explains why the public, in the National Commission on the State and Local Public Service survey, perceive municipal government to be most honest.

Government has a dilemma in how directly it deals with the public and in what manner. Dealing with the public too overtly, Hiebert says, and making too great an effort to promote

a government agency, leaves the official open to charges of propagandizing the public.⁶ Few officials relish such an accusation, so most take the opposite approach, often resulting in too little public contact.

The best road, Gandy's (1992) research shows, is one of enacting a public relations function stressing "government affairs," enhancing and protecting the organization's legitimate interests affected by public issues, and by "strategic communications," coordinating all the elements reflecting the organization's policy or strategy.⁷ In his research on the relationship of public relations and public policy, Gandy found communication and the people who practice it play a major role in structuring an environment conducive to influencing administrators to form effective public policy.⁸

The Need for Public Involvement: Bagdikian (1984) found that public involvement is critical to successful democratic policy decisions. "Public policy ... is likely to be perfected by involvement with the many, rather than the few. The smaller the circle of knowledge, the greater the incidence of undetected error and detachment from reality," he wrote.⁹ Arnold, Becker and Kellar (1983) point out that "connecting the process of government to the governed is not an extracurricular activity, but an essential service."¹⁰ Face-to-face contact is crucial for a municipal official who wants to promote responsiveness and the same is true at the state level, even if opportunities for contact are fewer.¹¹

The U.S. Department of Transportation encourages states to obtain public involvement early in road planning — opening doors to new ideas, ensuring construction programs are in line with citizen wishes, and leaving "an impression of how caring and concerned the department is for the citizen-user of the transportation system."¹² Two New York government agencies hired a public relations firm to educate the public about the state's deteriorating road system. This increased awareness enabled the New York DOT to earmark a greater portion of its state budget for road construction and repairs.¹³

To gain citizen involvement, a level of trust must be reached between government and public. A sharing of knowledge must take place. "Effective government requires citizens be informed about policies, programs and issues, and be enlisted as active participants in the ongoing process of government," reported the National Commission on the State and

Local Public Service in a 1993 study.¹⁴ "Government has to offer citizens a chance to be part of the solution, rather than be merely a client for the object of its services."

A frequently heard criticism of bureaucracy is that it is unwilling to respond to public preferences. Mladenka notes this is a relative statement, since an agency responsive to the majority of citizens would certainly appear to be insensitive to complaints from a dissenting individual or group.¹⁵ Perceptions of "insensitivity" should be tempered by public knowledge of the reason for the policy. This can come through effective communication.

Despite the best efforts of an agency to communicate, it can be rendered ineffective through a lack of citizen interest or understanding and is true locally, statewide or nationally.¹⁶ According to Manheim (1991), three basic classes of citizens exist in America.¹⁷ First are those in direct contact with political reality, either as journalists, analysts, contractors or government employees. Because of their position, they have direct understanding of the reasons behind government activities. Second are the "politically literate," a minority of citizens who possess significant skill in understanding how government works. This group is traditionally well-educated, well-read and media literate, often politically active and frequently financially independent. These resources make them more aware of government action. But the vast majority of Americans comprise a class lacking political skill and no motivation to acquire it. This group knows little about politics and doesn't care that it doesn't know. This "political illiterate" majority complains about bureaucracy the loudest, needs to be politically involved the most, and constitutes the weakest link in the information chain between government and citizen.

Responsiveness versus Responsibility: Two primary elements of democracy are responsiveness and leadership. Abraham Lincoln saw leadership as a form of responsiveness, according to Civil War historians, but Manheim asserts the opposite is true.¹⁸ Public administrators appear to agree with neither and hesitantly engage in public contact, according to Stivers (1994). In her survey of public administrators, they see responsibility to the population as something entirely apart from responsiveness to the individual. The former is government's goal, but the latter is indicative of political bias.¹⁹ Administrators view responsiveness as a reaction to the whims of citizens — while being responsible is to ignore those whims and respond to public needs. Stivers found practicing

responsiveness reduces tension between administrative effectiveness and flexibility to public needs. Moreover, developing a capacity to listen promotes accountability by helping administrators hear the neglected voices of the public.²⁰

Even a responsive political process will benefit a minority if the majority fails to raise its voice, says Manheim.²¹ It seems only reasonable those most affected by, and interested in, government policy should have a greater voice in the outcome than those only slightly interested, Riley (1975) states.²² Bagin, Ferguson and Marx (1985) remind citizens that, for the politician, responsiveness — especially in an election year and in a high-profile manner — can mean another term in office.²³

The Role of the Media: A college administrator gave Wygal (1977) this view of media relations: "We don't need public relations around here. If the news media need information, they can come ask us."²⁴ But Gandy notes that, in the arena of public information and government policy, the media and public officials share a symbiotic relationship. The official must rely on broadcast and print media to effectively make citizens aware of programs; the media rely on government, at all its levels, to provide a major portion of the content of each day's news hole.²⁵ The Coast Guard, in its introduction to a *Public Affairs Officer's Guide* (1993), notes that its public relations function is one of its most essential — to educate the boating public, promote good programs and for recruitment.²⁶ Similarly, the Department of Defense publishes its own manual, *Meeting the Press: A Media Survival Guide for the Defense Manager* (1993), outlining steps to deal with journalists. This book explains the role of the media, but also cautions public affairs people of its hazards:

Government officials traveling the road of public service increasingly find themselves under the watchful eye of the public media. The attention can be confusing, since the media represent a frustrating mixed bag of opportunity and grief. Ever ready to criticize, condemn, abuse and send careers spiraling downward, these same organs of information can applaud, congratulate, sing praises and carry careers onward and upward.²⁷

Many organizations involved in the administration of public funds or having regular contact with the public have published "how-to" guides on working with the media. The

American Association of School Administrators, in *Working with the Media* (1993) stresses cooperation. "Help reporters cover the news, and they'll help you," the guide says. Fair and balanced coverage only comes from fair and balanced treatment.²⁸ Likewise, the U.S. General Services Administration's *Communicator's Sourcebook* (1988) points out fair and cooperative relationships with the media can minimize misunderstandings and promote factual reporting.²⁹

The Role of the Public Information Office: A public information system in a democracy consists of elements and channels of communication through which citizens learn of government activities and convey their views and needs.³⁰ While the media provide a service in informing citizens of government activities, Cutlip's (1981) study of federal public information offices found it could not be done as efficiently or effectively without assistance from public information officers.³¹ Culbertson (1993) said it takes the public information specialist to provide the specialized knowledge a reporter needs to understand and cover government issues, and to provide the balance necessary for constructive dialogue. The public information manager often fills the role of "technocrat" in his or her particular agency.³² A politician may serve a brief tenure and make promises to benefit voters. But it falls to the technocrat — a tenured civil servant with specialized skills — to work out problems, implement programs and interpret them.

At one time, it was possible for a politician to serve as technocrat, but the growth of both the government and the American population changed this. Both have become more remote, impersonal and harder to understand. With this remoteness came a need for communication and this gave rise to public information managers, said Pimlott (1951).³³ They bridge the gap between the agency and the public, acting as a conduit for public comment on its views and needs.

At any stage in the public policy process, the availability of information can influence decisions, Gandy argues. Decision makers should rely on public input in policy formation. Public information specialists fill vital roles in this process by suggesting ways to frame potential problems so adverse public reaction is lessened, even though all facts are disclosed. They can identify available options in the problem-solving process and use media expertise to marginalize any opposition.³⁴ In doing this, public information

specialists assume the role of public relations practitioners, using their expertise to influence the behavior of others.³⁵

The public information manager fills a variety of roles in government, Hess (1984) says. A trained communication specialist accommodates questions from the public, leaving agency employees free to concentrate on assigned tasks.³⁶ Specialists keep administrators posted on changes in public attitudes, allowing officials to anticipate and compensate for reactions. They can identify the best medium to reach target populations.³⁷ Hernon and McClure (1986) note that information specialists can develop literature designed to help the public understand issues and do research to answer the questions of taxpayers, administrators and lawmakers.³⁸

In a frequently overlooked area, public information personnel can help develop and implement crisis communication plans. Adams states in *Public Relations Tactics* (1994) that an estimated 75 percent of U.S. businesses have no formalized crisis plans; in government, it is believed the figure is even higher.³⁹ Public information staffs can work to build positive community relations, a crisis prevention tool. Pires notes community relations can work as a catalyst for latent goodwill when a crisis occurs.⁴⁰ In a crisis, the specialist can often minimize the damage done by media coverage. When the media itself is the source of the bad publicity, the public information specialist can handle the press and avert further the damage from government officials' demands and ill-advised comments.⁴¹

Competent public information staffs are safeguards against abuse of political communication. Gandy addressed how situations can be manipulated to minimize adverse public reaction, but doing this without regard to results or to intentionally mask unethical or illegal motives threatens trust and goodwill built by the agency, Manheim asserts.⁴² Federal agencies, trying to combat a loss of credibility beginning in the mid 1970s, spent substantial funding on public information/relations. As long ago as 1986 an estimated \$2.6 billion was spent in a single year to promote government public relations.⁴³

On the state level, agencies face tremendous pressure from declining budgets, tax limitation measures, and an increasing number of regulations. These restrictions place greater pressure on public information officers as they strive to help agencies deal with the public and accomplish established goals, according to the National Cooperative Highway

Research Program (1994).⁴⁴ It is the job of public information staffs to conduct themselves in such a way they build citizen trust, gaining support for agency programs.⁴⁵

TQM and Quality in Government Agency Services: After World War II, Japanese industry implemented a management style stressing quality and employee involvement in problem solving. This style, labeled "total quality management" (TQM), has been embraced by U.S. industry in recent years as a way to more efficiently do business. In the late 1980s, the Federal Quality Institute was created to promote quality initiatives. Bowman writes that, by 1992, two-thirds of federal agencies had adopted some form of TQM to increase efficiency.⁴⁶

Bagin, Ferguson and Marx (1985) suggest that with TQM, every employee is a representative of government, therefore, everyone is a part of the agency's public relations function.⁴⁷ This expands the role of communications experts in government, since they not only have an external public with which to react, but also an internal one made up of employees. White and Dozier (1992) found taxpayers can be made more aware of policy matters, but it is just as important to inform an agency staff even more directly affected by management decisions.⁴⁸ Public information staffs provide knowledge and leadership to get things done in the citizen-government relationship, says Culbertson et al (1993).⁴⁹ Public information experts can help officials effectively lead and be good examples for employees, Zielinski (1994) adds.⁵⁰

The National Governors Association in 1994 advocated states become more involved in promoting the "National Information Infrastructure," a part of the information superhighway designed to ensure telecommunications and information services are responsive to the needs of customers — in this case, taxpayers, Newcombe (1994) says.⁵¹ In another example of how governments enhanced public images, found in *Total Quality Newsletter*, the municipal government of Aurora, Colo., emphasized getting feedback from citizens, taking on a "user-friendly" image and meeting the needs of residents.⁵² In both endeavors, public information experts played an integral role in increasing awareness.

As public information experts strive to better serve the public, some degree of measurement is needed to ensure competency in the information function. To the public, competency is an extremely important skill for the information manager to possess, as

Baker's study of public relations experts shows (1993).⁵³ Unlike private business, where there are profit-and-loss margins to measure the success of efforts, few such devices exist in government. This makes the public information function even more important, for if an elected official does his job competently, yet voters do not know it, the politician can fail to be reelected and both government and the public suffer. If public information does its job, the threat is lessened, Arnold, Becker and Kellar found.⁵⁴ Standards for public information employees can help maintain a level of competency and credibility for the communication function, Rabin (1981) found in his analysis of the Civil Service program.⁵⁵

Models of Public Relations

DeSanto (1995) finds there are subtle, yet vital, differences between those who are government public information officers and those who are public relations practitioners. Differences consist primarily of 1) source of financing, 2) management and 3) accountability.⁵⁶ Those who practice government public information do so with taxpayer funds, elected or politically appointed managers and an accountability to all citizens, as opposed to the public relations practitioners who use private funding, non-elected managers and a responsibility primarily to stockholders. This places public information officers in a position filled with unique challenges, not the least of which is dealing with citizens who feel it is not proper to use public dollars to promote an agency's viewpoint. Despite these differences, both groups operate under the guidance of accepted public relations practices.

A key element of DeSanto's research revolved around the adherence of public information officers to one of Grunig's models of public relations communication.

The Four Models: Grunig (1992) defined four models (or "patterns of behavior," as he preferred to define them) describing the way public relations practitioners communicate the position of their business and governmental entities with their customers and/or publics. These, seated primarily in historical importance, are: 1) press agency; 2) public information; 3) two-way "asymmetrical" public relations; and 4) two-way "symmetrical" public relations.⁵⁷

The "press agency" model arose in the mid-1800s and to promote people and events. The most successful of these practitioners was P.T. Barnum of circus fame.

Communication in this model was one-way (from organization to public) and consisted of propaganda techniques. A desire for truthfulness was not necessarily a primary goal.

Early in the 20th Century, the “public information” model was developed by government and major corporations to fight negative media publicity generated by muckraking journalists. These entities hired their own journalists to develop media information handouts telling the government/corporate side of the story. Unlike the press agency model, communication in the public information model was initially considered to be more two-way (from agency or business to the public and vice versa). Grunig later revised this element of his theory to indicate it, too, was a one-way practice. The primary difference between public information and press agency deals with the use of propaganda and the truthfulness of the information. Although public information practitioners were subjective in the information they released (ensuring it was favorable to their employer), the information reported was generally accurate. It is this model of public relations by which Grunig categorized today’s practitioners in state and local government.

During World War I, behavioral and social science began to play a role in the public relations process and gained a great deal of respectability during the second World War. The use of research by such public relations experts as Edward L. Bernays to craft a message which was more receptive to the public gave rise to Grunig’s third and “two-way asymmetrical” model — two-way because the information was sought from the public and released to it by the practitioner. History indicates Bernays believed individuals were manipulable, based on Nazi Germany’s propaganda efforts of World War II. The secret of successful manipulation lay in understanding people’s motivations and using research to identify the messages most likely to produce the attitudes and behaviors most desirable to the organization. Asymmetry results from the fact the manipulation is being done by the organization for its benefit, even though it may honestly believe it is conducting its actions on behalf of the individual.

“Two-way symmetrical” communication, based upon the theoretical writings of Bernays, Ivy Lee and others, was put into practice by public relations and scholars after World War II, Grunig theorized. This model makes use of research and other forms of two-way communication to facilitate understanding, rather than persuade people. Balanced

communication and mutual benefit are the hallmarks of this model. Grunig asserts

In a series of 13 studies looking at how different organizations use the four public relations models, Grunig found that, although most practitioners possessed the knowledge to best utilize the public information model in their activities, their preference was to practice the two-way asymmetrical model. In actual practice, however, the press agency model was the process most frequently used.⁵⁸ Overall, governmental and scientific agencies were the ones most likely to practice the public information model, as opposed to banks, hospitals, telecommunications firms, associations, insurance companies and sports organizations, all of which most frequently practiced the press agency model. Grunig's research into defining an "excellent" approach to public relations indicated the use of "two-way symmetrical" communications was most preferred, especially in helping the organization deal with activist groups.⁵⁹

Revising Grunig's Theory: Grunig's concept of four public relations models has come under a great deal of scrutiny since first proposed in 1984. Leichty and Springston argued in 1993 that organizations do not use a single model to deal with their publics, but rather vary them according to the situation.⁶⁰ Most organizations, in fact, have a variety of relationships with many groups and interact with each one differently. Kelly (1995) argues that the characteristics of the public information model are common to all four models and therefore are increasingly difficult to detect clearly.⁶¹ Reagan, Sumner and Hill (1992) suggest Grunig's indices should be more fully developed to make them more clearly useful in differentiating public relations process in organizations.⁶² They do not, however, suggest abandoning Grunig's measurement indices. Even DeSanto, in her research into public information officers in Oklahoma government, indicated that these practitioners did not follow the processes of Grunig's one-way public information model, but were more likely to engage in two-way communication.⁶³ In a 1993 paper titled "Implications of Public Relations for Other Domains of Communication," Grunig himself agreed that organizations practicing "excellent" public relations methods do indeed use a mixture of his models.⁶⁴ He has instead begun researching public relations strategies in various hierarchical levels: at the micro (or individual) level, at the meso (or managerial) level, and at the macro (or organizational) level. In this report and a previous one from 1976,

“Organizations and Public Relations: Testing a Communications Theory,” Grunig asserts it is ultimately the behavior and culture of the organization itself that dictates which procedure is utilized.⁶⁵ In one of his most recent works, Grunig (along with Dozier and L. Grunig, 1995) has developed the definition “dominant coalition” to help describe how “excellent” public relations practices develop. The dominant coalition is the group of individuals within an organization with the power to affect the structure of the organization, define its mission and set a course as a result of their strategic choices. It typically consists of an organization’s chief executive officer and senior management, but does not prohibit involvement from those low on the organizational chart, especially if those individuals are in charge of scarce resources.⁶⁶

It would be easy to replicate DeSanto’s research, applying it to a specific agency common to all 50 states to determine geographic variations of Grunig’s public relations models and see how they apply to cyberspace. After all, Grunig et al. specified that basic journalism skills and a knowledge of their practice are vital to the establishment of an organization’s excellent public relations programs.⁶⁷ Rather, this thesis will also look at his theories of management involvement in the implementation of public relations practices in cyberspace, specifically looking at those levels, micro, meso or macro, responsible for the leap of state departments of transportation onto the information superhighway.

The Innovation Diffusion Process

The “diffusion of innovation” is described as the process through which new ideas and changes are communicated within a social system.⁶⁸ Although anthropological studies focusing on the role of the societal unit in ancient cultures have verified the innovation diffusion process was in existence thousands of years ago, studies into the theory itself are far more recent, dating back only to the late 1800s.⁶⁹ U.S. research was first conducted in the 1930s, but the classic study of diffusion — involving the increased use of hybrid corn seed by Iowa farmers — did not occur until 1943.⁷⁰ This study would define many of the issues occupying research for decades to come: the role of social influence, the timing and process of adopting innovations and interactions among adopter characteristics, and perceived characteristics of the innovation.⁷¹

By 1962, Rogers demonstrated the five-step process describing innovation diffusion that has remained the recognized method by researchers. The process consists of: 1) learning of an innovation and its function, 2) developing a positive or negative opinion about it, 3) accepting or rejecting it, 4) implementing the innovation, and 5) assessing its merit.⁷²

In addition, Rogers asserted that innovations diffuse through society at different rates, dependent upon five factors: 1) the degree to which the innovation is perceived as an advantage over the idea it supersedes, 2) its compatibility with existing needs and values, 3) its complexity (in understanding or use), 4) the degree it is available for experimentation, and 5) the extent results of the innovation are visible to others.⁷³

Before delving too deeply into a discussion of innovation diffusion, it should be noted that since the mid-1960s, the term “technology transfer” has been used to describe the diffusion of new processes into society.⁷⁴ Although essentially identical to the diffusion of innovations, this terminology is used primarily to describe economic development. Since this thesis focuses on the use of the Internet as a communications tool rather than one to promote economic improvement, the use of the terms “technology transfer” or “information transfer” will not be found here, although their use would not necessarily be incorrect.

Elements of the Diffusion Process: Rogers (1962) theorized that four elements were crucial to successful diffusion: 1) the innovation, 2) its communication among individuals, 3) a social system, and 4) time.⁷⁵

Rogers described an innovation as an “idea perceived as new by the individual.”⁷⁶ It really matters little if the innovation itself is chronologically new — it is the individual’s perception of the newness that determines his or her reaction to it. In the case of the Internet, for example, the fact it is more than 25 years old does not lessen its status as an innovation, for it is its newness to a public growing increasingly infatuated with computer technology that gives it importance. Although not always true, most innovations are like cyberspace; that is, they are technical in nature.

An innovation spreads through diffusion, a process that cannot occur if the person or persons who are aware of the innovation do not communicate it to those who do not know about it. Thus, communication is a crucial part of the diffusion process.

Time is another part of diffusion and is usually a prime element in a mental procedure called the adoption process. Through adoption, an innovation passes from its first exposure to an individual to its final adoption, generally following five steps: 1) awareness, 2) interest, 3) evaluation, 4) trial and 5) adoption. In the case of the Internet, the adoption process is still in its early stages. The amount of media coverage consistently being given cyberspace has introduced this concept to nearly all Americans. Most, in fact, now find themselves in the interest stage where they seek additional information about the Internet, but likely have not judged its utility in terms of their situation. This "information gathering" stage will eventually give way to the evaluation stage, where the individual must make the conscious decision to try this computer innovation, followed by a trial period of actual use. Newspaper and scientific reports indicate millions have adopted this innovation, but this number is still minuscule in terms of the size of the entire U.S. population and its final action to accept or reject this technology.

It is important to note there is a vast difference between the adoption process and the diffusion process. Adoption concerns only the individual's acceptance of an innovation, while diffusion involves the spread of new ideas within a society, or the spread of innovations between social systems.⁷⁷

Often, the adoption process is not smooth and neither is its result certain. Sometimes an innovation is rejected rather than adopted by the individual; sometimes it may be adopted and then discontinued at a later date.

Rogers theorized that five personal characteristics of the adopters of technical innovations have a direct effect on the success and speed on the innovation.⁷⁸ First, he noted earlier adopters are younger in age than later adopters. Second and third, earlier adopters are higher in social status and have a more favorable financial position than those who adopt later. Often, earlier adopters come from a specialized field and have an ability to keep more up-to-date on innovations affecting that field. Lastly, since innovators must be able to adopt new ideas largely from mass media sources of information, Rogers theorized earlier adopters have a mental ability different from that of later adopters. A small number of surveys conducted to date into Internet use (to be mentioned in greater detail later in this chapter) appear to bear out most of these theories. Users are mostly young, belong to

upper-income social groups, and are currently involved in specialized fields (such as data processing, engineering or education). No studies appear to focus on the intelligence of users, although several Internet surveys indicate they are well educated, usually holding at least an undergraduate degree.⁷⁹

The Role of Communication in the Diffusion Process: Lauer (1991) pointed out that interpersonal channels produce isolation. The ability to communicate the benefit (or detriment) of an innovation is a critical part of the diffusion process. In diffusion, communication can come in the form of mass media or interpersonal exchange. In 3000 B.C., there were no satellites, computers, televisions, radios or newspapers. Yet the agricultural and political innovations of ancient Egypt were able to infiltrate first the Mediterranean region, then Europe.⁸⁰ This diffusion resulted from exchanges through interpersonal channels which, as demonstrated by the extent of the diffusion, were successful, although time consuming. Geography also played a major role in the diffusion process — the more isolated a culture was from the innovating source, the less likely were the chances of successful implementation.⁸¹

Barriers to diffusion are not always geographic, but sometimes the result of a type of self-imposed isolation, according to Lauer's studies. Hamblin, Jacobsen and Miller's study (1973) charting the use and acceptance of a new drug by two sets of physicians (those integrated into their medical communities, as opposed to those who were not) showed marked differences. Those physicians who remained informed of the latest medical advancements accepted the new drug at both a greater level (more than 10 percent) and more quickly (as much as eight months) than did their counterparts in the study.⁸²

Observing examples documented in the centuries since the spread of the Egyptian innovations, whether it was the introduction of iron farming implements to the Maori Indians in the 1600s, the efforts of Peace Corps volunteers in Asia during the 1960s, or the transfer of the U.S. model of cooperative extension programs to Brazil, India, Kenya and Nicaragua in the 1960s and 1970s, a face-to-face interchange constituted the primary method of diffusing new ideas.⁸³

Diffusion and the Management Function: Rogers and Picot (1985) noted that society was in the early stages of the "information revolution" in which the nature of the

individual household, the work environment and society itself were undergoing a major transformation. Information was beginning to replace energy as the basic resource on which an economy runs.⁸⁴

To this innovation were added others in the in the latter 1980s and early 1990s, including voicemail, the facsimile machine, videotape, pagers and cellular telephones (actually radio-based telecommunications systems) and videoconferencing. The speed at which these innovations are invading organizations is amazing. It is no wonder then, says Clark (1994), public and private organizations suffer from “technology phobia,” or an extreme reluctance to adopt these innovations. When this occurs, not only does the organization suffer, but also the customers it serves.⁸⁵

Rogers and Argawala-Rogers (1976) defined two different types of innovations in organizations, characterized by their impact on the behavior of individuals. “Innovations of the organization” are those adopted through management decisions (such as the addition of a new product line) and do not require members of the organization to behave differently. “Innovations in the organization” are those (such as the initiation of a new management style or the organization-wide installation of computers) requiring a great deal of change in individual behavior.⁸⁶ The speed at which an innovation is adopted can be influenced not only by the financial resources of the organization, but also by external forces. Rogers and Argawala-Rogers point out that the more accountable an organization is to external forces, the more likely it is to be an innovator. In the case of this thesis, state government agencies such as departments of transportation are be classified as being “domesticated” in that they have a captive customer, i.e. they do not have to compete with other organizations for clients and a certain level of funding for operation is generally guaranteed. Domesticated organizations are not required to adapt quickly to a changing environment; therefore they have a low degree of external accountability and, hence, of innovation.⁸⁷

Other reasons behind, and processes used in, the adoption of the innovation can be based on several factors, including the commitment of the organization (usually evidenced by the amount of resources — financial, personnel and physical — it devotes to implementing the innovation), the level of interactivity in the process, and how the innovation will change the overall effectiveness of the organization.⁸⁸ Smith (1993) adds

yet another factor affecting an innovation's adoption, a factor apparently unique to the United States. Americans, he suggests, have an enthusiasm for novelty, making it easier to create development niches for new markets. Smith said the "hula hoop" craze of the 1950s, for example, made it easier to develop markets for polyethylene plastic.⁸⁹ The novelty of home computers — and of the World Wide Web itself — may ultimately make it easier to diffuse the Internet into American society.

Technological Advancements in Communication: Since World War II, innovations in media technology have had an increasing impact on the ability to introduce new ideas efficiently and effectively to greater numbers of people. The development of offset printing, television, satellite networks, videotape and home videocassette recorders (each in themselves prime examples of successful diffusion efforts) contributed to changes in the diffusion process. Hyde (1994) agrees, noting the media have played an important role "in revolution and war, politics, fads and fashions, and entertainment."⁹⁰ Were it not for the existence of the mass media and their "ability to rapidly spread new ideas, American culture would not exist as we know it today."⁹¹

But how did a device that was primarily a toy for hobbyists in the 1970s⁹² become a common fixture in the home and office of the 1990s?

Its diffusion was a combination of mass media and interpersonal exchange. The initial word of this innovation was carried by print and broadcast means to the opinion leaders and innovators in private business — top staff members and "information experts," Huff found in 1987.⁹³ These people recommended personal computers to management, which implemented them into the workplace. The personal computer gave itself readily to the concepts governing the rate of diffusion into society: it greatly superseded its predecessors, it was highly compatible with business needs and efforts were made to reduce its complexity and increase "user friendliness." In addition, its presence in the workplace enhanced its exposure to potential buyers for home use and its effects were highly visible (again, because of its location).⁹⁴

Computer manufacturers continued to enhance the capabilities of this product, adding high-quality laser printers, scanning devices, impressive graphics, facsimile transmission modems and e-mail networks, Francik et al. found in 1991.⁹⁵ The availability — and

increased affordability — of such options enabled more people to purchase the devices for home use. Additionally, elementary schools taught computer skills at an earlier age, thus expanding the target audience and further turning personal computers from workplace machinery into useful household tools.

Innovation Diffusion and the Internet: The capabilities of the personal computer have cable created an environment extremely suitable for the diffusion of cyberspace technology into business and private sectors.

Technology exists for interactive television, meaning bills can be paid, and goods purchased from the comfort of home. Work can be done at home and electronically transferred to the office. Paychecks can be deposited directly into bank accounts. Medical instruments can be connected to personal computers, allowing health information to be transmitted directly to hospital mainframes.⁹⁶ Educational courses for both child and adult can be delivered to the home via television.⁹⁷

The Phenomenon of Cyberspace

“Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding.”

This is how writer William Gibson described the futuristic world of computers and telecommunications in the early 1980s.⁹⁸ Cyberspace is a virtual world of computer memory and networks, telecommunications and digital media. Advancements in personal computers, fiber optics and expanded computer memory have enabled Gibson's description of a future world dominated by computers and information to arrive quickly.

The Development of the Internet: In its simplest form, cyberspace can be described as a physical network characterized by a profusion of cables connected millions of computers.⁹⁹ But its potential as a (currently unregulated) communication tool and an instrument of social change make it far more than that.

The possibility of using cyberspace as a communications tool was an unintended

consequence resulting from scientist development and use of e-mail and electronic bulletin boards.¹⁰⁰ Today, these features are two of the most used of the Internet, providing users worldwide with a means of communication for business and personal purposes, and a process to socialize with those who have similar interests.

But its presence as an information resource is likely the Internet's greatest strength. Smith and Gibbs (1994) describe the Internet as the "world's biggest library card index" that, unfortunately, is hopelessly unorganized because the people who use it have too many different methods of organizing the data it contains.¹⁰¹ This prompted the development of a variety of Internet search tools, such as the University of Michigan's PAINT (a Personalized Adaptive Internet Navigation Tool), designed especially for "data mining."¹⁰² PAINT and other search engines operate in the hypertext environment of the World Wide Web, a creation of European physicists, making it possible to sift through millions of documents to locate those of interest.¹⁰³

The amount of information accessible in this manner is staggering. Dern (1994) estimates more than 90 percent of research sponsored by the U.S. government is conducted at institutions of higher learning connected to the Internet and is available to individuals with access to cyberspace.¹⁰⁴

Cyberspace in Print: Unfortunately, for a communications medium existing more than a quarter-century, the body of literature dealing with cyberspace has followed an unusual path. A year ago, a look at the library shelves of any university would have revealed a rather sparse selection of titles. Since public interest in cyberspace — and its resulting growth — has occurred only recently and rather suddenly, research on this subject is rather sparse.

Because of its exponential growth, most attempts at researching the Internet have focused on the number of users. Even this has produced diverse results. A 1995 survey by Internet@vantage states there are 72 million users in 130 countries worldwide — a use group growing by 150,000 people monthly.¹⁰⁵ A report from Global Interactive Solutions, based on surveys taken in the spring and summer of 1995 indicates there are between 45 and 65 million users worldwide, and qualifies that figure somewhat by stating most of these users have e-mail access only.¹⁰⁶ A Fall 1995 survey of Internet users by the Georgia

Institute of Technology indicates there are only 18 million users of the World Wide Web.¹⁰⁷ This closely corresponds with the estimate of a 1996 Louis Harris and Associates survey indicating there are 17 million users, but specifies these are U.S. residents only.¹⁰⁸ A demographics survey by the Matrix Information and Directory Services released in 1996 states there are 35 million people currently using commercial Internet provider services, although a great many are using e-mail capabilities only.¹⁰⁹ Finally, December's research (1996) estimates Internet use at 20-40 million people in 90 countries.¹¹⁰

Likewise, these studies vary greatly on age, education and income levels of Internet users, although most describe average users as in their early 30s, with at least a bachelor's degree.¹¹¹ Two-thirds had at least \$31,000 in yearly income.¹¹² All agreed on one thing — the most frequent Internet users are male and by a large percentage.¹¹³ Incidentally, this demographic data, with one exception, was obtained from the World Wide Web.

This diversity in research information is not based on poor research construction nearly as much as it results from the rapid entry of individuals into the pool of Internet users and because there are no well-defined boundaries to assist researchers in their efforts to find and survey cyberspace travelers.

This same rapid growth of users and the equally rapid progress in cyberspace technology plagues most books written on the subject. A sampling of more than a dozen books reviewed for this thesis produced an overwhelming redundancy of information. Most books written about cyberspace prior to 1994 have become so outdated that information contained within is almost useless, except for documenting the history of Internet development. While Internet use in college research has become commonplace over the past two years, as recently as 1995, Rubin, Rubin and Piele's guide for conducting research in communication devoted only a chapter to the Internet.¹¹⁴

Most available books on the subject approach it from its more technical aspects — the computer language involved, the history of its development, the "how to's" instead of the "whys." A great many of these sources were published prior to the period of rapid growth occurring during the past two years and some, such as *Cyberspace: First Steps* (1992) and *Surfing on the Internet* (1995) deal more with essays regarding the concepts of cyberspace.

Although Dern has estimated 90 percent of government research is available on the

Internet, most books written about the Internet overlook the role of the federal government as a resource for Internet users, individuals who are often called “Internauts,” “cybernauts” or “net surfers.” While these are excellent resources in helping the user to better understand cyberspace, the issue of state government use of the Internet or how decisions are made as to what is placed on it is virtually nonexistent. *Navigating the Internet* (1994) contains 20 pages of resource sites and another 180 pages of newsgroups covering a diversity of topics ranging from body art and ballroom dancing to unidentified flying objects and intellectual property rights. Yet there are only seven federal government and one state (Texas) government resource site listed.¹¹⁵ *Riding the Internet Highway*, (1993) a “complete guide to 21st Century communications,” lists only six federal government and no state government sites on its list of important servers.¹¹⁶ Veljkov and Hartnell (1994) make only a single mention of government as an information resource on the net — a notation the three-letter term “gov” in an e-mail or Internet host server address indicates it is a government agency.¹¹⁷ Snell (1995) is slightly more helpful, pointing out the profusion of government information over the Internet and predicting the federal government will use cyberspace as a tool in the delivery of both information and services in coming years.¹¹⁸ If this comes to pass, however, he notes discussion must eventually focus on how to make the Internet accessible to all citizens.

Government use of the Internet: These use of cyberspace by the public sector has been only briefly touched upon by researchers. Bourquard (1994) documented how the state legislatures of California, Hawaii and Utah took their first steps to make legislation and voting records available over the World Wide Web.¹¹⁹ Grossman (1995) and Ivry (1995) in separate essays have delved into the theoretical uses of cyberspace in the governing process, yet neither confronted the problems actually encountered by states attempting to establish web sites.¹²⁰

Government Technology magazine has proven to be an excellent resource for examples of ways government has adapted to cyberspace technology. In one of the magazine’s regular columns, “Trends,” Sood (1995) notes some state and local government operations are using Internet technology to automate their internal procedures, rather than improving public access. She predicts “integrated government service delivery is not only a

possibility, it is a necessity if governments are to efficiently serve their customers.”¹²¹ Harris (1995), writing in the magazine’s “Govt@Internet” column predicts cyberspace will have such a great impact and become so commonplace as society moves into the 21st Century that people will no longer take notice of the technology, but instead focus on the message it carries — much as we do television or the printed word.¹²² More than half of the articles published in the “Govt@Internet” column have dealt with examples from state government, such as how each of the 50 state governments are using the Internet (1994),¹²³ or how quickly state legislatures are going online.¹²⁴ The State of Texas has won one of the magazine’s “Best of the Web” awards for how it uses cyberspace to assist the public.¹²⁵ Likewise, Maine’s governor has been the focus of a 1996 story regarding efforts to automate state agencies¹²⁶ and local governments in New York drew praise for efforts to make public records more accessible.¹²⁷ At this time, however, none of these issues have documented how state transportation departments utilize cyberspace.

Kotcher’s research (1996) indicates cyberspace plays an integral role in crisis prevention. Agencies active on the Internet can monitor developing issues, learn about opposition and plan accordingly. The Internet provides the tools necessary to monitor, research, assess and respond to evolving crises. The key is for public information officers to become familiar with cyberspace and knowledgeable in its tools.¹²⁸

Technology’s Effect on the Public and Private Sectors

The presence of cyberspace technology pressures public and private sectors to develop new methods of providing service to millions regularly using the Internet. Cyberspace can overcome time and distance constraints to improve the effectiveness of business communications, training, marketing and even product and service distribution.

Few fields are exempt from the effects of cyberspace — even one as logically far removed as the transportation industry. A conference of trucking industry representatives were told in late 1995 “the Internet is the sixth form of transportation after the five traditional forms (of road, rail, water, air and pipeline)” because of its ability to deliver such goods as specialized publications, software, music and more.¹²⁹

Newspapers are going online en masse in 1995, with the number online at the end of

the year triple the number on the Internet the previous January. There were 175 U.S. newspapers online in early 1996 and 775 worldwide.¹³⁰ But not all journalists appear excited about this new medium. A survey of food, entertainment and lifestyle editors showed sparing use, although the Internet was available to more than half of them. These journalists blamed their lack of use on a problem with the credibility of cyberspace stories and their personal preference for face-to-face contact.¹³¹

Public relations professionals who have become “cybernauts” are quick to encourage their colleagues to make the Internet a regular tool of their working environment. “The options for a communicator are endless,” said Jeff Herrington of Jeff Herrington Communications during a presentation to the Central Oklahoma Chapter of the International Association of Business Communicators in 1996. “If we don’t learn the importance of this new medium, our profession could be kidnapped away from us.”¹³² Entire issues of *Public Relations Tactics* have been devoted to teaching public relations professionals how to use cyberspace as a media relations tool.¹³³ But the magazine also predicts 20 percent of the Fortune 500 companies who have gone online in recent months will abandon this strategy by 1997.¹³⁴ The reason, Solberg (1996) says, is because insufficient research went into the decision to go online. While the Internet is an important tool, it is not so foolproof it can be used haphazardly and produce effective results.

Government Services Over the Internet: Javed (1995) suggests recent advancements in telecommunications — and especially cyberspace — has ushered in a “Telecom Society,” replacing the “Computer Society” of the past decade.¹³⁵ The information flow of the former society (from many to many) has been replaced with the possibility of an information flow from all to one and one to all. Interactive movies may become the entertainment of the future, surfing the Internet will become a major pastime and global brands will begin dominating the marketplace. Javed sees the “Telecom Society” as a transition to the eventual arrival in a true “Virtual Society.” Arrival in the “Virtual Society” may result in the end of large government as we know it, according to noted cyberspace writer John Perry Barlow. “The net is about taking power away from institutions and giving it to individuals,” Barlow said. Large institutions will just “keel over and die.”¹³⁶

Other Literature

The mainstream press (magazines and newspapers) appears to be one of the best sources of cyberspace information, since it has the ability to provide timely details of advancements in technology, latest commercial use and how government and political policies are changing cyberspace. Several new publications have appeared in the early 1990s, most notably *Wired* magazine, which goes beyond technical aspects of the Internet to portray its culture. This includes such issues as tracking the federal government's efforts to censor cyberspace and looking at Presidential elections to determine its potential impact on Internet users.¹³⁷ And no discussion of cyberspace would be complete without mention of *Neuromancer*, William Gibson's fictionalized account of the virtual world of the future.

Evaluation

As it has already been noted, cyberspace use by the average American is a recent phenomenon. As such, no research has yet addressed the Internet with relation to theories of communication, diffusion or democratic theory. Much of the research cited in this review of the literature, although valid and fairly recent, was conducted prior to the rapid growth of the Internet. The majority of works specific to cyberspace deal with historical background and how to familiarize users with its functionality. This thesis will address cyberspace as a channel of communication, the evidence of diffusion theory in its use, and how its use affects the government public relations function.

End Notes

1. John E. Newhagen and Sheizaf Rafaeli, "Why Communication Researchers Should Study the Internet: A Dialogue," *Journal of Communication* 46 (Winter 1996): 5.
2. Ray Eldon Hiebert, "A Model of the Government Communication Process," in *Informing the People: A Public Affairs Handbook*, ed. Lewis M. Helm et al. (New York: Longman, Inc., 1981), 4.
3. Kenneth R. Mladenka, "Responsive Performance by Public Officials," in *The Public Encounter*, ed. Charles T. Goodsell (Bloomington: Indiana University Press, 1981), 145.
4. National Commission on the State and Local Public Service, *Hard Truths/Tough Choices: An Agenda for State and Local Reform* (Albany, N.Y.: Nelson A. Rockefeller

Institute of Government, 1993), 50.

5. Hiebert, 5.

6. Ibid., 3.

7. Oscar H. Gandy Jr., "Public Relations and Public Policy: The Structuration of Dominance in the Information Age," in *Rhetorical and Critical Approaches to Public Relations*, ed. Elizabeth L. Toth and Robert L. Heath (Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1992), 134.

8. Ibid., 135.

9. Ben H. Bagdikian, preface to *Keeping America Uninformed*, by Donna A Demac (New York: The Pilgrim Press, 1984), xi.

10. David S. Arnold, Christine S. Becker and Elizabeth K. Kellar, eds., *Effective Communication: Getting the Message Across* (Washington, D.C.: International City Management Association, 1983), 29.

11. Ibid., 15.

12. National Cooperative Highway Research Program, *Public Outreach Handbook for Departments of Transportation*, Report 364 (Washington, D.C.: National Academy Press, 1994), 3.

13. "Without Efforts Like Ours, Drivers Might be Watching Out for a Lot More Than the Highway Patrol," advertisement in *Inside PR*, July 1994:7.

14. National Commission on State and Local Public Service, 49.

15. Mladenka, 144-145.

16. Committee on Public Relations of Public Personnel Agencies, *Public Relations of Public Personnel Agencies* (Chicago: Civil Service Assembly of U.S. and Canada, 1941), 60.

17. Jarol B. Manheim, *All of the People, All the Time: Strategic Communication and American Politics* (Armonk, N.Y.: M.E. Sharpe, Inc., 1991), 238.

18. Ibid, 236-237.

19. Camilla Stivers, "The Listening Bureaucrat: Responsiveness in Public Administration," *Public Administration Review* 54, no. 4 (July/August 1994):367.

20. Ibid.

21. Manheim, 239-240.

22. Dennis D. Riley, *Specialized Policy Making: A System-Subsystem Model*, Center for Public Affairs, Papers in Public Administration no. 29 (Tempe, Ariz., 1975), 4.

23. Don Bagin, Donald Ferguson and Gary Marx, *Public Relations for*

Administrators (Arlington, Va.: American Association of School Administrators, 1985), 64.

24. Benjamin R. Wygal, "Public Relations: Concepts, Authority, Control," in *Improving Relations with the Public*, 20 (Winter 1977): 11-12.

25. Gandy, 134.

26. U.S. Department of Transportation, United States Coast Guard, *U.S. Coast Guard Auxiliary Public Affairs Officer's Guide* (Washington, D.C.: GPO, 1993), 1-1.

27. U.S. Department of Defense, *Meeting the Press: A Media Survival Guide for the Defense Manager*, by Judson Connor (Washington, D.C.: National Defense University Press, 1993), xi.

28. Pat Ordovensky and Gary Marx, *Working with the News Media* (Arlington, Va.: American Association of School Administrators, 1993), 26.

29. U.S. General Services Administration, Office of Public Affairs, *Communicator's Sourcebook: Tips and Tools for Speeches, Interviews and Press Conferences* (Washington, D.C.: GPO, 1988), 34.

30. Scott M. Cutlip, "Government and the Public Information System," in *Informing the People: A Public Affairs Handbook*, ed. Lewis M. Helm et al. (New York: Longman, Inc., 1981), 24.

31. *Ibid.*, 30.

32. Hugh M. Culbertson et al., *Social, Political and Economic Contexts in Public Relations: Theory and Cases* (Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1993), 87.

33. J.A.R. Pimlott, *Public Relations and American Democracy* (Princeton, N.J.: Princeton University Press, 1951), 235-237.

34. Gandy, 138-140.

35. *Ibid.*, 133.

36. Stephen Hess, *The Government/Press Connection: Press Officers and Their Offices* (Washington, D.C.: The Brookings Institute, 1984), 115.

37. Committee on Public Relations of Public Personnel Agencies, 55.

38. Peter Hemon and Charles R. McClure, *Public Access to Government Information: Issues, Trends and Strategies* (Norwood, N.J.: Ablex Publishing Corp., 1986), 345.

39. Bill Adams, "Ask the Professor," *Public Relations Tactics*, October 1994, 2.

40. Mary Ann Pires, "Community Relations: An Old Standby with New Clout," (Presented at the Oklahoma City Chapter of the Public Relations Society of America's professional development seminar, Oklahoma City, Okla., 28 Oct. 1994).

41. Peter Roche, "How to Respond to a Bashing by the Press," *Public Relations Tactics*, October 1994, 6.
42. Manheim, 4-5.
43. David Zizzo, "PR Pushers Gladly Help Media Decide What's Important," *Daily Oklahoman* (Oklahoma City), 13 Nov. 1994, sec. A, p. 20.
44. National Cooperative Highway Research Program, 3.
45. Ibid., 4.
46. James S. Bowman, "At Last, an Alternative to Performance Appraisal: Total Quality Management," *Public Administration Review* 54, no. 2 (March/April 1994): 129.
47. Bagin, Ferguson and Marx, 45.
48. Jon White and David M. Dozier, "Public Relations and Management Decision Making," in *Excellence in Public Relations and Communications Management*, ed. James Grunig (Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1992), 103.
49. Culbertson et al., 81.
50. Dave Zielinski, "Constant Communication and Follow-Through Build Trust," *Total Quality Newsletter* 5, no. 5 (May 1994):6.
51. Tod Newcombe, "Governors Push State Role in Information Highway," *Government Technology* 7, no. 11 (Nov. 1994): 38.
52. "Four-Part Quality Strategy Gives City a Sparkling Public Image," *Total Quality Newsletter* 5, no. 6 (June 1994):4.
53. Lee W. Baker, *The Credibility Factor: Putting Ethics to Work in Public Relations* (Homewood, Ill.: Business One Irwin, 1993), 296.
54. Arnold, Becker and Kellar, 12.
55. Kenneth Rabin, "Factors Affecting Government Communications Staffing," in *Informing the People: A Public Affairs Handbook*, ed. Lewis M. Helm et al. (New York: Longman, Inc., 1981), 105-107.
56. Barbara J. DeSanto, "Public Information Officers and Functions: Exploring the 'Invisible Influence' in Oklahoma Government" (Paper presented to the Public Relations Division of the Association for Education in Journalism and Mass Communication annual convention, Washington, D.C.), August 1995.
57. James E. Grunig and Larissa A. Grunig, "Models of Public Relations and Communications," in *Excellence in Public Relations and Communication Management*, ed. James E. Grunig, (Hillsdale, N.J.: Lawrence Erlbaum Associates, 1992), 286-289.
58. Ibid, 304.
59. Ibid, 307-309.

60. Greg Leichty and Jeff Springston, "Reconsidering Public Relations Models," *Public Relations Review* 19 (Winter 1993): 333.
61. Kathleen S. Kelly, "Utilizing Public Relations Theory to Conceptualize and Test Models of Fund Raising," *Journalism and Mass Communication Quarterly* 72 (Spring 1995): 115.
62. Joey Reagan, Janine Sumner and Scott Hill, "Using Grunig's Indices to Differentiate Organizational Public Relations Functions," *Journalism Quarterly* 69 (Spring 1992): 186.
63. DeSanto.
64. James E. Grunig, "Implications of Public Relations for Other Domains of Communication," *Journal of Communication* 43 (Summer 1993): 168.
65. James E. Grunig, "Organizations and Public Relations: Testing a Communication Theory," *Journalism Monographs* No. 46 (November 1976): 49.
66. David M. Dozier, Larissa A. Grunig and James E. Grunig, *Manager's Guide to Excellence in Public Relations and Communication Management* (Mahwah, N.J.: Lawrence Erlbaum Associates, 1995), 15.
67. Ibid, 58.
68. Edgar F. Borgatta and Marie L. Borgatta, *Encyclopedia of Sociology*, vol. 1 (New York: Macmillan, 1992), 488.
69. Goran Hedebro, *Communication and Social Change in Developing Nations: A Critical View* (Ames: Iowa State University Press, 1982), 25.
70. Borgatta and Borgatta, 488.
71. Ibid.
72. Everett M. Rogers and F. Floyd Shoemaker, *Communication of Innovations: A Cross-Cultural Approach* (New York: The Free Press, 1971), 25. (By 1971, Rogers had proposed deleting the implementation phase of his model. However, all other sources researched for this paper utilized the five-step diffusion process, therefore, it is the one selected for use here.)
73. Ibid., 22-23.
74. Kazushi Ohkawa and Katsuo Otsuka, *Technology Diffusion, Productivity Employment and Phase Shifts in Developing Economies* (Tokyo: University of Tokyo Press, 1994), 24.
75. Everett M. Rogers, *Diffusion of Innovations* (New York: The Free Press, 1962), 12.
76. Ibid.
77. Ibid.

78. Ibid., 172-182.
79. "WWW Usage and Demographics," Nielsen Internet Survey, <http://www.nielsenmedia.com/company/nmrwhere.htm>, (14 March 1996); "Demographics," Internet@vantage, <http://www.iav.com/demo.html>, (14 March 1996); "Internet Survey," Parallax Webdesign Report, <http://www.echonyc.com/%7Eparallax/interfacts.html>, (January 1996).
80. Robert H. Lauer, *Perspectives on Social Changes*, 4th ed. (Boston: Allyn and Bacon, 1991), 177-178.
81. Ibid.
82. Robert L. Hamblin, R. Brooke Jacobsen and Jerry L. Miller, *A Mathematical Theory of Social Change* (New York, Wiley, 1973).
83. Lauer, 178; Rogers and Shoemaker, 230-233; Hedebro, 32-33.; Niels G. Roling, Joseph Ascroft and Fred Wa Chege, "The Diffusion of Innovations and the Issue of Equity in Rural Development," in *Communication and Development*, ed. Everett M. Rogers (Beverly Hills: Sage Publications, 1976), 74-75.
84. Everett M. Rogers and Arnold Picot, "The Impact of New Communication Technologies," in *The Media Revolution in America and Western Europe*, ed. Everett M. Rogers and Francis Balle (Norwood, N.J.: Ablex Publishing Corp., 1985), 109.
85. Martin P. Clark, *Managing to Communicate* (Chichester, England: John Wiley and Sons, 1994), 7.
86. Everett M. Rogers and Rekha Argawala-Rogers, *Communication in Organizations* (New York: The Free Press, 1976), 150.
87. Ibid., 161.
88. Ibid., 155-156.
89. John K. Smith, "Thinking About Technological Change: Linear and Evolutionary Models," in *Learning and Technological Change*, ed. Ross Thompson (New York: St. Martin's Press, 1993), 71.
90. Jana L. Hyde, "The Media and Diffusion of Innovation," in *The Significance of the Media in American History*, ed. James D. Startt and William D. Sloan (Northport, Ala.: Vision Press, 1994), 233.
91. Ibid.
92. Sid L. Huff, "Computing as Innovation," *Business Quarterly*, vol. 52 no. 1 (Summer 1987): 8.
93. Ibid.
94. Ibid., 9.
95. Ellen Francik et al., "Putting Innovation to Work: Adoption Strategies for

Multimedia Communication Systems," *Communication of the Association of Computing Machinery*, vol. 34 no. 12 (December 1991): 54. (Publishing Co., 1995)

96. William Kornblum, *Sociology in a Changing World*, 2nd ed. (Fort Worth: Harcourt Brace Jovanovich, Inc., 1991), 339-340.

97. Ibid., 551-552.

98. Bob Cotton and Richard Oliver, *The Cyberspace Lexicon: An Illustrated Dictionary of Terms from Multimedia to Virtual Reality* (London: Phaidon Press, Ltd., 1994), 54.

99. Bennett Falk, *The Internet Road Map*, 2nd ed. (San Francisco: Sybex, 1994), 11.

100. Ibid.

101. Richard J. Smith and Mark Gibbs, *Navigating the Internet* (Indianapolis: Sams Publishing, 1994), 136.

102. K.A. Oostendorp, W.F. Punch and R.W. Wiggins, "A Tool for Individualizing the Web," oostend2@cps.cps.msu.edu (14 September 1994).

103. Ed Krol, *The Whole Internet: User's Guide and Catalog*, 2nd ed. (Sebastopol, Calif.: O'Reilly and Associates, Inc., 1994), 288.

104. Daniel P. Dern, *The Internet Guide for New Users* (New York: McGraw-Hill, Inc., 1994), 430.

105. Internet@vantage.

106. "How many people are connected?" Global Interactive Solutions, <http://www.atgi.com/demog.html>, (14 March 1996).

107. Jim Pitkow and Colleen Kehoe, "GVU WWW Internet Survey: Executive Summary," Georgia Institute of Technology, http://www.cc.gatech.edu/gvu/user_surveys/survey-10-1995/, (14 March 1996).

108. "Survey Doubles Estimate of Web Use to 17 Million American Adults," The Associated Press, 15 February 1996.

109. Parallax Webdesign.

110. John December, "Units of Analysis for Internet Communication," *Journal of Communication* 46 (Winter 1996): 14.

111. Mike Perry, "Internet Survey No. 1," <http://www.wisdom.com/sv/>, (1995).

112. "Business Access Technologies Internet Survey," <http://batech.com/cgi-bin/shostats/>, (14 March 1996).

113. "WWW Usage and Demographics," Nielsen Internet Survey, <http://www.nielsenmedia.com/company/nmrwhere.htm>, (14 March 1996).

114. R.B. Rubin, A.M. Rubin and L.J. Piele, *Communication Research: Strategies and Sources*, 4th ed. (Belmont, Calif.: Wadsworth Publishing Co., 1995).
115. Smith and Gibbs, 346-365.
116. Sharon Fisher, *Riding the Internet Highway: Complete Guide to 21st Century Communications* (Indianapolis: New Riders Publishing, 1993), 245.
117. Mark Veljkov and George Hartnell, *Pocket Guides to the Internet: Basic Internet Utilities*, Vol., 5 (Westport, Conn.: Mecklermedia, 1994), 6.
118. Ned Snell, *Curious About the Internet?* (Indianapolis: Sams Publishing, 1995), 51.
119. Jo Anne Bourquard, "Legislatures Hit Cyberspace," *State Legislatures* 20, no. 8 (Aug. 1994): 31-33.
120. Lawrence K. Grossman, "The Electronic Republic," *Media Studies Journal* 9, no. 3 (Summer 1995): 165; Sara B. Ivry, "Town Hall On-Line," *Media Studies Journal* 9, no. 3 (Summer 1995): 169-171.
121. Rishi Sood, "Government Service Delivery in the 21st Century," *Government Technology*, October 1995, 40.
122. Blake Harris, "Cyberspace 2020," *Government Technology*, October 1995, 32.
123. "State Internet Strategies," *Government Technology*, December 1994, 20-21.
124. "State Legislature Home Pages," *Government Technology*, December 1995, 107.
125. Mike Nevins, "Best of the Web," *Government Technology*, January 1996, 20.
126. Brian Miller, "Maine Governor Angus King," *Government Technology*, March 1996, 18-19.
127. James Evans, "New York Tackles Storage and Access Problems," *Government Technology*, March 1996, 32.
128. Raymond L. Kotcher, "Surviving a Crisis in Cyberspace," *PR Tactics*, March 1996, 12.
129. "Internet: The Sixth Mode of Transportation," *Transport Topics*, 13 November 1995, 34.
130. "Number of Papers with Online Editions Tripled," *Editor and Publisher*, 24 February 1996, 39.
131. Jerry Walker, "Food Journalists are Slow to Embrace Online Services," *O'Dwyer's PR Services Report* 10, March 1996, 44.
132. Jeff Herrington, "Why Should I Care About the Internet," (Presented to the Central Oklahoma Chapter of International Association of Business Communicators, Oklahoma City, 14 March 1996).

133. Amy Watson Plummer, "Managing Media Relations in Cyberspace," *Public Relations Tactics*, June 1995, 18.
134. Ron Solberg, "The Net: More than a Medium," *Public Relations Tactics*, March 1996, 18.
135. Naseem Javed, "Sunrise: Day One, Year 2000," *Communication World*, December 1995, 23.
136. John Gerstner, "Cyber Cowboy," *Communication World*, November 1995, 19.
137. Todd Lapin, "The Rogues Gallery," *Wired*, April 1996, 80; John Heilemann, "The GOP Big Tent is Full of Holes," *Wired*, April 1996, 63-183.

CHAPTER III

METHODOLOGY

General

The rapid growth and popularity of the Internet's World Wide Web opened up an entirely new area for the dissemination of information by state government agencies, and provided a new tool in the practice of public relations. Many state departments of transportation were quick to recognize the potential of the World Wide Web, but others remain uncertain of its usefulness to their missions. This portion of the thesis focused on characteristics typically describing the average department of transportation website, and sought to determine the reasons state DOTs made the decision to enter, or to stay off of, cyberspace's "information superhighway."

Purpose of the Study

The purpose of this study was to determine if Internet use by state departments of transportation was consistent with theories of public relations (specifically Grunig's models of PR) and to determine how actively the development of websites followed the diffusion of innovations. The primary focus of this study was to determine what reasons (such as available technology, overall cost, competition with other states, public input and public relations processes) influenced the entry of government agencies into cyberspace.

Research Approach

Research on this topic was conducted through two methods: 1) a content analysis of the web pages of the approximately 30 state departments of transportation currently on the World Wide Web, and 2) a survey of all 50 state departments of transportation.

The content analysis was used to determine the type of information transportation agencies are offering through the World Wide Web. A checklist of elements (such as the use of color, varying type styles and type sizes, real-time audio and video, maps, photographs, counters, compressed files, graphics, types of information and services offered) was developed to analyze state web pages consistently and objectively.

Questionnaires were distributed to all 50 state departments of transportation. The data collection device was divided into sections with questions applicable to each of the two groups: those with websites, and those without.

Some questions were designed to provide verification of the existence of a website for the content analysis portion of the thesis. Other questions were developed to provide additional demographic data pertinent to the website (its date of establishment, World Wide Web address, degree of public input, who is in charge of the website's development) and additional questions were designed to unearth attitudes toward cyberspace from the DOT personnel who have the responsibility of developing a website. Additionally, the questionnaire was expected to provide valuable input in learning to what degree the public is accessing transportation information from the Internet, how websites are being promoted among users, and to what degree states with websites looked at other home pages in the development of their own.

Research Questions and Hypotheses

General

Questions examined as part of the content analysis portion of the research included:

- 1) What type of transportation information is commonly placed on Internet electronic resource sites?
- 2) What types of graphics or technical innovations, if any, do state transportation agencies utilize to improve appearance and readability of information on electronic resource sites?
- 3) Does the type of information carried over electronic resource sites conform to recognized public relations communications models (is it strictly for information purposes or is the information structured to promote better public relations between the agency and

taxpayers; is the communications format one-way or two-way)?

Questions to be examined as part of this portion of the research include:

- 1) What level of importance is placed on various types of transportation information commonly placed on Internet electronic resource sites?
- 2) What reasons are driving states to develop transportation information resource sites on the World Wide Web?
- 3) When transportation agencies begin to develop web sites, do they utilize the expertise of other transportation agencies who have already developed electronic resource sites?
- 4) Is the growth of cyberspace and its use by state departments of transportation following the course described by Rogers' diffusion of innovations?
- 5) Are the people responsible for providing the information on transportation home pages trained communication professionals, or is their expertise derived from another area?

Variables and Definitions

The following variables are of interest to this study:

Departments of Transportation, an independent variable. Although their official names may vary from state to state (some are called highway departments, one is called a transportation cabinet), each of the 50 United States maintains a governmental agency responsible for the construction and maintenance of that state's transportation infrastructure (roads, waterways, rail and air).

Website Contents, a dependent variable. Operationally defined as "visual enhancements," "operational enhancements" and "information types."

Reason to go Online, a dependent variable operationally defined as "because other states were online," "technology made it possible," "governor's request/command," "agency head's request/command," "public interest," "ability of qualified personnel" and "other."

Visitor Accesses, a dependent variable, measured in times per week and operationally defined as "less than 50," "51-100," "101-200," "201-300," "301-400," "401-500," "more than 500" and "don't know."

Frequency of Information Updates, a dependent variable operationally defined as “daily,” “semi-weekly,” “weekly,” “semi-monthly,” “monthly,” “semi-annually” and “not yet updated.”

Responsibility for Website Graphics, a dependent variable operationally defined as “professional computer service,” “trained DOT staff,” “another state agency,” “webmaster,” “staff member working with professional” and “no graphics used.”

Source of Webmaster, a dependent variable operationally defined as “trained staff,” “assigned staff,” “outside computer expert,” “another state agency,” “public information office,” “data processing unit” and “provider service.”

Graphic Elements, a dependent variable operationally defined as “graphics,” “construction information,” “maps,” “e-mail address,” “press releases,” “mission statement,” “other DOT links,” “organizational chart,” “state government links,” “realtime audio/video.”

Methods of Monitoring Feedback, a dependent variable operationally defined as “surveys,” “telephone,” “counter,” “in-person contacts,” “e-mail,” “U.S. mail” and “other.”

Types of Websites Visited, a dependent variable operationally defined as “other DOTs,” “federal government,” “other state agencies,” “entertainment,” “education” and “other.”

Personal Attitudes toward Cyberspace, a dependent variable operationally defined as “novice or expert,” “easy or hard to use,” “useful or not useful,” “innovation or fad,” “information tool or entertainment medium,” “never used or regular user,” “overrated or underrated in importance,” “time saver or waster.”

Responsibility for Website Implementation, a dependent variable operationally defined as “governor,” “state official,” “state agency,” “local agency head,” “department head,” “data processing unit,” “public affairs unit” or “other.”

Responsibility for Website Operation, a dependent variable operationally defined as “public information unit,” “data processing unit,” “administrative unit,” “another unit within agency,” “another state government agency,” “private company” or “other.”

Factors Affecting Implementation Decision, a dependent variable operationally defined as “personnel’s technical expertise,” “cost/budget considerations,” “available technology,”

“public input,” “geographic concerns” or “manpower (or lack of).”

Research Objectives

The culmination of this research project is anticipated to yield information supporting the presence of Rogers’ diffusion process in the development of electronic resource sites on the World Wide Web by state agencies. It should also yield data shedding light on recent questions regarding Grunig’s public relations models — if his original four-model system is the most accurate representation of how the public relations process works, or if time and advancements in technology have added new dimensions to his theories. Thirdly, it is hoped this project will lay the groundwork for future studies on the use of cyberspace by state governments to determine how this technology is affecting the ways agencies deal with citizens. Finally, results from this study will prove helpful to state agencies desiring to establish Internet websites by giving them background information on the use of this medium by other agencies.

Sampling Plan

Establishing a sampling plan for this research was made much easier because the sample population was a small, finite population consisting of 50 state departments of transportation. The number of state DOTs with Internet websites was even smaller — only 30 (in fact, it was only 27 when research began; three states established transportation websites during the research period).

The sample frame used to obtain addresses for the mail survey was the annual directory of the Association of State Highway and Transportation Officials. The sample frame for state DOT websites was found on a list of links contained in the United States Department of Transportation’s Internet website. Neither source was 100-percent accurate and necessitated further investigation from the research to develop a complete list of contact names, mail addresses and Internet addresses.

Questionnaires targeted an individual (possibly a “webmaster,” possibly upper-level management) as its sample unit. It is the responsibility of those individuals to maintain the information provided on the Internet. In the case of state transportation departments not yet

on the World Wide Web, questionnaires were directed to the agency's top management official. The sample unit for the content analysis was each state's website.

Sample sizes for the questionnaire and the content analysis were the entire population. Based on a 96-percent response rate, the sampling error for each survey technique was expected to be extremely small.

Schedule for Conducting the Research

Questionnaires were sent via U.S. mail to a contact person at each of the 50 state departments of transportation on Feb. 14, 1996. The mailing was preceded by a two-week effort of contacting each agency by either e-mail or telephone to determine who would be the appropriate person to receive the questionnaire. This gave each state an opportunity to be aware of the questionnaire's existence prior to its arrival.

Questionnaires were accompanied by a cover letter on Oklahoma State University letterhead explaining the purpose of the survey. The letter was written with as few Internet-specific terms as possible so that it was readily understandable to those states which had not yet initiated a website in cyberspace. A general overview of the contents of the questionnaire was also presented in the cover letter. A postage-paid envelope accompanied the cover letter and questionnaire.

A response deadline of Feb. 29, 1996, was listed in the cover letter. By that date, 22 forms (44 percent) had been completed and returned by mail. By March 7, 1996, 31 forms (62 percent) had been returned. A reminder telephone call was made during the week of March 8-15 to states not responding to the questionnaire. This resulted in 17 additional responses, for a total of 48 completed forms, or a 96-percent overall rate. At their request, seven states submitted telephone responses and five states returned the questionnaire by facsimile machine. Only two states declined to respond to the questionnaire after the follow up call was made — Delaware and Hawaii. There was no second follow up contact.

Content analysis of the 30 state DOT websites was done over a three-week period — from April 9-30, 1996. A review of all state government websites was made during the second week of May 1996 to pick up any state DOTs going online after the initial survey.

Data Collection

The researcher's employment by a transportation agency was a factor in the selection of this topic. To avoid any perceived conflict of interest in this research, his role as an employee of the Oklahoma Department of Transportation was clearly noted in the cover letter. No correspondence in relation to the survey was mailed on letterhead from Oklahoma DOT. In addition, the author was not involved in any aspect of the development of Oklahoma's transportation web site.

Intercoder reliability

The content analysis portion of this study was designed to detect the presence or absence of particular elements (color, graphics, type faces, use of e-mail, specific types of information, etc.). Conducting the study in this way reduced the level of subjectivity to nearly zero. Because of it, analysis was done by a single person rather than a coding team.

Data collection instruments

The questionnaire was four pages in length and consisted of 30 questions. By its design, a staff member from a state DOT with a World Wide Web page answered questions 1-21 and questions 26-30, for a total of 26 questions. A staff member from a state DOT with no website answered question 1 and questions 22-30, for a total of 10 questions. All respondents answered basically an equal number of attitudinal questions with the additional questions for respondents at DOTs with web pages focusing on specific information regarding the website.

The first question on the form was designed to confirm early investigation by the researcher to determine states with websites. It also served as a screening question to direct respondents to the appropriate locations they were to answer on the form.

Seventeen questions (directed at those states with websites) asked for specific pieces of information regarding the resource site. Three questions asked for information relating more to the personal opinions of the respondent.

For non-website DOTs, two questions addressed the future of the state agency's use of the Internet and two asked questions regarding the personal Internet experience of the

respondent.

All respondents answered the final five questions — one regarding personal attitudes toward the Internet, one regarding the respondent's opinion about factors influencing the decision to use the Internet, and two regarding the decision-making process within each DOT. A final item was an optional verification question to assist with tabulating responses and making follow-up contacts.

For the content analysis, a checklist of various items common to Internet websites was developed. Each state's website was then reviewed and the presence or absence of these characteristics was noted on the checklist. These responses were then cross-referenced with responses on the same topic to determine the accuracy of responses on the questionnaire. Characteristics were also quantified as a percentage in determining the commonality of elements for a state department of transportation website.

Pretest

A three-person panel was asked to review the questionnaire after its initial development. The panel consisted of one person with Internet experience, who reviewed the form for clarity of cyberspace terminology and completeness of information; one staff member from a state department of transportation, who reviewed the form for its treatment and completeness of transportation issues; and one person with no Internet experience, who reviewed the questionnaire for its clarity from the standpoint of a staff member from a DOT having no website. A copy of the questionnaire can be found in Appendix C.

For the content analysis, a checklist of 27 items the researcher considered to be a typical part of a department of transportation webpage was developed. These involved 13 items considered to be visual enhancements (described as the use of elements such as "wallpaper," multiple type fonts, varying type sizes, illustrations, photos, "new item" icons, and other techniques to improve the aesthetic appeal of the website), seven items considered to be operational enhancements (described as the use of such user-related abilities as search engines, links, e-mail, warnings pertaining to length of time to download information, and other elements designed to make the website more "user friendly"), and seven items considered to be information types (such as a mission statement, employee

information, the offering of materials online, and other types of content considered and the important to a user accessing the website).

Three state DOT websites — Texas, Minnesota and Alaska — were selected at random for a pretest of the checklist for its functionality. A copy of the final content analysis checklist is located in Appendix D.

Data Analysis

In looking for a way to establish a level of applicability for the data collected in this study, it is important to note that the information obtained through the mail survey pertained primarily to the elements common to all transportation websites and information specific to the establishment of each state's website, such as the date it went online and its Internet address. A relatively small portion of the questionnaire dealt with the respondent's personal views toward the Internet, precluding any meaningful use of methods of determining statistical variance. The content analysis of web pages focused on the presence or absence of specific informational and graphical elements used by transportation agencies.

The researcher felt the best statistical method of analyzing data, both from the questionnaire and the content analysis, came from expressing the presence or absence of website characteristics as a percentage of the total number of websites studied in this survey. In some cases, such as questions using a semantic differential scale, a sum of mean values was utilized to draw a clearer comparison of variables. This analysis was carried out according to the methods prescribed by Wimmer and Dominick, and DeVellis.¹ This served to construct a picture of a website typical to transportation agencies, providing a baseline of information these state agencies sought to make available, as well as the graphic techniques the agencies used to improve attraction to website visitors and usefulness to its citizens.

Many state DOTs took the trouble to establish a method of evaluating their websites' usefulness to the public by attaching a counter to monitor the number of visitors accessing information. Although not all agencies went to this effort, the questionnaire indicated that most states had an idea of the number of visitors accessing information from each of the 30

websites. This information was cross-tabulated with the population of each state, and the extent of development of each one's website to see what relationships existed.

The presence of a state DOT website and the extent of its development were also measured against the personal attitudes of respondents toward the Internet to seek to determine if those attitudes governed the state's development of a website.

Assumptions and Limitations

If one characteristic has typified the Internet over the past two years, it is the rapid growth of the network. Computer technology has become more commonplace in the home, attracting more users, and thus providing an incentive for the establishment of more websites. This rapid growth means the information in this study is extremely time sensitive. One year ago only eight state departments of transportation were represented on the web, today nearly four times that number are online. Within the next 12 months, DOT representation on the World Wide Web should reach nearly 100 percent.

This study is limited by the fact it represents a specific time frame — the period of February through May 1996. And it is limited by its focus on a single agency from each of the 50 states. While the graphic characteristics of the websites covered in this study may be applicable to a wide range of World Wide Web resource sites, the type of information disseminated through these websites is not.

Even after state DOTs complete the establishment of electronic resource sites, rapidly evolving technology will spur more changes.

This study hopes to capture this method of communications technology in 1996 so future researchers focusing their attention on the Internet and the World Wide Web may use this as a reference point to measure how use of cyberspace has changed.

End Notes

1. Roger D. Wimmer and Joseph R. Dominick, *Mass Media Research: An Introduction*, 4th ed. (Belmont, Calif.: Wadsworth Publishing Co., 1994), 211-212; Robert DeVellis, *Scale Development: Theory and Applications* (Newbury Park, Calif.: Sage Publications, 1991), 83.

CHAPTER IV

FINDINGS AND ANALYSIS

General

The purpose of this study is to determine if Internet use by state departments of transportation was consistent with theories of public relations (specifically Grunig's models of PR) and to determine how actively the development of websites followed the diffusion of innovations. The primary emphasis was an attempt to determine what reasons (such as available technology, overall cost, competition with other states, public input and public relations processes) influenced the entry of government agencies onto the World Wide Web.

A mail questionnaire seeking specific information about responsibilities and methods of development of websites and personal attitudes toward the Internet was distributed to all 50 state departments of transportation in mid-February 1996. Questionnaires were collected over a six-week period, with 96 percent of states participating in the survey. The findings of the survey are reported in this chapter.

This research format was supplemented with a content analysis of 28 state department of transportation resource sites on the World Wide Web. Specifically, this format looked at the elements comprising DOT websites and the information offered over it. Content analysis was done over a one-month period, April 1996.

Pretesting of Methods

Questionnaire

Input from the three-person panel resulted in minor revisions of the questionnaire, all of which involved restating items to improve clarity. The location of one item was changed to improve the orderliness of the overall questionnaire.

Content Analysis

The content analysis portion of the survey was administered to three state DOT websites. As a result of the pretest, all 27 of the original items were retained and 29 more were added, making the checklist 55 items long (19 visual enhancements, 17 operational enhancements and 19 information types). A 56th item on the checklist noted whether the website was operated by the transportation department itself, or as a page (or pages) of a state government website.

Findings

Questionnaire

A mail questionnaire was distributed to 50 state departments of transportation, targeted at an individual on each one's staff who played an important role in the operation of that state's Internet website, or in the decision-making process regarding institution of a website. Of the 50 forms mailed, 48 were answered, for an overall participation rate of 96 percent. The two states failing to respond were Delaware, which the content analysis portion of the survey indicated did not have a website, and Hawaii, which does have a website. Twenty-eight states indicated they operated an information resource site on the World Wide Web, leaving 20 states indicating they did not (Table I).

| Table I Operation of an Internet Information Resource Site N=48 | |
|--|------|
| State DOTs operating website | 58% |
| State DOTs not operating website | 42 |
| Total | 100% |

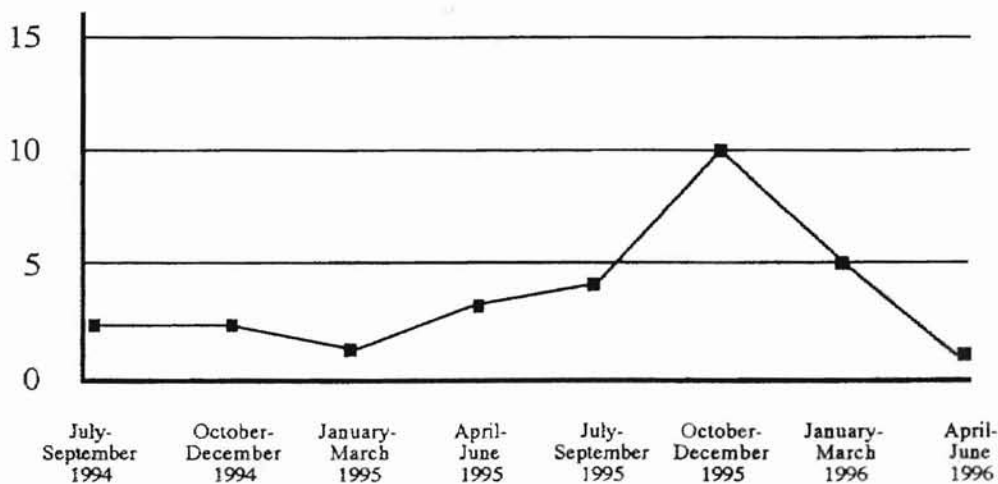
Question No. 1 was used as a screening device to divide states into two groups — those with an Internet website and those without. The questionnaire itself can be divided into three segments: Part I, answered only by states with websites; Part II, answered only by states without websites; and Part III, answered by all states. The data from the survey will be discussed in the order just mentioned.

An interesting phenomenon occurred in this portion of the research. A group of five

DOTs were in a transition period — two going online after the survey was conducted, and three indicating they were allowing their state government servers to carry information on their behalf while they developed their own websites. For the purposes of interpreting the research, these five states will be treated throughout this chapter according to the answers they gave to question No. 1: one online, four not yet online.

Part I: Figure I depicts the entry of state departments of transportation onto the World Wide Web. A directory of the individual states, each one's website URL, and the dates they initiated their websites is found in Appendix A.

FIGURE I
Initiation of Internet Websites by State DOTs per Quarter
N=28



Minnesota DOT holds the distinction of going online first (in July 1994), followed by the Virginia DOT with a forum page on the American Online provider service in September 1994. Two more states, California and Washington, went online by the end of that year. Eighteen state departments of transportation went online in 1995 (most in the final three months of that year). Six more states were online when the mail survey was conducted in 1996, with Rhode Island being the newest. (After the survey, North Dakota DOT became the 29th state to go online.)

Participants were asked to select primary and related factors influencing their decision to go online with seven choices offered. Results are depicted in Table II (next page).

| | <u>Primary</u> | <u>Second</u> | <u>Third</u> | <u>Mean</u> |
|--------------------------------------|----------------|---------------|--------------|-------------|
| Because other state DOTs were online | 0% | 18% | 3% | 0.4 |
| Technology made it possible | 25 | 18 | 18 | 1.3 |
| Governor's request/command | 29 | 0 | 14 | 1.0 |
| Agency head request/command | 7 | 18 | 11 | 0.7 |
| Public interest | 11 | 7 | 11 | 0.6 |
| Ability of qualified personnel | 14 | 29 | 14 | 1.1 |
| Other: Need to improve service | 11 | 0 | 0 | 0.3 |
| Saw opportunity | 0 | 3 | 0 | 0.2 |
| Test of the concept | 3 | 0 | 3 | 0.2 |
| No response | 0 | 7 | 30 | |
| Total | 100% | 100% | 100% | |

Overall, available technology was mentioned most frequently, followed by technical ability of personnel and response to a command or request from a governor or other state agency. Responding to a governor's request was mentioned most frequently as a primary response, but just slightly more than availability of technology.

States were asked to estimate the level of public input given into website development. Only four of the 28 respondents (14 percent) indicated that no public input was considered in development. Twenty-one states (75 percent) described the public's role as minor.

Nineteen of 26 states (73 percent) indicated they monitored the number of times their websites were being accessed. They were then asked to indicate the number of times their pages were being accessed from the categories indicated in Table III.

| | |
|---------------|------|
| Less than 50 | 4% |
| 51-100 times | 7 |
| 101-200 times | 7 |
| 201-300 times | 4 |
| 301-400 times | 0 |
| 401-500 times | 7 |
| More than 500 | 43 |
| Don't know | 28 |
| Total | 100% |

A few respondents indicated their websites were receiving an extremely large number of accesses per week. Departments of Transportation in California, Texas and Washington all indicated in written comments beside this question they were receiving more than 20,000 weekly visits from Internet travelers.

To the question of how frequently website information is updated, more than half revise information at least weekly. Four websites had gone online so recently the original information had not been updated since their establishment. One state failed to respond to this question. Table IV describes the frequency of updates.

| TABLE IV Frequency of Updating Information N=27 | |
|--|-------------|
| Daily | 33% |
| Semi-weekly | 4 |
| Weekly | 19 |
| Semi-monthly | 11 |
| Monthly | 7 |
| Semi-annually | 11 |
| Not yet been updated | 15 |
| Total | 100% |

Table V indicates the variety of sources state DOTs used to develop website graphics.

| TABLE V Responsibility for Graphic Development of Website N=28 | |
|---|-------------|
| Professional computer service | 4% |
| Trained DOT staff | 29 |
| Another state agency | 4 |
| Site's webmaster | 39 |
| Staff member working with professional | 22 |
| No graphics used | 2 |
| Total | 100% |

Most states (39 percent) assigned the task to the site's webmaster, or a trained person on staff (29 percent). Six states used a team comprised of a staff member and a computer

professional. Only two states went outside the agency to develop website graphics.

Likewise, most states opted to find their webmasters from within their agencies, as is seen in Table VI. (Seven states did not respond to this question.)

| | |
|---------------------------|-------------|
| Trained staff member | 14% |
| Assigned staff member | 0 |
| Outside computer expert | 5 |
| Another state agency | 10 |
| Public information office | 31 |
| Data processing unit | 40 |
| Provider service | 0 |
| Total | 100% |

Use of agency personnel, whether from a data processing unit (40 percent), public information unit (31 percent), or a specially trained employee (14 percent), accounted for 85 percent of webmasters. Three states went outside the agency to find webmasters. One state assigned the task to two personnel — one from data processing and one from public information. Table VII reflects that webmaster as if split evenly among the two units.

The importance of various graphic and information elements to a website was asked of all states, with each respondent rating 10 items on a scale of “not important” to “very important,” with an option of stating “no opinion.” Results are depicted in Table VII.

| | <u>Very Important</u> | <u>Somewhat Important</u> | <u>Marginally Important</u> | <u>Not Important</u> | <u>No Opinion</u> | <u>Mean</u> |
|----------------------|-----------------------|---------------------------|-----------------------------|----------------------|-------------------|-------------|
| Graphics | 14% | 43% | 32% | 0% | 11% | 2.5 |
| Construction info | 64 | 22 | 0 | 14 | 0 | 3.4 |
| Maps | 28 | 36 | 18 | 14 | 4 | 2.7 |
| E-mail address | 47 | 32 | 14 | 7 | 0 | 3.2 |
| Press releases | 47 | 28 | 11 | 7 | 7 | 3.0 |
| Mission statement | 25 | 28 | 25 | 11 | 11 | 2.5 |
| Links to other DOT's | 18 | 46 | 22 | 14 | 0 | 2.7 |
| Organizational chart | 4 | 32 | 21 | 25 | 18 | 1.8 |
| State govt. links | 22 | 39 | 25 | 7 | 7 | 2.6 |
| Realtime audio/video | 7 | 7 | 18 | 43 | 25 | 1.3 |

With the exception of two elements, a majority of states indicated that the elements in Table VII were at a minimum, somewhat important to the operation of their websites. Less importance was placed on the use of realtime audio and/or video and the inclusion of a departmental organizational chart drew overall weaker responses than did other elements.

Information-related items such as road construction (3.4 mean), an e-mail address (3.2 mean) and press releases (3.0 mean) were more frequently cited as very important to a website than were maps (2.7 mean), links to other state DOT sites (2.7 mean) and other state government web links (2.6 mean). The three latter elements were most often described as being "somewhat important" to a website, as were a mission statement (2.5 mean), graphics (2.5 mean) and organizational charts (1.8 mean).

The element selected overall as being the least important of the ten items was the use of realtime audio or video information, which 43 percent of states described as "not important" to operation of a website (1.3 mean).

Only eight of the responding states designed their websites for use with a particular software. Those eight selected versions of Netscape as their preference.

Participants indicated they were monitoring feedback regarding the information they were placing on their websites in a variety of ways, as Table VIII indicates.

| TABLE VIII Methods of Monitoring Feedback on Websites N=28 | |
|--|----|
| Surveys | 4% |
| Telephone | 29 |
| Website counting device | 39 |
| Citizen contacts | 21 |
| Electronic mail | 75 |
| U.S. mail | 11 |
| Other: Statistical information | 4 |
| Use of an electronic "guest book" | 4 |
| Because states were allowed to select more than one item, categories total more than 100%. | |

The use of e-mail was the most popular form of monitoring used by states, with 75 percent of DOT websites employing this technology. Other forms were used significantly

less, with a website counter (39 percent) being the second most frequently employed feedback device. Traditional forms of communication, such as the telephone (29 percent), in-person contact (21 percent) and standard mail (11 percent) were also used to monitor feedback, though to a lesser extent. Respondents were allowed to indicate all methods used in their states, therefore the total amount of use exceeds 100 percent on this table.

States with websites were also questioned about the extent of their research of other Internet locations, such as websites belonging to other state transportation agencies and agencies within their own state government. The results of those questions are contained in Tables IX and X.

| TABLE IX Research into other Websites Prior to Establishment of Own Site N=27 | | |
|--|-------------------|-----------------------------|
| | <u>Other DOTs</u> | <u>Other State Agencies</u> |
| Looked at other websites | 81% | 70% |
| Did not review other sites | 19 | 30 |
| Total | 100% | 100% |

| TABLE X Number of Other Websites Reviewed | | |
|---|-------------------|-----------------------------|
| | <u>Other DOTs</u> | <u>Other State Agencies</u> |
| Less than 5 | 41% | 50% |
| 6-10 | 27 | 28 |
| 11-15 | 32 | 17 |
| 16-25 | 0 | 0 |
| More than 25 | 0 | 5 |
| Total | 100% N=22 | 100% N=18 |

The majority of states surveyed indicated they had looked at other similar websites before implementing their own. Generally, however, these agencies looked at fewer than 15 because six months before this study only 12 state DOT websites were online and a year before the study, only five were available for review.

Washington and North Carolina (at four times each), Texas and California (at two times

each) and Kansas and Wisconsin (at once each) were listed by respondents as the DOTs whose pages they had reviewed in preparation for initiating their own sites.

Promotion of websites was most frequently done through press releases and media interviews (39 percent), links to other websites (29 percent), submission of listings to search engines and Internet directories (18 percent) and by such miscellaneous processes as contests, radio public service announcements and word of mouth (4 percent each).

Respondents were allowed to mention more than one method of promotion used, therefore, percentages reflect usage based on N=28.

Part II: Among the 20 states not yet initiating a website, all but one (or 95 percent) have plans to do so. Twenty percent planned to initiate a website within a month after completing the questionnaire and 60 percent intended to go online within six months. Five percent expected it to take six months to a year to go online and 10 percent anticipated waiting more than a year.

Two questions dealt with personal experience of Internet use among states without websites. Respondents from all 20 reported having used Internet services at least once, but 30 percent indicated they had been in cyberspace fewer than 10 times. Thirty-five percent described their usage level at less than five hours weekly and 35 percent estimated usage at 5-10 hours weekly.

The types of sites visited by participants are described in Table XI.

| | |
|--|-----|
| Other state DOTs | 75% |
| Federal government | 65 |
| Other same-state agencies | 55 |
| Entertainment | 55 |
| Media websites | 50 |
| Education websites | 45 |
| Computer/Technology | 25 |
| Vendor/Financial | 5 |
| Because states were allowed to select more than one item, categories total more than 100%. | |

A majority of respondents had visited government-related sites — 75 percent to other state DOTs on the Internet, 65 percent to federal sites and 55 percent to state government sites. Fifty-five percent had visited entertainment-related websites and 50 percent had visited media sites. Educational sites had been visited by 45 percent of participants and computer and technology sites had been visited by 25 percent of those answering the questionnaire.

Part III: All participants regardless of their state's presence on the Internet, were asked to fill out a final section of four questions regarding their personal attitudes toward the Internet and where responsibility lies for directing their agencies' cyberspace activities.

This section of the survey will compare the responses of the two groups, beginning with mean values of attitudes toward the Internet measured on a Semantic Differential Scale, in Table XII.

| | DOTs with Websites | DOTs without Websites |
|----------------------------|-----------------------|--------------------------|
| Expert/Novice | 3.9 | 2.5 |
| Easy/Hard | 4.5 | 3.8 |
| Useful/Not useful | 4.7 | 3.9 |
| Innovation/Fad | 4.6 | 3.9 |
| Information/Entertainment | 4.1 | 3.9 |
| Regular user/Never used it | 4.6 | 3.3 |
| Underrated/Overrated | 3.8 | 3.0 |
| Time saver/Time waster | 4.1 | 3.1 |
| | N=27 | N=20 |

In comparing the two data sets, both users and non-users tended to agree with the more favorable characteristics of the Internet with its ease of use, overall usefulness, innovation and information aspects. The primary differences came with description of personal use, as website states produced personnel with higher attitudes toward their own personal abilities. Overall, personal attitudes toward this series of questions showed a more even response from states without a DOT website, than by personnel from those states with DOT websites, whose responses were more heavily weighted toward the positive end of

the scale.

Responsibility for implementation of an Internet website by the state transportation agency is depicted in Table XIII, comparing the two states.

| | <u>DOTs with Websites</u> | <u>DOTs without Websites</u> |
|-------------------------|-------------------------------|----------------------------------|
| Governor | 7% | 5% |
| Other state official | 0 | 5 |
| DOT agency head | 54 | 60 |
| DOT department head | 7 | 15 |
| Data processing unit | 12 | 10 |
| Public information unit | 12 | 0 |
| DOT committee | 4 | 5 |
| Survey respondent | 4 | 0 |
| Total | 100% N=28 | 100% N=20 |

Responses to this question indicated very similar treatments of responsibilities at both classes of transportation agencies, with agency heads at 54 percent of states with websites and 60 percent of states without websites holding final responsibility over cyberspace decisions. Public information offices at state DOTs with websites held a more pronounced role in the decision process when compared with their counterparts in states without websites.

Actual website maintenance is depicted in Table XIV.

| | <u>DOTs with Websites</u> | <u>DOTs without Websites</u> |
|-------------------------|-------------------------------|----------------------------------|
| Data processing unit | 51% | 50% |
| Public information unit | 30 | 35 |
| Another DOT unit | 8 | 5 |
| Another state agency | 11 | 0 |
| Undetermined | 0 | 10 |
| Total | 100% N=28 | 100% N=20 |

As with the previous question, the two groups of respondents gave similar answers, with both indicating the data processing units within their agencies have been delegated (or would be delegated) primary responsibility for maintenance of Internet websites. Public information units were also targeted for similar use by both transportation groups.

The final comparative question asked respondents to rank a series of situations influencing the implementation of Internet websites by state transportation departments. Responses to this question are found in Table XV.

| | DOTs with Websites N=28 | | | | DOTs without Websites N=20 | | | |
|----------------------|----------------------------|---------------|--------------|-------------|-------------------------------|---------------|--------------|-------------|
| | <u>Primary</u> | <u>Second</u> | <u>Third</u> | <u>Mean</u> | <u>Primary</u> | <u>Second</u> | <u>Third</u> | <u>Mean</u> |
| Personnel expertise | 18% | 29% | 18% | 1.3 | 15% | 10% | 15% | 0.8 |
| Cost considerations | 7 | 18 | 11 | 0.7 | 15 | 30 | 15 | 1.2 |
| Available technology | 39 | 18 | 11 | 1.6 | 20 | 20 | 15 | 1.2 |
| Public input | 14 | 7 | 14 | 0.7 | 20 | 5 | 15 | 0.9 |
| Manpower | 7 | 7 | 7 | 0.4 | 10 | 15 | 30 | 0.9 |

Because states were allowed to select more than one item, categories do not total 100%.

All states placed emphasis on the availability of technology at their agency as a primary factor influencing how decisions about implementation of an Internet website were made (39 percent for those implementing sites and 20 percent for those that did not). Twenty percent of states without websites also cited public input as a primary factor influencing their decisions. Beyond that, however, the two groups differed in their choices regarding any supplemental factors influencing the decision-making process in their states. Technical expertise of personnel was a notable choice, with 29 percent of states listing it as a secondary reason and 18 percent of states ranking it as a third reason among state departments of transportation implementing sites. Transportation agencies without Internet websites, however, placed greater emphasis on cost/budgetary considerations as a secondary reason for not implementing a site (30 percent). Additionally, a lack of manpower was cited by 30 percent of agencies as a third reason for not implementing

websites.

Content Analysis

Content analysis of 28 state transportation websites was conducted using the three-category checklist described at the beginning of this chapter. The initial pool of websites to be studied was changed slightly from the group of states responding to the mail questionnaire, although both groups consisted of 28 states. The Arkansas Highway and Transportation Department and the Colorado Department of Transportation both indicated in their questionnaires that they were operating information pages on the World Wide Web. Arkansas' URL was accessible early in the study when preliminary investigations were underway to determine what states maintained DOT websites. When the content analysis began, however, the researcher's URL request was refused and continued to be refused for several weeks, indicating a possible hardware problem with the Arkansas computer equipment or a retooling of the website. Colorado's homepage, on the other hand, could never be found and no URL was listed in the questionnaire. Taking the places of these two departments of transportation in the survey were South Dakota, which went online in late March, and Hawaii, which did not participate in the mail survey. This allowed the content analysis to go forward with an identical number of states as were indicated in the mail survey.

Websites could be found for Pennsylvania, Tennessee and Wyoming departments of transportation, but are maintained by state governments and not the agencies themselves. In answering the mail questionnaire, agencies did not recognize these as being their websites. Following that interpretation, the researcher deleted those three websites from the list studied.

Websites were evaluated on the basis of three types of content: the use of visual enhancements (19 elements designed to make the website aesthetically appealing), the use of operational enhancements (17 elements designed to make the website more user-friendly) and use of information types (19 categories of information for the website visitor). Data were analyzed in two different dimensions: 1) by element to determine how widely all transportation websites were using it, and 2) by state to determine how many of

frequently used require little computer memory and can be transferred quickly via modem. In contrast, most of the items used by 14 percent or less of the state departments of transportation are items requiring users to obtain specialized software or modems with faster speeds in order to effectively use them. Icons noting the addition of new elements to the website, and "under construction" graphics indicating new information is being developed for the website were used by approximately half of transportation department sites on the World Wide Web. These icons have been growing in use in recent months because of their ability to encourage Internet visitors to return at a future time to view the new information.

TABLE XVII
Use of Operational Enhancements
N=28

| | |
|--|-----|
| Electronic mail | 86% |
| Date of last revision | 71 |
| USDOT link | 71 |
| Links to other local agencies | 68 |
| Other state DOT links | 57 |
| Downloadable files | 39 |
| Hyperlinking icons | 39 |
| Access counter | 36 |
| Search engines | 21 |
| Online ordering of products | 11 |
| Firewall | 7 |
| Information about server | 7 |
| Advertising links | 4 |
| Electronic bid submission | 4 |
| Graphics time load warning | 4 |
| Multi-lingual text | 4 |
| Visitor guest book | 4 |
| Because it was possible for states to use more than one element, the column totals more than 100%. | |

Electronic mail was by far the most frequently used element of any in the three categories examined as part of the content of transportation websites. Updated information and links to transportation websites in other states and those associated with the local state government were also common elements found in websites examined in this study. The relatively high use (39 percent) of downloadable files ties in closely with the inclusion of

engineering information on state department of transportation websites, since a great deal of the files available are technical in nature. Transportation agencies in Alaska, Arizona and Montana demonstrated creativity and innovation through the offering of materials through the World Wide Web. Similar creativity was demonstrated through the Oklahoma Department of Transportation's use of cyberspace to provide roadbuilding corporations a vehicle to submit bids for projects and the Minnesota Department of Transportation's use of multilingual text to reach an often-overlooked part of its constituency. However these operational enhancements had yet to initiate any widespread use among their transportation counterparts in other states at the time this study was conducted.

TABLE XVIII
Use of Information Types
N=28

| | |
|--|-----|
| Maps | 71% |
| Mission statement | 61 |
| Engineering information | 54 |
| Information on bid submission | 43 |
| News releases | 43 |
| Employee contact information | 39 |
| Information on governing authority | 36 |
| Road conditions | 32 |
| Frequently asked questions | 29 |
| Road construction information | 25 |
| DOT long range goals | 18 |
| Biographies of staff/management | 14 |
| Mention of governor | 14 |
| Pending legislation | 14 |
| Promotional tools | 11 |
| Disadvantaged business enterprises | 7 |
| Glossary of terms | 7 |
| Organizational chart | 7 |
| Information for children | 4 |
| Because it was possible for states to use more than one element, the column totals more than 100%. | |

Of the 10 types of information topping the list of elements most frequently included in transportation websites, eight were considered categories of a practical nature, rather than information for its own sake. A mission statement and details about the governing

authority serve a different need than do maps, road conditions, locations of road construction, employee names/phone numbers, and the proper procedure for submitting bids for construction projects. That concept seemed to be reversed for information elements at the bottom of the list appearing to be less practical in nature. The selection of pages designed for children (developed by Minnesota DOT to focus on aeronautics) was innovative, however, and opened the transportation industry to a whole new segment of Internet traveler.

Taking the three categories (visual, operational and information) into consideration, Table XIX depicts the extent of their use among the 28 departments of transportation currently operating websites.

| | |
|----------------|-----|
| Alaska | 45% |
| Arizona | 44 |
| California | 31 |
| Florida | 36 |
| Georgia | 27 |
| Hawaii | 4 |
| Idaho | 38 |
| Illinois | 22 |
| Indiana | 22 |
| Kansas | 29 |
| Kentucky | 18 |
| Maryland | 31 |
| Michigan | 35 |
| Minnesota | 40 |
| Montana | 42 |
| New Jersey | 11 |
| North Carolina | 27 |
| North Dakota | 22 |
| Ohio | 47 |
| Oklahoma | 35 |
| Oregon | 27 |
| Rhode Island | 5 |
| South Dakota | 11 |
| Texas | 44 |
| Utah | 36 |
| Virginia | 25 |
| Washington | 40 |
| Wisconsin | 31 |

When reviewing the extent of visual, operational or informational elements available for use by states, it is interesting to note no agency used more than half the techniques listed in this study. Ohio DOT used more than any other state (47 percent), followed by Alaska DOT with 45 percent. In fact, only one-fourth of states with websites used more than 40 percent of the elements included in this project.

Comparing this list with the questionnaire, it is interesting to note both Texas and Washington were among the top 25 percent in use of these graphic elements and both were mentioned by other states as among those most often studied by other states preparing to go online.

At the other end of the scale, Hawaii, Indiana, New Jersey, Rhode Island and South Dakota ranked as the five states using these categories the least. The content analysis indicated that, except for Indiana, these states participated as a page on a state government server, rather than sponsor their own sites. This participation may include a conformance to particular styles, precluding these states for utilizing some of the items included in this checklist.

It is important to note that the researcher has assigned equal value to the elements comprising the three categories. It can reasonably be argued that an informational element, such as road construction, is more important to a website than the style of wallpaper used as a background graphic and should, therefore, carry more weight in terms of importance. In fact, it could also be argued that the inclusion of road construction details are more important to a website than whether or not the governor of that state is mentioned — even though both are elements of the information category. The author is not trying to imply that these elements are equal. In fact, research into the various aspects of the Internet is so new at this point, no one really knows what weight these elements carry in making websites more important or user friendly. That question can only be answered through continued Internet research.

Summary

This chapter analyzed data collected through a mail survey of state departments of transportation and content analysis of DOT websites in an attempt to determine how orderly

and thoroughly government agencies are educating themselves about the Internet and implementing services actually meeting the public's needs. The information collected helped outline the processes states use to go online and determines who actually has the responsibility of determining what is offered on websites.

The question of how closely transportation departments communicated with adjacent and regional counterparts was examined, as were other factors, such as cost, technology and training, to determine what aspects of Rogers' diffusion theory are in effect. Other questions focused on agency interaction with the public to determine if it was consistent with Grunig's theories of public relations.

Information collected in this research is reflective of state department of transportation use of the World Wide Web during April 1996.

Statistical analysis was conducted through percentage comparisons and means rankings. These findings will be summarized in the next chapter with conclusions and recommendations answering the research questions posed in Chapter I.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

General

The purpose of this study was to determine if Internet use by state departments of transportation was consistent with Grunig's models of public relations and to determine how actively the development of websites followed the diffusion of innovations. A primary focus of this study was to determine the reasons (such as available technology, overall cost, competition with other states, public input and public relations processes) influencing the entry of government agencies into cyberspace.

This chapter summarizes the findings of research into 28 state transportation departments (in Spring 1996) operating information resource sites on the Internet and 20 states yet to implement websites.

Summary

Methodology

Research into this topic was conducted through a content analysis of the web pages of 28 state departments of transportation on the World Wide Web and a survey of 48 state transportation agencies.

A content analysis of state transportation department Internet websites was used to determine the type of information transportation agencies were offering via the World Wide Web. A checklist of elements was developed to analyze state web pages consistently and objectively. Elements were divided into three types: 1) "visual enhancements" designed to improve the aesthetic appearance of individual websites; 2) "operational enhancements"

making websites more user-friendly; and 3) "information types" categorizing what transportation departments offered over their websites.

Four-page mail questionnaires were distributed to all 50 state departments of transportation. The form was divided into sections with questions applicable to each of the groups: state DOTs with websites (focusing on the details of how the Internet operation was developed) and those without (focusing on Internet experience and intentions to eventually develop a website). A third section contained questions applicable to all both groups, regardless of the existence of Internet websites. This section of the questionnaire focused on personal attitudes toward the Internet and responsibilities for initiating and maintaining an information resource site.

The two research methods, on the whole, looked at reasons that states went online and the characteristics of webpages to determine if there was a relationship with Rogers' diffusion of innovations, and looked at the manner of dissemination of information, including public involvement in prompting site establishment and development and providing feedback once in operation to see if there was a relationship with Grunig's public information model of public relations.

Findings

An analysis of the data from this study produced the following results:

When and why states went online: No state department of transportation operated a site on the World Wide Web prior to July 1994. Establishment of websites began rather slowly, with only eight states establishing sites during the first twelve months transportation agencies began utilizing cyberspace as an information source. After that, migration to the World Wide Web picked up drastically — 19 in a nine-month period and indications that 18 more would establish sites by the end of 1996. If this pace holds true, 90% of state departments of transportation will begin using the Internet as a channel for providing public information about the functions about their agencies in a 2 1/2-year period — a rather rapid diffusion of this innovation. Transportation agencies made the jump to the Internet most often as a response to a command from their state's top official, the governor. Even so, technology and the technical abilities of trained departmental staff most frequently

were cited by state DOTs as the reasons they initiated websites. Following the lead of other state DOTs was not recognized as a major factor in going online, nor was public interest.

Who decided to go online: Despite the fact that influence from the governor was cited by states as the reason they went online, the actual decision to implement a website was most frequently credited to the person holding the top position in the transportation agency. This factor held true, whether the question was asked of an agency already online, or one yet to implement a website. One-fourth of states with websites credited the decision to go online to either the agency's public information or data processing units, while one-fourth of states without websites credited the decision to a department head within the agency, or to the data processing unit.

Factors affecting website implementation: In deciding favorably on the implementation of a website, availability of technology and the technical expertise of staff members at the transportation agency were the strongest factors considered by states that have gone online. Cost considerations and public input were also considered, but were much weaker factors than the first two. For those who have not yet initiated websites, the cost and a lack of available technology were the strongest considerations influencing agencies to take a slower route to going online. Public input, lack of available manpower and a lack of technical expertise were lesser considerations. While a noticeable gap separated mean values of the top two considerations from the lower three among states with websites, mean values of reasons among states without an Internet website were much more closely grouped.

Website maintenance: States indicated that the people they chose to be responsible for maintenance of websites had experience in either computers or public information. No state simply assigned a staff member as its webmaster and only a small number went to another state agency or an outside service for this purpose. The webmaster was the staff person usually given the responsibility to develop the website's graphics and — similar to the process used to select a webmaster — few states went outside their own agency for this purpose. The data processing and public information units within the transportation agencies were the departments most likely given the responsibility for operating websites.

Level of public input: Although nearly nine out of ten states with websites stated public input was considered in the development of a transportation website, the majority of states tended to indicate that this input was either relatively minor, or was not seriously considered by the agency. As far as affecting the decision to go online, only nine of the 48 states surveyed listed public input as a primary consideration. Online agencies, however, appear to be actively monitoring use of their websites, using electronic mail, counters and more traditional means such as telephone and in-person contacts to determine how actively the public is accessing information, and to receive queries, public comments and suggestions about their website and their agency functions.

Type of information offered: State transportation agencies placed a greater level of importance on the information they included in Internet websites than with the technological gadgetry making the process possible. When asked in the mail questionnaire how important various items were to a website, information items drew stronger responses than visual or operational items. User-important information, such as road construction details, press releases and listing of an e-mail address were most frequently seen by respondents as very important to a website. Maps, a mission statement, graphics and links to other transportation and government websites were also seen as important to a website, but with less emphasis than the first three items. The least important items to states were agency organizational charts and the use of more advanced website technology such as "realtime" audio and video.

In a content analysis of the websites themselves, maps, a mission statement and engineering information were found on more than half of those in operation. Contract bidding information, news releases, employee contact information, details about the agency's governing authority and road conditions were used moderately. States were less likely to develop information for children, for disadvantaged businesses and regarding legislation, or to use the website as a promotional tool for a particular aspect of transportation.

Graphics and illustrations, background "wallpaper," color, an agency logo, color photographs and the use of a method to note new information on the website were utilized by more than half of all state transportation agencies in the visual enhancement of their

website. Varying type fonts and sizes were not frequently used by states to make pages more appealing to readers, although software is neither expensive nor taxing to computer memories. Innovations least used were those requiring expensive hardware to add to a website, require visitors to use special software or have larger memory storage on their computers, or require lengthy amounts of time to download via modem.

It is interesting to note, although road construction information ranked in responses as the most important element to a transportation website, in practice, only one fourth of states with websites actually provided it.

Conclusions

Recognized public relations models indicate that information can be used to propagandize, to promote the image of a specific individual or agency, or to benefit the recipient of the information. All these types of information can be found on the Internet, although the emphasis with transportation agencies lies in practical information benefiting the public. In public relations, information flow can be either one-way or two-way. The Internet's interactive nature, especially with the advantage of immediate and low-cost e-mail as one of its typical elements, makes the potential for two-way communication extremely strong. But because cyberspace access is currently available to only a portion of the American population, e-mail cannot yet be considered the ultimate and most efficient means of feedback in the citizen-government relationship. It is only an additional tool enhancing the communication process.

In a democratic society such as the United States, it is the duty of government agencies to provide a means for communication between themselves and the public and to attempt to foster a two-way dialog with citizens. But even with the presence of a means of feedback, it must be remembered the option of engaging in two-way communication ultimately lies with the citizen rather than the agency. It therefore becomes the duty of the agency to encourage citizens to participate, making them an active part of the democratic process. Internet websites and electronic mail are useful in this regard.

As a channel of communication, all of Rafaeli's suggested elements for study are in wide use by departments of transportation in their websites. Since censorship was not an

issue in this research, the element of packet-switching dealt mainly with its usefulness in rapid and reliable delivery of data to the user. A noticeable improvement in availability of information occurred during research for this thesis. In the early weeks of this project, it was not uncommon to have difficulty linking to websites, especially those belonging to states recently going online. This is probably reflective of the inexperience of webmasters and technical problems which frequently accompany such endeavors. As time passed, however, this problem disappeared and links to websites were accomplished with relative ease.

The multimedia aspects of cyberspace, including color and black and white photographs, multigraphic images, realtime video, quicktime movies, multiple typefaces, color and unusual wallpaper were incorporated by many websites, making them visually appealing and interesting to visitors.

Several states understand the importance of synchronicity, incorporating realtime traffic information and realtime video to allow website visitors to obtain important data virtually as it is being recorded. States which have not yet incorporated this feature into their websites also understand the relevance of fresh information and have undertaken the efforts necessary to provide frequent updates and new topics for the benefit of the public. Likewise, the importance of hypertextuality to a website is evolving in its importance to states. While a few state DOT webpages are "dead ends" and contain no links to other websites, those appear to be exceptions in the world of cyberspace. The remainder are well linked to other sites, with several DOT s structuring hundreds of links into their websites. In fact, the Ohio Department of Transportation has linked more than 1,000 files, pages and related locations to its website.

Cyberspace's interactive properties are well-incorporated into websites, with 85 percent of online transportation agencies providing electronic mail for citizen communication. Some have incorporated travel games, downloadable files and maps, electronic submission of bids from contractors and the ability to order information and products online as methods of increasing interactivity.

Grunig's theories of public relations place government agencies in the category of the public information model offering the characteristic of selective release of truthful

information, demonstrating a one-way flow from agency to citizen. This study uncovered a mixture of strictly information data (such as mission statements, news releases and biographies) combined with information of a more subjective and practical use to citizens (such as road conditions, construction details, how to submit bids on construction projects and use of multilingual text). This information was supplemented with links to other state and transportation agencies, search engines, downloadable files, and the ability to order maps, publications and products over the Internet.

The interactive capabilities of the Internet, such as the use of e-mail for feedback, take this aspect of public relations beyond the scope of Grunig's model of public information designated for government agencies. This medium is more two-way in nature than print or broadcast techniques, yet still embodies other aspects of Grunig's models, more in the nature of two-way symmetrical communication.

While it is recognized Grunig's work in the field of public relations has been instrumental in developing a better understanding of the processes of organizational communication — especially through the use of his historical models of public relations — many researchers have noted the fact this profession and its communication processes are far too complicated to be explained by four rigidly-defined models. This was pointed out in the literature review of this thesis — and has even been recognized by Grunig himself. The results of this thesis indicate the public information model of public relations no longer holds true, at least in its purest sense.

Grunig himself indicated the actions of practitioners and organizations often fluctuate among the models, depending upon the situation. The content analysis of websites appears to bear this out. While the basic elements of the public information model can be observed in state transportation agency websites, the elements of Grunig's two-way symmetrical model are also there: the offer and acceptance of public feedback, the dissemination of information of an important practical aspect to the consumer. If anything, the use of cyberspace by state and federal government agencies may result in the addition of new dimensions to Grunig's public relations models.

Turning to the work of Rogers, his theories regarding the diffusion of innovations were noticeable among state transportation agencies. The timeline of website implementation

produced indicators typical of the participants in his adoption theories. There were more than indications the decision-making process he described were reflected in state DOT personnel's individual attitudes toward the Internet. And finally, the selection of models by later adopters of Internet technology indicated the presence of opinion leaders among state transportation agencies.

An extremely strong number of transportation agencies admitted visiting other DOT websites and local state government websites in the development of their own home pages. A certain number of state DOT websites — Washington, North Carolina, Texas and California among them — were specifically mentioned by states as being models for their own websites. Nearly 60 percent of state DOTs indicated they had reviewed at least six transportation websites in the process of developing their own, while 50 percent said they had reviewed other government websites in their own state.

Rogers described five types of participants in the innovation diffusion process and all five are present in the diffusion of cyberspace technology in the realm of transportation agencies. After Minnesota went online in the summer of 1994, it was followed by three other states within six months, following the pattern of what Rogers called "innovators." The second six months saw four states adopt the technology, fitting the mold of the "early adopters." Washington and California were among the transportation agencies establishing websites within a year after Minnesota — both of whom were mentioned by some other states DOTs as examples of models for websites, as was the Texas Department of Transportation, which went online almost exactly a year after Minnesota. Texas was one of an influx of 14 states going online during the third six-month period after Minnesota and fit Rogers' description of the "early majority" legitimizing the process. Six states have gone online thus far in the fourth six month period and four more stand poised to join them before the period ends — "the late majority," according to Rogers. Thirteen states plan to be online over the course of the next 12 months, making up Rogers' "laggards" and leaving three states whose plans to institute Internet service are indecisive or nonexistent.

Rogers also theorized that developing a positive opinion about an innovation was an early factor in the decision-making process ending with adoption. Items focusing on personal attitudes toward the Internet showed respondents from states with websites

generally exhibited more favorable and stronger levels of feelings toward cyberspace than did those from states slower to adopt its use.

Revisions to Data Collection Devices

Given the opportunity to revise the data collection devices used in this research, the following changes are suggested:

Mail questionnaire: Question Nos. 8 and 28, regarding the background of the webmaster and the department within the agency responsible for operation of the website, failed to take into account multiple webmasters. One state DOT operates its website with three webmasters coming from two different departments within their agency. Two states with websites in the planning phase are handling the situation in a similar manner. These two questions should be rewritten in a manner that reflects this possibility.

Question No. 13, regarding the number of times websites were accessed weekly, could be made more accurate by a restructuring of answers, giving a greater number of choices for states with heavy visitation. At least three states indicated they received in excess of 20,000 visits per week — four times the maximum number indicated by the questionnaire.

For more detailed information regarding Rogers' theory, questions could be included to determine when respondents first became aware of the Internet (providing a measurement of time between awareness and implementation) and how long certain website elements had been in use by the agency (also providing a measurement of time; this time attempting to determine how long it takes a particular element to work its way through the web network).

Website checklist: It can be reasonably argued the content analysis checklist could be streamlined by eliminating those visual, operational and informational elements in use by three or fewer states (indicating they were not used by 90 percent of states with web pages). It is recommended that the list be left at its current length since many of these elements, such as electronic bid submission, multilingual text, enlargeable photo files, quicktime video and child-related sites, are innovative and hold promise for future use by states as technology and level of use continues to improve. Listing them here would provide an indication of how quickly this new technology diffused through websites.

Recommendations for Further Research

An early problem encountered during the analysis portion of the study involved discrepancies between questionnaire responses and examination of website characteristics. This resulted primarily from states in transition from non-website to website status. Two states (North Dakota and Rhode Island) fell into this category. Three other state transportation agencies indicated they had no websites while searches of state links showed they, in fact, did. This discrepancy is not attributed to a lack of communication or credibility within the agencies in question, but rather to the fact those states' web pages are part of their state government website and not technically maintained by the agency itself.

Because of the nature of this study, in other words, tracking the diffusion process and monitoring public relations models, it is suggested this study be replicated within the next 12-18 months, providing more complete results without losing any of its timeliness.

Related research could focus on Internet users to determine the effectiveness of visual, operational and information elements on websites from the perspective of the recipient of the information rather than from the provider.

Recommendations to State Transportation Agencies

Observations arising from questionnaire responses indicated state transportation agencies, for the most part, did not rely enough on the experience and expertise of their fellow agencies in the development of websites. Relatively few states indicated they used other transportation websites as models for their own locations.

Similarly, there were indications most agencies relied little on public input or feedback — an unusual action considering one of the primary purposes of their website is to enhance service and information levels for the benefit of citizens.

Lastly, two of the most difficult aspects of the content analysis originated from 1) several states with website graphics wider than the computer screen, forcing the researcher to scroll horizontally across the page, and 2) pages so hyperlinked the website became a maze of files nearly impossible to successfully navigate. While, theoretically, the most comprehensive website would be one in which every word on screen were hyperlinked to another, in practice it is not only an impossibility, but a detriment to the website visitor.

There appears to be a maximum number of links above which the website visitor cannot be sure he or she has seen every page the website offers.

Concluding Comment

Hanson (1994) predicts the use of the Internet in relation to government will evolve into "teledemocracy," or the use of electronic media to register votes and opinions.¹⁸⁷ Utilizing the increasingly common network of interactive communication typified by the Internet, it will be complemented by television call-in programs, teleconferencing, e-mail and traditional mail service. While this concept is likely to expand public participation in the political process because of the convenience it provides individuals who have access to its technical capabilities, it is still too early to predict if, and how, politicians will use the medium to "manipulate" public opinion, as many now suggest they do.

Just as there is evidence this technology is successfully being diffused through state transportation agencies, there are strong indications the Internet itself is finally become diffused among the public, even after it has been in existence for more than 25 years.

Likewise, there are indications the Internet is changing the face of public relations processes. Cyberspace is proving itself to be a valuable resource for information, education and entertainment.

As this medium continues to advance technologically, it holds the possibility of drastically changing the way we gather information, communication with each other, and lead our daily lives. As McLuhan said, we are becoming an information society. Cyberspace is indisputably an important part of it and merits continued study.

BIBLIOGRAPHY

- "Access to Data Highway." *Christian Science Monitor*, 7 June 1994, p. 18.
- Adams, Bill. "Ask the Professor." *Public Relations Tactics*, October 1994, 2.
- American Association of State Highway and Transportation Officials. *AASHTO Strategic Plan*. Washington, D.C.: 1995.
- Arnold, David S., Christine S. Becker and Elizabeth K. Kellar, eds. *Effective Communication: Getting the Message Across*. Washington, D.C.: International City Management Association, 1983.
- Bagdikian, Ben H. Preface to *Keeping America Uninformed*, by Donna A Demac. New York: The Pilgrim Press, 1984.
- Bagin, Don, Donald Ferguson and Gary Marx. *Public Relations for Administrators*. Arlington, Va.: American Association of School Administrators, 1985.
- Baker, Lee W. *The Credibility Factor: Putting Ethics to Work in Public Relations*. Homewood, Ill.: Business One Irwin, 1993.
- Bayers, Chip. "The Great Web Wipeout." *Wired*, April 1996, 125-128.
- Benedikt, Michael, ed. *Cyberspace: First Steps*. Cambridge, Mass: MIT Press, 1992.
- Bennahum, David S. "Mr. Gingrich's Cyber-Revolution." *New York Times*, 17 Jan. 1995, sec. A, p. 19.
- Berlin, Michael J. "Information Superhighway: Keeping Access Open to All." *Christian Science Monitor*, 7 Feb. 1994, p. 22.
- Black, Thomas R. *Evaluating Social Science Research: An Introduction*. London: Sage Publications, 1993.
- Borgatta, Edgar F. and Marie L. Borgatta. *Encyclopedia of Sociology*, vol. 1. New York: Macmillan, 1992.
- Bourquard, Jo Anne. "Legislatures Hit Cyberspace." *State Legislatures* 20, no. 8 (Aug. 1994): 31-33.
- Bowman, James S. "At Last, an Alternative to Performance Appraisal: Total Quality Management." *Public Administration Review* 54, no. 2 (March/April 1994): 129-136.
- "Business Access Technologies Internet Survey." <http://batech.com/cgi-bin/shostats/>, (14 March 1996).
- Cahill, Richard. "Lost in Cyberspace: The New Media Communications

- Challenge." *Communique*, February 1996, 3.
- Carson, Jim Bob. "OneNet to Link State." *The Daily O'Collegian*, 5 Feb. 1996, p. 1.
- Cerf, Vinton G. Foreword to *The Internet Navigator*, by Paul Gilster. New York: John Wiley and Sons, Inc., 1993.
- Clark, Martin P. *Managing to Communicate*. Chichester, England: John Wiley and Sons, 1994.
- Coats, James. "From On-Line Hangout to Data Superhighway." *Chicago Tribune*, 15 Jan. 1994, sec. 7, p. 1.
- Committee on Public Relations of Public Personnel Agencies. *Public Relations of Public Personnel Agencies*. Chicago: Civil Service Assembly of U.S. and Canada, 1941.
- Computer Science and Telecommunications Board. *Realizing the Information Future*. Washington, D.C.: National Academy Press, 1994.
- Cotton, Bob, and Richard Oliver. *The Cyberspace Lexicon: An Illustrated Dictionary of Terms from Multimedia to Virtual Reality*. London: Phaidon Press, Ltd., 1994.
- Croft, Brian. "Opening Windows to the World." *Communication World*, December 1995, 16-19.
- Croft, Brian. "Through the Looking Glass." *Communication World*, November 1995, 26-29.
- Culbertson, Hugh M., Dennis W. Jeffers, Donna Besser Stone and Martin Terrell. *Social, Political and Economic Contexts in Public Relations: Theory and Cases*. Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1993.
- Cutlip, Scott M. "Government and the Public Information System." In *Informing the People: A Public Affairs Handbook*, edited by Lewis M. Helm, Ray Eldon Hiebert, Michael R. Naver and Kenneth Rabin. New York: Longman, Inc., 1981. 22-37.
- December, John. "Units of Analysis for Internet Communication." *Journal of Communication* 46 (Winter 1996): 14-38.
- "Demographics." *Internet@vantage*. <http://www.iav.com/demo.html>, (14 March 1996).
- Dern, Daniel P. *The Internet Guide for New Users*. New York: McGraw-Hill, Inc., 1994.
- DeSanto, Barbara J. "Public Information Officers and Functions: Exploring the 'Invisible Influence' in Oklahoma Government." Paper presented to the Public Relations Division of the Association for Education in Journalism and Mass Communication annual convention, Washington, D.C., August 1995.
- DeVellis, Robert. *Scale Development: Theory and Applications*. Newbury Park, Calif.: Sage Publications, 1991.
- Dozier, David M., Larissa A. Grunig and James E. Grunig. *Manager's Guide to Excellence in Public Relations and Communication Management*. Mahwah, N.J.:

- Lawrence Erlbaum Associates, 1995.
- Evans, James. "Internet Security: Imperfect, but Improving." *Government Technology* 9, no. 2 (1996): 1-45.
- Evans, James. "New York Tackles Storage and Access Problems." *Government Technology* 9 no. 3 (1996), 32-34.
- Falk, Bennett. *The Internet Roadmap*, 2nd ed. San Francisco: SYBEX, 1994.
- Fisher, Sharon. *Riding the Internet Highway: Complete Guide to 21st Century Communications*. Indianapolis: New Riders Publishing, 1993.
- "Four-Part Quality Strategy Gives City a Sparkling Public Image." *Total Quality Newsletter* 5, no. 6 (June 1994):4.
- Francik, Ellen, Susan E. Rudman, Donna Cooper, and Stephen Levine. "Putting Innovation to Work: Adoption Strategies for Multimedia Communication Systems." *Communication of the Association of Computing Machinery*, vol. 34 no. 12 (December 1991): 53-63.
- Friedrich, Carl J. "Public Policy and the Nature of Administrative Responsibility." *Public Policy* 1 (1940): 3-24.
- Gaines, Claudia. Quoted in "Will the Internet be the Next Great PR Tool?" *Public Relations Tactics*, June 1995, 25.
- Gandy, Oscar H. Jr. "Public Relations and Public Policy: The Structuration of Dominance in the Information Age." In *Rhetorical and Critical Approaches to Public Relations*, edited by Elizabeth L. Toth and Robert L. Heath. Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1992. 131-163.
- Gerstner, John. "Cyber Cowboy." *Communication World*, November 1995, 18-22.
- Gilster, Paul. *The Internet Navigator*. New York: John Wylie and Sons, Inc., 1993.
- Grossman, Lawrence K. "The Electronic Republic." *Media Studies Journal* 9, no. 3 (Summer 1995): 163-168.
- Grunig, James E. "Implications of Public Relations for Other Domains of Communication." *Journal of Communication* 43 (Summer 1993): 164-173.
- Grunig, James E. "Organizations and Public Relations: Testing a Communication Theory." *Journalism Monographs* No. 46 (November 1976).
- Grunig, James E. and Larissa A. Grunig. "Models of Public Relations and Communication." In *Excellence in Public Relations and Communication Management*, edited by James E. Grunig. Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1992. 285-326.
- Hamblin, Robert L., R. Brooke Jacobsen and Jerry L. Miller. *A Mathematical Theory of Social Change*. New York, Wiley, 1973.

- Hanson, Jarice. *Connections: Technologies of Communication*. New York: HarperCollins College Publishers, 1994.
- Hanson, Wayne. "Wiring the Wallet: Electronic Commerce, the Internet and Government." *Emerging Technologies*, 1995, 42-48.
- Harmon, Amy. "Last Off-Ramp on Information Highway." *Los Angeles Times*, 7 May 1994, sec. D, p. 2.
- Harris, Blake. "Cyberspace 2020," *Government Technology* 8 no. 10 (1995), 32-34.
- Hedebro, Goran. *Communication and Social Change in Developing Nations: A Critical View*. Ames: Iowa State University Press, 1982.
- Heilemann, John. "The GOP Big Tent is Full of Holes." *Wired*, April 1996, 63-183.
- Hernon, Peter, and Charles R. McClure. *Public Access to Government Information: Issues, Trends and Strategies*. Norwood, N.J.: Ablex Publishing Corp., 1986.
- Herrington, Jeff. "Why Should I Care About the Internet." Presented to the Central Oklahoma Chapter of International Association of Business Communicators, Oklahoma City, 14 March 1996.
- Herz, J.C. *Surfing on the Internet: A Nethead's Adventures Online*. Boston: Little, Brown and Co., 1995.
- Hess, Stephen. *The Government/Press Connection: Press Officers and Their Offices*. Washington, D.C.: The Brookings Institute, 1984.
- Hiebert, Ray Eldon. "A Model of the Government Communication Process." In *Informing the People: A Public Affairs Handbook*, edited by Lewis M. Helm, Ray Eldon Hiebert, Michael R. Naver and Kenneth Rabin. New York: Longman, Inc., 1981. 3-13.
- "How many people are connected?" Global Interactive Solutions. <http://www.atgi.com/demog.html>, (14 March 1996).
- Huff, Sid L. "Computing as Innovation," *Business Quarterly*, vol. 52 no. 1 (Summer 1987): 7-9.
- Hyde, Jana L. "The Media and Diffusion of Innovation." In *The Significance of the Media in American History*, edited by James D. Startt and William D. Sloan. Northport, Ala.: Vision Press, 1994. 233-246.
- "The Internet: Industry Watchers Say a Basic Proficiency is Required." *Executive Strategies* 10 (1995): 8.
- "Internet Survey." Parallax Webdesign Report. <http://www.echonyc.com/%7Eparallax/interfacts.html>, (January 1996).
- "Internet: The Sixth Mode of Transportation." *Transport Topics*, 13 November 1995, 34-36.

- Ivry, Sara B. "Town Hall On-Line." *Media Studies Journal* 9, no. 3 (1995): 169-171.
- Javed, Naseem. "Sunrise: Day One, Year 2000." *Communication World*, December 1995, 20-23.
- Kelly, Kathleen S. "Utilizing Public Relations Theory to Conceptualize and Test Models of Fund Raising." *Journalism and Mass Communication Quarterly* 72 (Spring 1995): 106-127.
- Komblum, William. *Sociology in a Changing World*, 2nd ed. Fort Worth: Harcourt Brace Jovanovich, Inc., 1991.
- Kotcher, Raymond L. "Surviving a Crisis in Cyberspace." *PR Tactics*, March 1996, 12.
- Krol, Ed. *The Whole Internet: User's Guide and Catalog*, 2nd ed. Sebastopol, Calif.: O'Reilly and Associates, Inc., 1994.
- Kuttner, Bob. "The Divided Information Superhighway." *Boston Globe*, 21 Jan. 1994, p. 15.
- Lapin, Todd. "The Rogues Gallery." *Wired*, April 1996, 80.
- Lauer, Robert H. *Perspectives on Social Changes*, 4th ed. Boston: Allyn and Bacon, 1991.
- Leichty, Greg, and Jeff Springston. "Reconsidering Public Relations Models." *Public Relations Review* 19 (Winter 1993): 327-339.
- Lynch, Daniel C. and Marshall T. Rose. *Internet System Handbook*. Reading, Mass.: Addison-Wesley Publishing Co., Inc., 1993.
- Magid, Lawrence J. *Cruising Online*. New York: Random House, 1994.
- Manheim, Jarol B. *All of the People, All the Time: Strategic Communication and American Politics*. Armonk, N.Y.: M.E. Sharpe, Inc., 1991.
- Marine, April, Susan Kirkpatrick, Vivian Neou and Carol Ward. *Internet: Getting Started*. Englewood Cliffs, N.J.: PTR Prentice Hall, 1994.
- Miller, Brian. "Maine Governor Angus King." *Government Technology* 9 no. 3, (1996), 18-19.
- Mladenka, Kenneth R. "Responsive Performance by Public Officials." In *The Public Encounter*, edited by Charles T. Goodsell. Bloomington: Indiana University Press, 1981. 143-159.
- National Commission on the State and Local Public Service. *Hard Truths/Tough Choices: An Agenda for State and Local Reform*. Albany, N.Y.: Nelson A. Rockefeller Institute of Government, 1993.
- National Cooperative Highway Research Program. *Public Outreach Handbook for Departments of Transportation*, Report 364. Washington, D.C.: National Academy Press, 1994.

- Nevins, Mike. "America's Job Bank." *Government Technology* 9, no. 3 (1996): 34.
- Nevins, Mike. "Best of the Web," *Government Technology* 9 no. 1 (1996), 20-21.
- Nevins, Mike. "Texas: Pioneers on the WWW." *Government Technology* 9, no. 2 (1996): 30.
- "New Times, New Media." *Public Relations Tactics*, December 1994, 3.
- Newcombe, Tod. "Governors Push State Role in Information Highway." *Government Technology* 7, no. 11 (1994): 38-43.
- Newcombe, Tod. "Technology Advances Electronic Services." *Government Technology*, 9, no. 2 (1996): 1-42.
- Newhagen, John E. and Sheizaf Rafaeli. "Why Communication Researchers Should Study the Internet: A Dialogue." *Journal of Communication* 46 (Winter 1996): 4-13.
- "Number of Papers with Online Editions Tripled." *Editor and Publisher*, 24 February 1996, 39.
- Ohkawa, Kazushi, and Katsuo Otsuka. *Technology Diffusion, Productivity Employment and Phase Shifts in Developing Economies*. Tokyo: University of Tokyo Press, 1994.
- Oostendorp, K.A., W.F. Punch and R.W. Wiggins. "A Tool for Individualizing the Web." Submitted to *Journal of Computer Mediated Communication*, 1994, <http://www.ncsa.uiuc.edu/SDG/IT94/Proceedings/Agents/oostendorp/oostendorp.html> (19 Feb. 1996).
- Ordovensky, Pat, and Gary Marx. *Working with the News Media*. Arlington, Va.: American Association of School Administrators, 1993.
- Pearl, Daniel. "Debate Over Universal Access Rights Will Shape Rules Governing the Future of Communications." *Wall Street Journal*, 14 Jan. 1994, sec. A, p. 12.
- Perry, Mike. "Internet Survey No. 1." <http://www.wisdom.com/sv/>, (1995).
- Pimlott, J.A.R. *Public Relations and American Democracy*. Princeton, N.J.: Princeton University Press, 1951.
- Pires, Mary Ann. "Community Relations: An Old Standby with New Clout." Speech presented at the Oklahoma City chapter of the Public Relations Society of America's professional development seminar, Oklahoma City, Okla., 28 Oct. 1994.
- Pitkow, Jim and Colleen Kehoe. "GVU WWW Internet Survey: Executive Summary." Georgia Institute of Technology, http://www.cc.gatech.edu/gvu/user_surveys/survey-10-1995/, (14 March 1996).
- Plummer, Amy Watson. "Managing Media Relations in Cyberspace." *Public Relations Tactics*, June 1995, 18.
- "Policy in Practice: Making Public Information Electronically Accessible." *Mn/DOT News*, 16 Jan. 1996, 3.

- Rabin, Kenneth. "Factors Affecting Government Communications Staffing." In *Informing the People: A Public Affairs Handbook*, edited by Lewis M. Helm, Ray Eldon Hiebert, Michael R. Naver and Kenneth Rabin. New York: Longman, Inc., 1981. 105-111.
- Reagan, Joey, Janine Sumner and Scott Hill. "Using Grunig's Indices to Differentiate Organizational Public Relations Functions." *Journalism Quarterly* 69 (Spring 1992): 181-187.
- "Reporters Use of Internet on Rise." *PR Tactics*, March 1996, 15.
- Riley, Dennis D. *Specialized Policy Making: A System-Subsystem Model*. Center for Public Affairs, Papers in Public Administration no. 29. Tempe, Ariz., 1975.
- Roche, Peter. "How to Respond to a Bashing by the Press." *Public Relations Tactics*, October 1994, 6-7.
- Rogers, Everett M. *Diffusion of Innovations*. New York: The Free Press, 1962.
- Rogers, Everett M., and Rekha Argawala-Rogers. *Communication in Organizations*. New York: The Free Press, 1976.
- Rogers, Everett M., and Arnold Picot. "The Impact of New Communication Technologies." In *The Media Revolution in America and Western Europe*, edited by Everett M. Rogers and Francis Balle. Norwood, N.J.: Ablex Publishing Corp., 1985. 108-133.
- Rogers, Everett M., and F. Floyd Shoemaker. *Communication of Innovations: A Cross-Cultural Approach*. New York: The Free Press, 1971.
- Roling, Niels G., Joseph Ascroft and Fred Wa Chege. "The Diffusion of Innovations and the Issue of Equity in Rural Development." In *Communication and Development*, edited by Everett M. Rogers. Beverly Hills: Sage Publications, 1976. 63-78.
- Rubin, R.B., A.M. Rubin and L.J. Piele. *Communication Research: Strategies and Sources*, 3rd ed. Belmont, Calif.: Wadsworth Publishing Co., 1993.
- Runge, David A. *Winning with Telecommunications*. Washington, D.C.: International Center for Information Technologies, 1988.
- Shiver, Jube Jr. "Busting the Barriers to Cyberspace." *Los Angeles Times*, 29 March 1995, p. 1.
- Smith, John K. "Thinking About Technological Change: Linear and Evolutionary Models." In *Learning and Technological Change*, edited by Ross Thompson. New York: St. Martin's Press, 1993. 65-79.
- Smith, Richard J. and Mark Gibbs. *Navigating the Internet*. Indianapolis: Sams Publishing 1994.
- Snell, Ned. *Curious About the Internet?* Indianapolis: Sams Publishing, 1995.
- Solberg, Ron. "Is the Information Superhighway Really all that Super?" Multi-media

presentation at the Oklahoma City Chapter of the Public Relations Society of America's professional development seminar, Oklahoma City, Okla., 23 Jan. 1996.

Solberg, Ron. "The Net: More than a Medium." *Public Relations Tactics*, March 1996, 18.

Sood, Rishi. "Government Service Delivery in the 21st Century." *Government Technology* 8 no. 10 (1995), 40.

Soto, Tom. "Redlining the Information Superhighway." *L.A. Times*, 18 April 1995, sec. B, p. 13.

"State Internet Strategies," *Government Technology* 7 no. 12, (1994), 20-21.

"State Legislature Home Pages," *Government Technology* 8, no. 12 (1995), 107.

Stivers, Camilla. "The Listening Bureaucrat: Responsiveness in Public Administration." *Public Administration Review* 54, no. 4 (July/August 1994):364-369.

"Survey Doubles Estimate of Web Use to 17 Million American Adults." Associated Press. <http://www.boston.com/globe/cgi-bin/globe.cgi?ap/apnat.htm>. (15 Feb. 1996).

U.S. Department of Defense. *Meeting the Press: A Media Survival Guide for the Defense Manager*, by Judson Connor. Washington, D.C.: National Defense University Press, 1993.

U.S. Department of Transportation. United States Coast Guard. *U.S. Coast Guard Auxiliary Public Affairs Officer's Guide*. Washington, D.C.: GPO, 1993.

U.S. General Services Administration. Office of Public Affairs. *Communicator's Sourcebook: Tips and Tools for Speeches, Interviews and Press Conferences*. Washington, D.C.: GPO, 1988.

Veljkov, Mark and George Hartnell. *Pocket Guides to the Internet: Basic Internet Utilities*, Vol., 5. Westport, Conn.: Mecklermedia, 1994.

"W3 Concepts." CERN. <http://www.w3.org/pub/WWW/Talks/General/Concepts.html> (9 March 1996).

Walker, Jerry. "Food Journalists are Slow to Embrace Online Services." *O'Dwyer's PR Services Report* 10, March 1996, 44.

White, Jon, and David M. Dozier. "Public Relations and Management Decision Making." In *Excellence in Public Relations and Communications Management*, edited by James Grunig. Hillsdale, N.J.: Lawrence Erlbaum Associates, Publishers, 1992. 91-108.

"Will the Internet be the Next Great PR Tool?" *Public Relations Tactics*, June 1995, 25.

Wimmer, Roger D. and Joseph R. Dominick. *Mass Media Research: An Introduction*, 4th ed. Belmont, Calif.: Wadsworth Publishing Co., 1994.

"Without Efforts Like Ours, Drivers Might be Watching Out for a Lot More Than the

Highway Patrol." Advertisement in *Inside PR*, July 1994, 7.

"WWW Usage and Demographics." Nielsen Internet Survey.
<http://www.nielsenmedia.com/company/nmrwhere.htm>, (14 March 1996).

Wygol, Benjamin R. "Public Relations: Concepts, Authority, Control." In *Improving Relations with the Public*, edited by Louis W. Bender and Benjamin R. Wygol. San Francisco: Jossey-Bass, Inc., Publishers, 1977. 11-18.

Zielinski, Dave. "Constant Communication and Follow-Through Build Trust." *Total Quality Newsletter*, May 1994, 6.

Zizzo, David. "PR Pushers Gladly Help Media Decide What's Important." *Daily Oklahoman* (Oklahoma City), 13 Nov. 1994, sec. A, p. 20.

APPENDICES

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APPENDIX A

**INTERNET ESTABLISHMENT DATES
AND WEBSITE ADDRESSES FOR
STATE TRANSPORTATION
DEPARTMENTS**

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INTERNET ESTABLISHMENT DATES AND WEBSITE ADDRESSES FOR STATE DEPARTMENTS OF TRANSPORTATION

| | | |
|----------------|------------------------------|--|
| Alabama | No website | |
| Alaska | Website since May 1995 | http://www.dot.state.ak.us/ |
| Arizona | Website since May 1995 | http://www.dot.state.az.us/ |
| Arkansas | Website since January 1996 | http://www.ahtd.state.ar.us |
| California | Website since October 1994 | http://www.dot.ca.gov/ |
| Colorado | Website since November 1995 | Not available |
| Connecticut | No website | |
| Delaware | No website | |
| Florida | Website since Jan. 16, 1996 | http://www.dot.state.fl.us/ |
| Georgia | Website since January 1995 | http://www.dot.state.ga.us/ |
| Hawaii | Website on state server | http://hinc.hinc.hawaii.gov/hinc/dot/dot.html |
| Idaho | Website since Nov. 20, 1995 | http://www.state.id.us/itd/itdhmpg.htm |
| Illinois | Website since Dec. 12, 1995 | http://dot.state.il.us/ |
| Indiana | Website since Oct. 10, 1995 | http://www.state.in.us/dot/ |
| Iowa | No website | |
| Kansas | Website since April 1, 1995 | http://www.dot.state.ks.us/bcs.html |
| Kentucky | Website since March 1, 1996 | http://www.kytc.state.ky.us |
| Louisiana | No website | |
| Maine | No website | |
| Maryland | Website since December 1995 | http://www.inform.umd.edu:8080/UMS+State/MD_Resources/MDOT |
| Massachusetts | No website | |
| Michigan | Website since July 1995 | http://www.mdot.state.mi.us/ |
| Minnesota | Website since July 1994 | http://www.dot.state.mn.us/ |
| Mississippi | No website | |
| Missouri | No website | |
| Montana | Website since Nov. 1, 1995 | http://192.100.54.138/ |
| Nebraska | No website | |
| Nevada | No website | |
| New Hampshire | No website | |
| New Jersey | Website since February 1996 | http://www.state.nj.us/transportation/ |
| New Mexico | No website | |
| New York | No website | |
| North Carolina | Website since October 1995 | http://www.dot.state.nc.us/DOT/ |
| North Dakota | Website since March 22, 1996 | http://www.state.nd.us/dot/ |
| Ohio | Website since Dec. 27, 1995 | http://www.dot.state.oh.us/ |
| Oklahoma | Website since Aug. 1, 1995 | http://www.okladot.state.ok.us/ |
| Oregon | Website since Feb. 1, 1996 | gopher://gopher.odot.state.or.us/ |
| Pennsylvania | Website on state server | http://www.state.pa.us/PA_Exec/Transportation/overview.html http://www.sec.state.ri.us/STDEPT/sd47.htm |
| Rhode Island | Website in planning phase | |
| South Carolina | No website | |
| South Dakota | Website since July 1995 | http://www.state.sd.us/state/executive/dot/dot.html |
| Tennessee | Website on state server | http://www.inaugural.state.tn.us/hp/sundquist/trans.html |
| Texas | Website since July 14, 1995 | http://www.dot.state.tx.us/ |
| Utah | Website since Nov. 10, 1995 | http://www.sr.ex.state.ut.us/ |
| Vermont | No website | |
| Virginia | Website since September 1994 | http://pratt.vtrc.virginia.edu/vdot.html |
| Washington | Website since November 1994 | http://www.wsdot.wa.gov/ |
| West Virginia | No website | |
| Wisconsin | Website since Dec. 18, 1995 | http://www.dot.state.wi.us/ |
| Wyoming | Website on state server | http://www.state.wy.us:80/state/government/state_agencies/dot.html |

APPENDIX B

**COVER LETTER FOR DOT
SURVEY INSTRUMENT**

Oklahoma State University

COLLEGE OF ARTS AND SCIENCES

School of Journalism and Broadcasting
206 Paul Miller
Stillwater, Oklahoma 74078-0195
405-744-6354

Feb. 14, 1996

Dear Transportation Official:

In recent years developing technology has focused the public's attention on cyberspace, a land of "virtual reality" comprised of computers, modems and the Internet. As a graduate student at Oklahoma State University and someone who works in the field of transportation, I am extremely interested in how state departments of transportation across the U.S. are dealing with this technology.

I realize it is possible that your state is not "online" with a "home page" on the Internet, but your input is just as important as those states that are, since my interest lies in the situations influencing the decision to become involved in this technology.

I have prepared a brief survey to discover how your state is utilizing (or not utilizing) cyberspace. If you have a website, please forward this questionnaire to the person on your staff responsible for it. If you don't, forward it to the person who would ultimately make the decision to go online. Although the entire survey is approximately 30 questions, they are categorized according to whether or not your state operates a website, so no survey participant will answer every question. The questionnaire should take only a few moments to complete.

Although I am an employee of the Oklahoma Department of Transportation's Public Affairs Office, it is not sponsoring my research, nor will it utilize any survey results as part of its operation. In fact, ODOT is being asked to participate in the same capacity as your state. I selected transportation as the basis for my research because of my background, and because the similarity in DOT operations nationwide make this subject an excellent comparative study. When done, I hope to have developed a model that can be used to compare cyberspace use among members of any compatible group, whether it is a state or federal agency, a business or an organization.

I have included a postage-paid return envelope for your convenience. The deadline for returning the survey is Feb. 29, 1996, since I hope to complete my thesis by the end of the spring semester. If you are interested in the survey's results, please make a note on the questionnaire and I will mail or fax a summary when my research is complete.

If you have questions regarding any portion of the survey, please feel free to call me at 405/521-6005 weekdays between 7:30 a.m. and 4:30 p.m., or send Email via the Internet to "mitchell@keytech.com".

Thank you for your assistance.

Sincerely,



Keith Mitchell

Internet Survey

APPENDIX C

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DOT SURVEY INSTRUMENT

8. Check the most appropriate description of your site's "webmaster" (web page operator).

- Trained staff member
 Assigned staff member
 A private computer expert outside your agency (but not with your provider service)
 Someone from another state agency
 Member of Public Information staff
 Member of Data Processing staff
 Someone on the staff of your online provider service

9. How important are the following elements to your agency's web site?

| | Very Important | Somewhat Important | Marginally Important | Not Important | No Opinion |
|--|-------------------|-----------------------|-------------------------|------------------|---------------|
| a. Graphics | _____ | _____ | _____ | _____ | _____ |
| b. Road Construction Information | _____ | _____ | _____ | _____ | _____ |
| c. Maps | _____ | _____ | _____ | _____ | _____ |
| d. E-mail address | _____ | _____ | _____ | _____ | _____ |
| e. Press Releases | _____ | _____ | _____ | _____ | _____ |
| f. Mission Statement | _____ | _____ | _____ | _____ | _____ |
| g. Links to other state DOT websites | _____ | _____ | _____ | _____ | _____ |
| h. Organizational Chart | _____ | _____ | _____ | _____ | _____ |
| i. Links to other websites in your state government | _____ | _____ | _____ | _____ | _____ |
| j. "Real-time" video/audio clips | _____ | _____ | _____ | _____ | _____ |

10. Is your website designed for use with a particular software (such as Netscape, Mosaic, etc.)?

- Yes
 No

11. If so, which one?

12. Is the activity level (i.e., the number of times your website is being accessed) of your site being monitored?

- Yes
 No

13. How many times is your website being accessed over a 7-day period?

- Less than 50
 301-400
 51-100
 401-500
 101-200
 More than 500
 201-300
 Don't Know

14. How are you measuring feedback of the information you are placing on your website? (Check all that apply.)

- Surveys
 E-mail
 Telephone Contacts
 Written correspondence
 Counting device on website
 Other: _____
 Citizen contact

15. Did you look at any other state DOT websites before implementing your own?

- Yes
 No

(Next page, please)

All respondents please answer the following questions:

26. Look at each pair of words or phrases describing the Internet and your experience with it. Mark the spot on each scale which best describes your attitude or relationship regarding Internet use:

| | | |
|-------------------------|-------|--------------------------|
| I'm a novice | _____ | I'm an expert |
| Easy to Use | _____ | Difficult to Use |
| Not Useful | _____ | Very Useful |
| Innovation | _____ | Fad |
| Information tool | _____ | Entertainment medium |
| Never Used | _____ | Regular User |
| Importance is Overrated | _____ | Importance is Underrated |
| Time Saver | _____ | Time Waster |

27. Whether or not your transportation agency has a home page, who holds the responsibility for the actual decision to implement a World Wide Web site on behalf of your agency?

The governor
 Another state official (please list) _____
 Another state agency (please list) _____
 The head of your agency
 A departmental head (please list) _____
 Your agency's data processing unit
 Your agency's public information/affairs unit
 Other _____

28. Who is (or would be) responsible for maintaining your website?

Your agency's public information unit
 Your agency's data processing unit
 Your agency's administrative office
 Another unit within your agency (please list) _____
 Another agency in your state government (please list) _____
 A private computer company
 Other: _____

29. What were/are the factors involved in your agency's decision to implement (or not implement) a site on the World Wide Web? (Rank up to three reasons; with 1 indicating the most important)

| | |
|---|--|
| <input type="checkbox"/> Technical expertise of personnel | <input type="checkbox"/> Public input |
| <input type="checkbox"/> Cost/budgetary considerations | <input type="checkbox"/> Geographic concerns |
| <input type="checkbox"/> Available technology at your DOT | <input type="checkbox"/> Manpower (or lack of) |

30. In what state is your DOT?

Thank you for taking the time to answer this survey. Please return it in the enclosed postage-paid envelope. If you would like a copy of the survey results, please list your name and mailing address here.

ement Checklist

ate

APPENDIX D

**INTERNET CONTENT ANALYSIS
INSTRUMENT**

Website Element Checklist

State: _____

URL: _____ **Date:** _____

Visual Enhancements

- Graphics/illustrations _____
- Wallpaper _____
- Use of color _____
- Agency logo _____
- Color photos _____
- "New" items noted _____
- Sites "under construction" _____
- More than two type sizes used _____
- Multigraphic images _____
- Black/white photos _____
- Realtime video _____
- Multiple typefaces _____
- Toolbar _____
- Charts and graphs _____
- Enlargeable photos _____
- Quicktime movies _____
- Realtime traffic information _____
- Audio "wave" clips _____
- Realtime audio _____

Information Types

- Maps _____
- Mission statement _____
- Engineering information _____
- Information on bid submission _____
- News releases _____
- Employee contact information _____
- Information on governing authority _____
- Road conditions _____
- Frequently asked questions _____
- Road construction information _____
- DOT long range goals _____
- Biographies of staff/management _____
- Mention of governor _____
- Pending legislation _____
- Promotional tools _____
- Disadvantaged business enterprises _____
- Glossary of terms _____
- Organizational chart _____
- Information for children _____

Operational Enhancements

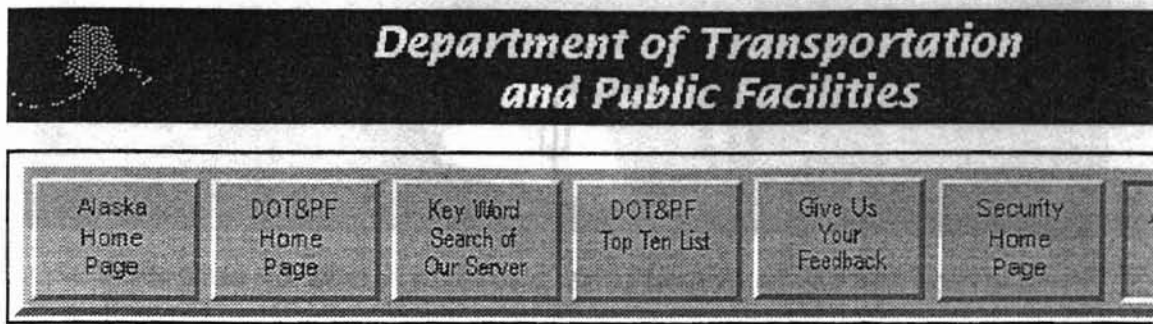
- Electronic mail _____
- Date of last revision _____
- USDOT link _____
- Links to other local agencies _____
- Other state DOT links _____
- Downloadable files _____
- Hyperlinking icons _____
- Access counter _____
- Search engines _____
- Online ordering of products _____
- Firewall _____
- Information about server _____
- Advertising links _____
- Electronic bid submission _____
- Graphics time load warning _____
- Multi-lingual text _____
- Visitor guest book _____

No. of Pages in Website: _____


Notes:

*Department of Transportation
and Public Facilities*

**HOMEPAGES FOR STATE DEPARTMENTS
OF TRANSPORTATION**



Welcome to the State of Alaska Department of Transportation and Public Facilities Home Page. In an effort to make information more accessible to the public, DOT&PF has created a World Wide Web server. New information is being added regularly.

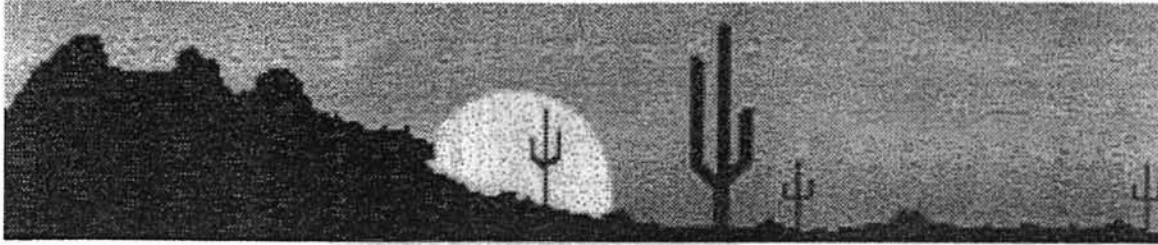
- [About DOT & PF.](#)
- [Alaska Airport System](#)
- [Alaska Marine Highway System \(AMHS\)](#)
- [Design and Construction](#)
- [Transportation Planning](#)
- Statewide Disadvantaged Business Enterprise / External Equal Employment Opportunity (DBE/ExEEO)
 1. [DBE Directory, etc.](#)
- For information from Technology Transfer Center [articles](#).
- To search for a DOT&PF employee's [internet address](#) and send mail.
- National Bridge Inventory System (NBIS)  [data file](#). *
*Warning: File uncompresses to a 1 megabyte file size.
- For information on [security](#) at this web server.

For other information on the State of Alaska, see the [State of Alaska Homepage](#).

To view a list of other useful Internet Sites, [press here](#).



Thanks for visiting The State of Alaska Department of Transportation and Public Facilities WWW server. We hope to hear from you again soon. For information on products and services, please feel free to phone us at (907) 465-8964, or send [email](#) to the WebManager.



Welcome to the Arizona Department of Transportation

206 South 17th Avenue

Phoenix, AZ 85007-3213



Question or suggestion for ADOT? Please send [to info@dot.state.az.us](mailto:info@dot.state.az.us). To ensure a prompt reply, please verify that your web browser is configured with a valid return email address.

- [Computer Aided Engineering Section](#)
- [Roadway Design](#)
- [Arizona Highways Magazine](#)
- [Traffic Operations Center](#)

[US Department of Transportation](#), other [state DOT sites](#) and the [State of Arizona](#)


To send email to an employee at ADOT, use an address of the form:

first initial (first name)/last name@dot.state.az.us
 example for Bob Smith-
 bsmith@dot.state.az.us

If the last name contains a hyphen, use only the portion after the hyphen.

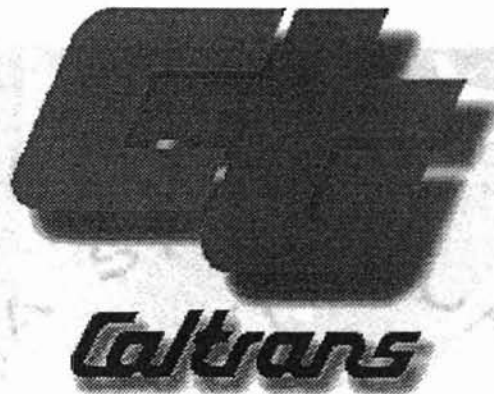
Or better yet, search the ADOT [email data base!](#) ^{NEW!}

Please note, not all ADOT employees are Internet email capable.
 For additional email information, postmaster@dot.state.az.us

To find the  numbers of various ADOT offices, look [here!](#)

Accesses of this page since January 12, 1996: **008092** and click [here](#) for Web Server Statistics

Email webmaster@dot.state.az.us for Web related questions



Welcome to the
California Department of Transportation

What's New as of March 12, 1996

● In the news

Look here for Seismic Safety Information

● About Caltrans

Bios, fact sheets, history, FAQs

● In motion

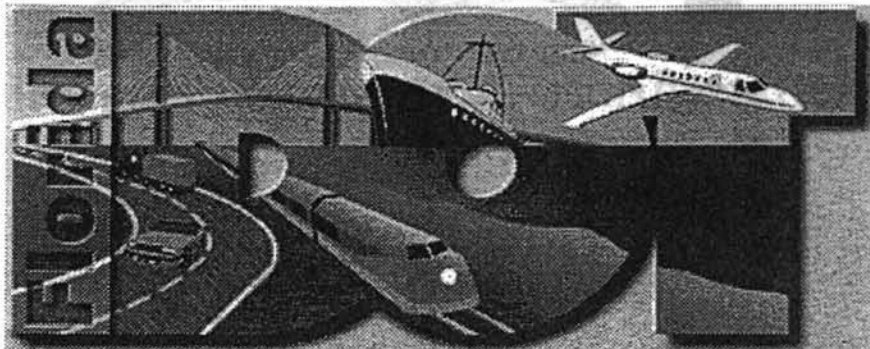
Highway conditions, traffic information, permits, Smart Traveler

● In the works

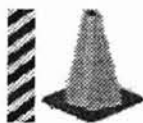
Project design and development, mass transportation, transportation financing plans and management, environmental information, new technology & research, Scenic Highways & landscaping

● Taking shape

Engineering Service Center, construction, pavement testing, seismic retrofit, maintenance, contracting opportunities



Welcome to the Florida Department of Transportation (FDOT)



Highway Construction



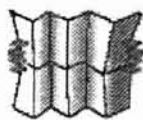
Safety Programs



Turnpike & Tolls



Trucking Information



Maps & Publications



More About FDOT



 Credits

Last Updated Monday, April 8, 1996



GDOT External Homepage

[Public Information Requests](#)

[GDOT Email Directory](#)

[Transportation and Related Links](#)

[Other State of Georgia Offices](#)

[GDOT Office Pages](#)

Please send questions and comments regarding GDOT Web to the [GDOT Webmaster](#)

Last Update 03/11/96



[Return to GDOT Home Page](#)

Department of Transportation

Transportation Program Objectives

The objective of the transportation program is to facilitate the rapid, safe, and economical movement of people and goods in the State of Hawaii by providing and operating transportation facilities.

The Department of Transportation is responsible for the planning, design, construction, operation, and maintenance of State facilities in all modes of transportation: air, water, and land. Coordination with other State, County, and Federal programs is maintained in order to achieve the objective.

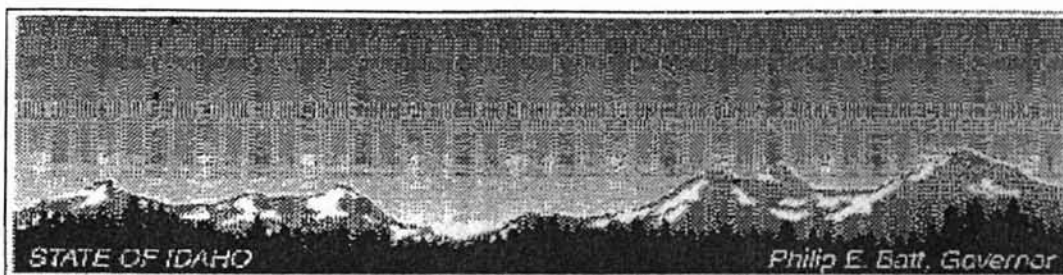
Transportation Program Activities

At present, the Department has jurisdiction over the following facilities: Eleven (11) airports; three (3) general aviation airports; seven (7) deep-draft harbors; three (3) medium draft harbors and 2,450 miles of highways.

The Transportation program is composed of four principal subprograms: Air Transportation, Water Transportation, Land Transportation, and Overall Program Support for Transportation.

Kazu Hayashida, Director

Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813



TRANSPORTATION DEPARTMENT

P.O. BOX 7129 • BOISE, ID. • 83707-1129 • (208) 334-8000










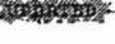




Our Mission

We provide high quality, cost effective transportation systems that are safe, reliable and responsive for the economical and efficient movement of people and products.

Our Vision

We envision transportation systems and services that are characterized by safety, reliability, and innovative technology and are founded on a workforce of highly trained, motivated and committed employees. We will continue to be sensitive to the environment while integrating the multiple interest of all citizens, visitors, business, industry and government.

It is our vision that Idaho's transportation system and services will provide a competitive edge to businesses in their expanding markets. ITD will continue to be a leader in implementing one of the most efficient, responsive and cost-effective transportation and service delivery systems in the nation. Idahoans will have a modern, balanced, and integrated multi-modal transportation network that is efficient, safe, and dedicated to a quality environment. The transportation system will continue to be developed to accommodate future population growth while minimizing congestion, improving air quality and preserving scarce resources.

-  [ITD Overview](#) 
-  [ITD Executive Management](#) 
-  [ITD Phone Listing](#) 
-  [ITD Road Reports](#) 
-  [ITD Press Releases](#) 
-  [Idaho Bicycle Transportation Homepage](#) 
-  [ITD Central Materials Switchboard](#) 





Illinois Department of Transportation

Welcome.

This is the home page for the **Illinois Department of Transportation**. This site's materials are provided as a service to the citizens of Illinois. Please feel free to browse.

IDOT News

General IDOT Information, Announcements, Press Releases and FAQ's

Getting Around in Illinois

Road Conditions, Amtrak Info., Road Restriction Lists, Motorcycle Training Courses and Chicago Expressway Congestion Map

Doing Business with IDOT

Consultant Services, Contract and Bidding Information, Order Forms for Manuals and Map Sales Information

Links to Other Resources

State of Illinois Home Page, US Department of Transportation and Economic Development programs

For Road Condition Information, Please call 1-800-452-IDOT

Questions or comments concerning this server? Please email webmaster@dot.state.il.us

This page last updated 5/23/96



Department
of Transportation
Web Server

Indiana Department of Transportation - INDOT

Visitors to our site since 10/10/95

001948

INDOT The Indiana Department of Transportation selects, develops, builds and maintains the best transportation projects to:

Provide mobility;
Stimulate economic growth; and
Improve the quality of life.

We accomplish this through the following:

- Focusing on our customer;
 - Developing a productive and motivated work force;
 - Optimizing all resources;
 - Improving processes on a continuous basis;
 - Integrating the objectives of leadership and employees;
 - Employing innovative technologies throughout the agency.
-



Kansas Department of Transportation WWW Server

brought to you through the Bureau of Computer
Services.

You have entered the Kansas Department of Transportation WWW Home Page. This page is being built to give easy access to Internet services to KDOT personnel, as well as to provide information from KDOT to those outside of the department.

[About KDOT's Web Server](#)

[KDOT Regional Map of Kansas](#)

[Other DOT Sites \(State and Federal\)](#) or use [Graphical Map](#) (updated 2/2/96)

[Information Network of Kansas \(INK\)](#) Some services require access subscription.

- [INK - KDOT Page](#) (Requires Subscription) This includes information on :
 - Planholder lists, Bid tabulations, Low Bidders list
 - Engineering Standards (DGN format files for engineering standard plans)
- [INK - Legislative Services Page](#) (Some Parts Require Subscription)

[Road Conditions Information](#) Toll free number, links to weather information.

[State Bridge Office](#)

[KDOT Users Only](#)

[KDOT Internet-related Frequently Asked Questions](#)

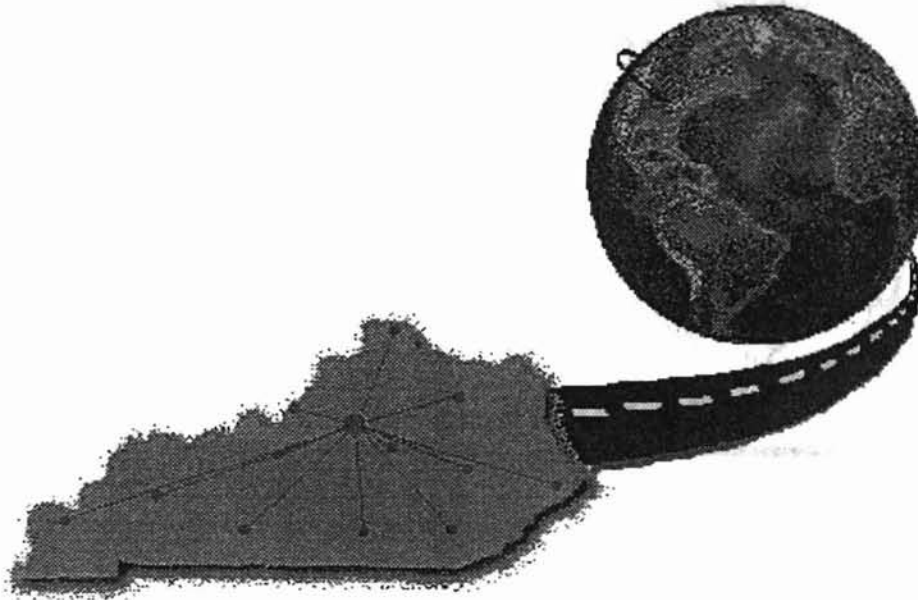
[Downloadable Programs](#)










[CADD Resources](#) Cell libraries, fonts, etc. (updated 4/13/96)

E-Mail inquiries to: webmaster@dtbcs.wpo.state.ks.us

Last updated 7 March 1996

Kentucky Transportation Cabinet



- | | | |
|--|--|--|
|  <u>Road Condition Report</u> |  <u>Maps of Kentucky</u> |  <u>Press Releases</u> |
|  <u>Links to Kentucky Web Sites</u> |  <u>Division and District Pages</u> |  <u>Computer Sites</u> |
|  <u>Adopt a Highway Program</u> |  <u>Download Files</u> |  <u>Traffic Accidents Statistics</u> |

Provide a safe, efficient, environmentally sound, and fiscally responsible transportation system which promotes economic growth and enhances the quality of life in Kentucky.

What's New ???

[Press Release regarding House Bill 400.](#)

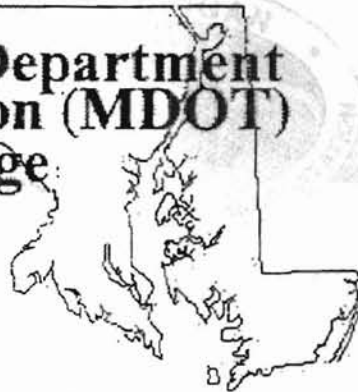
If you have any comments or suggestions about this Web site please Email brobinson@dotsob.kvtrans.kytc.state.kv.us

Welcome to...

Maryland
1789 • 1789 • 1789 • 1789



**The Maryland Department
of Transportation (MDOT)
Home Page**



You are visitor number

003639

Select from one of the following MDOT agencies you wish to explore or send e-mail to the Maryland Department of Transportation at dwinstea@mail.state.md.us



[The Office of the Secretary](#)



[Maryland Aviation Administration](#)



[Motor Vehicle Administration](#)



[Maryland Port Administration](#)




[Mass Transit Administration](#)



[State Highway Administration](#)

Thursday, January 4, 1996


 Our pages are still under construction. Please visit often and see what's new.


to the Michigan Department of Transportation Home Page "Excellence En Route"

Welcome! We're glad you stopped at the Michigan Department Transportation (MDOT) Home Page during your travels on the information highway. The MDOT mission is "to provide the highest quality transportation services for economic benefit and improved quality of life" to the people of Michigan.

Directory of Michigan Department of Transportation Pages

- **Motorist Information**

Here you will find information to help you travel our Michigan highways. Information on construction, bridge tolls and ferry schedules, Welcome Centers, Average Daily Traffic volumes and more...

- **Construction News**

Use this handy guide to construction in Michigan to help you get around.

- **MDOT Directory**


A guide to the Michigan Department of Transportation.

- **MDOT Facts and Figures**

Fascinating facts from yesterday and today with a transportation twist...

- **MDOT's Bulletin Board System New**

MDOT OnLine, the Department's BBS, is now reachable via the Internet. Visit the MDOT OnLine Home Page (<http://mdotbbs.mdot.state.mi.us/>) and learn how this service is expanding and integrating with the Department's other online, Internet-based services. Download Worldgroup Manager, the BBS's new Windows interface software, as well as other utilities. View files in the public file libraries. Telnet into MDOT OnLine via the Internet. Watch for new and expanded services available both through these web pages and the BBS. Pardon our construction work as some services are still a little "rough around the edges". Please visit again as we are constantly improving our customer services.

 We're working to bring you more information everyday! In the meantime, you may want to check out these sites...

- **The Federal and State DOT's...**
- **Other State of Michigan Web Sites...**
- **Related Areas of Interest...**



Welcome to the Minnesota Department of Transportation

Traffic Conditions, Highway Improvements and Construction Work Zones.

Mn/DOT and Connect Computer Company are working jointly to create the Twin Cities Traffic Net which provides a real-time display of traffic flow on Twin Cities area freeways.

Before you do any traveling, you may also want to look at information about current highway improvement projects to avoid or anticipate delays along the way. Information about proposals and plans for future highway improvements is also available.

Driver License and Motor Vehicle Information

If you are looking for assistance with driver licenses, driving records, motor vehicle registration or insurance questions, connect to the Department of Public Safety

We want to hear from you.

Your comments and concerns will help us develop our services to meet your needs.

If you would like to leave comments or questions about Mn/DOT or our programs please send them to the Commissioner at commissioner@dot.state.mn.us.

If you have comments or questions about this WWW server please send them to webmaster@dot.state.mn.us. To send



Montana Department of Transportation

PO BOX 201001 2701 PROSPECT AVE. HELENA, MT 59620-1001

(Picture of MDT Headquarters)

MDT's Mission is to serve the public by establishing a transportation system that emphasizes safety, environmental preservation, cost effectiveness and quality.

You are visitor number **06586** since 11/01/95

Be sure to check out the [Current Bid Invitations](#) and the [Montana Road and Weather Reports](#).

The [MDT Contractor's System](#) is now available, now with the ability to download the documents! Here you can find reports such as the As Read Letting List, Plan Holders List, DBE/WBE Directory, Construction bid invitations and much more. Check it out!

For information on Montana's speed limit laws see the [Speed Limit Table](#) or [MCA 61-8-303](#).

Click [here](#) to view a [Montana State Map](#).

The [CADD Standards](#) are now available via our [FTP site](#).

The MDT's [Global Positioning System\(GPS\) Files](#) ~~New!~~ are available for downloading.

Looking for a way to get around in Montana? Then the [MDT's Guide to Public Transportation in Montana](#) is for you.

The MDT's [Research Project Table](#) is available. ~~New!~~

Check out the latest issue of Transportation Planning's [Newsline](#) newsletter or [request a](#)



State of New Jersey
Department of
Transportation

NJ InTouch



Office of the Commissioner
1035 Parkway Avenue
CN 600
Trenton, NJ 08625
Telephone (609) 530-2000
Bulletin Board (609) 530-5151

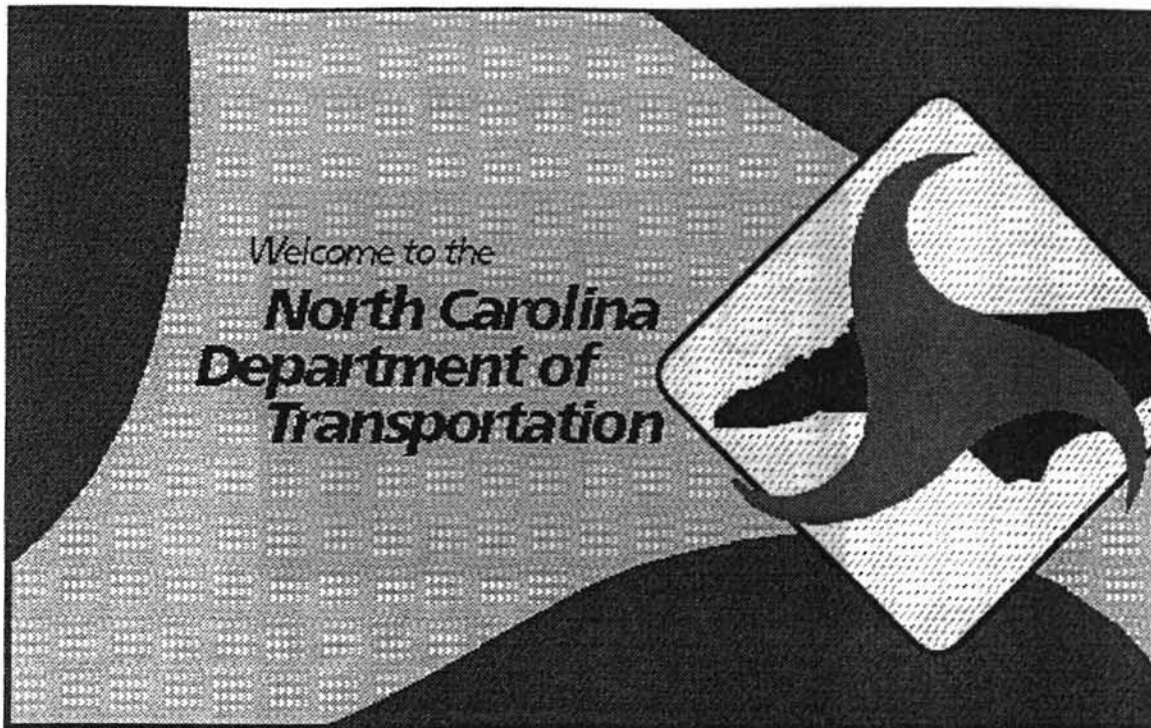
Frank J. Wilson, Commissioner

News Releases

- Fast Track Projects
-

NJ InTouch

Please send your comments to: feedback@state.nj.us



A Message from the Secretary

Welcome to the NC Department of Transportation. Our goal is to continue providing the citizens of our state with an efficient and well-maintained transportation system now and in the future.

Known as the "Good Roads State," North Carolina has the nation's largest state-maintained highway system. It is comprised of more than 78,000 miles of primary, secondary and urban highways and is a major factor in the state's economic well-being. Aviation, public transportation, rail, bicycle, pedestrian and safety programs also help ensure a good quality of life for all North Carolinians.

NCDOT's Home Page contains many routes to transportation destinations at the department and on other World Wide Web (WWW) sites. We hope you find them useful in getting information about our department.

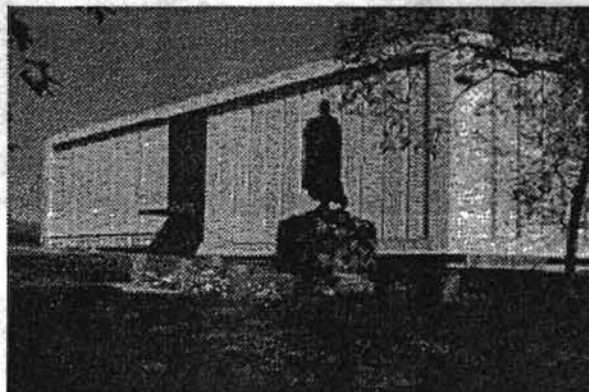
Sincerely,

Garland B. Garrett, Jr.
Secretary

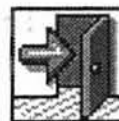


March 22, 1996  *Our pages are still under construction. Please visit often and see what's new.*

Welcome to the North Dakota Department of Transportation



To reach our Web Directory, click here...



[\[ND Homepage \]](#)

The Mission of the North Dakota Department of Transportation is to provide a transportation system which meets the needs of the citizens of our state and nation, thereby contributing to a high quality of life



[North Dakota Road Report](#)



[ND State Map \(244 Kbytes\)](#)



[NDDOT Interesting Facts and Figures](#)



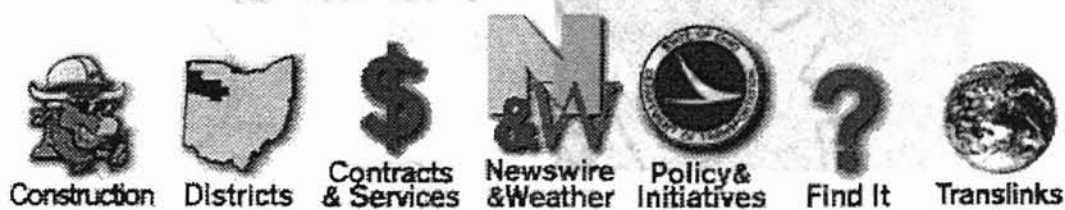
[North Dakota & Transportation related Scenery](#)



[State of North Dakota Agencies & Departments](#)

Updated Monday, April 29, 1996

I-270 and Tuttle Crossing - Northwest Columbus



WHAT'S NEW:

April 23, 1996: District 12 Deputy Director To Resign

April 19, 1996: Transportation Director Signs Partnership Agreement

April 18, 1996: State Infrastructure Bank

Welcome to the Ohio Department of Transportation

George V. Voinovich, Governor of Ohio

Jerry Wray, ODOT Director

[[The Ohio Plan](#)] [[Vision 2000](#)] [[Vision 2000 FAQs](#)] [[Find It](#)] [[Travel Information](#)] [[Contract Services](#)]

[[Wildflower Program](#)] [[ODOT Districts](#)] [[Construction Info](#)] [[Newswire and Weather](#)] [[Ohio's STIP](#)]
[[Translinks](#)] [[County Maps](#)]

[[Morgue](#)] [[CADD](#)]

State of Ohio Front Page

//////CONSTRUCTION ZONE//////

Oklahoma Transportation

Governor: Frank Keating

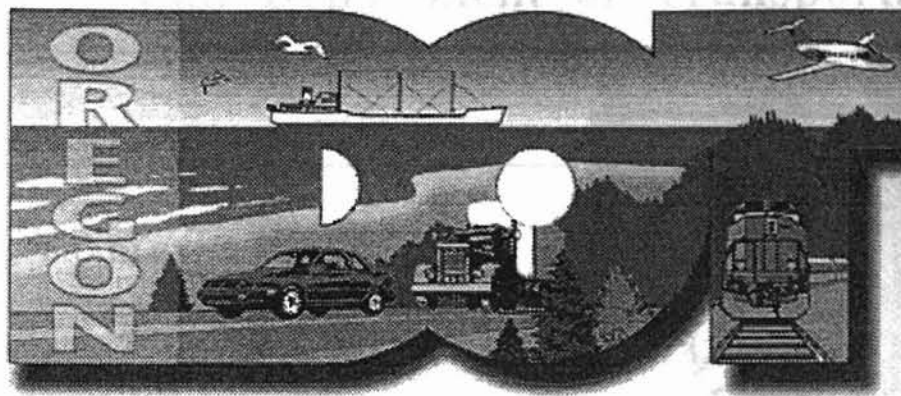
Lieutenant Governor: Mary Fallin

Secretary of Transportation: Neal A. McCaleb



Other Selected Web Servers

| | | |
|---|--|--|
| <u>Questions Comments Information</u> | TO PAGE: | <u>E-MAIL TO WEBMASTER</u> |
| | <u>Oklahoma Transportation Options</u> | |



Oregon Department of Transportation

- [New ODOT Director Announced](#) **NEW**
 - [News Releases](#)
 - [DMV](#)
 - [Oregon Transportation Commission](#)
 - [Oregon Transportation Plan Annual Report](#)
 - [Oregon Road Reports](#)
 - [Central Oregon Road Information](#)
 - [Washington Road Reports- Pass Report](#)
 - [California Road Reports- Reported Traffic delays/closures only](#)
 - [National Weather Service- Weather for Oregon](#)
 - [Route and Distance Calculator](#) **NEW**
 - [Gopher](#)
 - [E-Mail Directory](#) for Oregon State Employees and Others
 - [Telephone Directory](#) for Oregon State Employees
 - [Web Policies](#) **NEW**
-

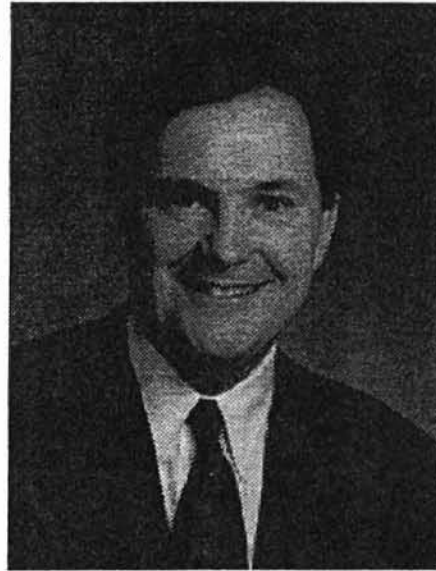
Last Updated 4/22/96

Comments or Suggestions contact: [Michael Topik](#)
 Web Administration: [Brian McBee](#)
 Page Address: www.odot.state.or.us

Pennsylvania Department of Transportation

Secretary
BRADLEY L. MALLORY

*1200 Transportation and Safety Building
 Harrisburg, PA 17120
 (717) 787-2838*



Bradley L. Mallory was born Aug. 16, 1952, in Elkland, the son of Wayne E. (dec.) and Onalee J. Kemp Mallory; grad., Elkland H.S., 1970; Dickinson College (B.A.), 1974; Dickinson School of Law (J.D.), 1977; Pa. Dept. of Transportation: Asst. Attorney General, 1977-80; Exec. Sec., Pa. Hazardous Substances Trans. Bd., 1980; mgr., Systems and Support Group, 1981; Dir. of Highway Safety, 1981-84; Dir. of Strategic Planning, 1984-87; Depty. Secty. of Trans., 1987-90; counsel, Deckert Price & Rhoads, 1990-94; appointed Secretary of Transportation, January 13, 1995; mem., Pa. Bar Assn., Amer. Assn. of State Hwy. & Trans. Officials; chmn., Special Com. on Intermodal Issues & Domestic Freight Policy; past secty., Natl. Assn. of Governor's Hwy. Safety Representatives; married Marcy Carey; 1 child, Kathryn.

Mission Statement

Act 120 of 1970 created the Department of Transportation, effective July 1, 1970.

The Department was given the responsibility to develop programs to assure adequate, safe and efficient transportation facilities and services at the lowest reasonable cost to the citizenry. Coordination of transportation services by local government and private enterprise is encouraged, as is cooperation of federal, state and local government bodies in the achievement of transportation goals. These goals include providing needed facilities for the movement of people and goods, stimulating technological advancement in transportation facilities, providing leadership to identify and solve transportation problems, and developing and applying inter and multi-modal approaches to transportation policy and programs.

The Department assumed all of the powers and duties formerly performed by the Department of Highways; the Bureaus of Motor Vehicles and Traffic Safety in the Department of Revenue; the Mass Transit Division in the Department of Community Affairs; and the Aeronautics Commission in the Department of Military Affairs. Of special importance among these responsibilities are those relating to certificates of title, licensing of operators, registration and licensing of motor vehicles, administrative enforcement of the Motor Vehicle Code including the Point System, and administration of aviation and airport development programs within the



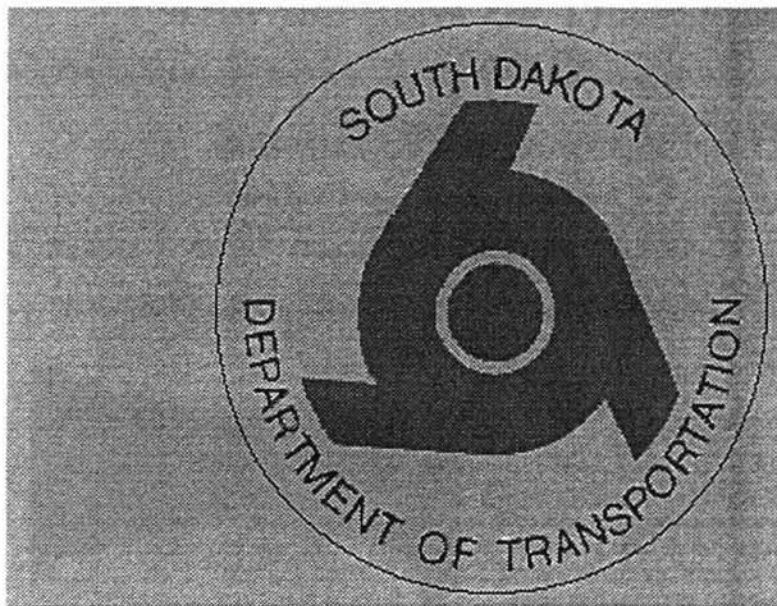
DEPARTMENT OF TRANSPORTATION

DIRECTOR: William F. Bundy
 Two Capitol Hill, Providence, Rhode Island 02903
Phone#: (401) 277-2481
FAX#: (401) 277-6038
TDD#: (401) 277-4971

DIVISION HEADS

| | | |
|---------------------------------------|-----------------------------|----------|
| Engineering Bureau Chief Engineer: | James R. Capaldi, P.E. | 277-2481 |
| Bridge Design: | Kazem Farhoumand, P.E. | 277-2053 |
| Maintenance Operations: | Thomas E. Jackvony, Jr. | 277-2378 |
| Survey: | Frank Pezzullo, Jr., P.L.S. | 277-2815 |
| Traffic: | Paul R. Annarummo, P.E. | 277-2694 |
| Intermodal Programs: | William Alves | 277-2694 |
| Research & Technology: | Colin A. Franco, P.E. | 277-4955 |
| Contract Administration: | Ronald E. Delvecchio | 277-2495 |
| Financial Management: | Leo Cirello | 277-6590 |
| MIS: | Kenneth Marrocco | 277-6935 |
| Claims: | Richard M. Sparks | 277-3742 |
| Construction: | John B. McGee | 277-2468 |
| Materials: | Mark E. Felag, P.E. | 277-2524 |
| Program Support Bureau Administrator: | David J. Sasso | 277-6003 |
| Real Estate: | William J. McCarthy | 277-2411 |
| Design: | Edmund T. Parker, Jr., P.E. | 277-2023 |
| Audit: | James R. Choquette | 277-2297 |
| Assistant To The Director: | Tish Wold | 277-2481 |
| Legal Services-Chief Legal Counsel: | Veronica Ridolfi, Esq. | 277-6510 |
| Human Resources Administrator: | Paul E. Pysz | 277-2572 |
| Final Review: | Alphonse A. Prata | 277-2021 |
| Public Affairs: | John H. Woodhouse, Jr. | 277-1362 |

Department of Transportation



Department of Transportation Building

Secretary of the Department of Transportation: Ronald W. Wheeler

Address:
Department of Transportation
Transportation Building

Phone:
(605) 773-3265 - Routine Business
1-800-637-3255 - Size & Weight Permit

DEPARTMENT OF TRANSPORTATION

**James K. Polk State Office Building
Nashville, Tennessee 37243-0349
(615) 741-2848**

APPOINTEE

BRUCE SALTSMAN



Transportation is so basic that many of us overlook its overwhelming importance in our daily lives. Practically everything used in our homes, offices or schools across Tennessee--from furniture to food items to clothing--requires a large and complex transportation network. Understanding that will make it easier to understand why keeping Tennessee moving is the primary goal of the Department of Transportation.

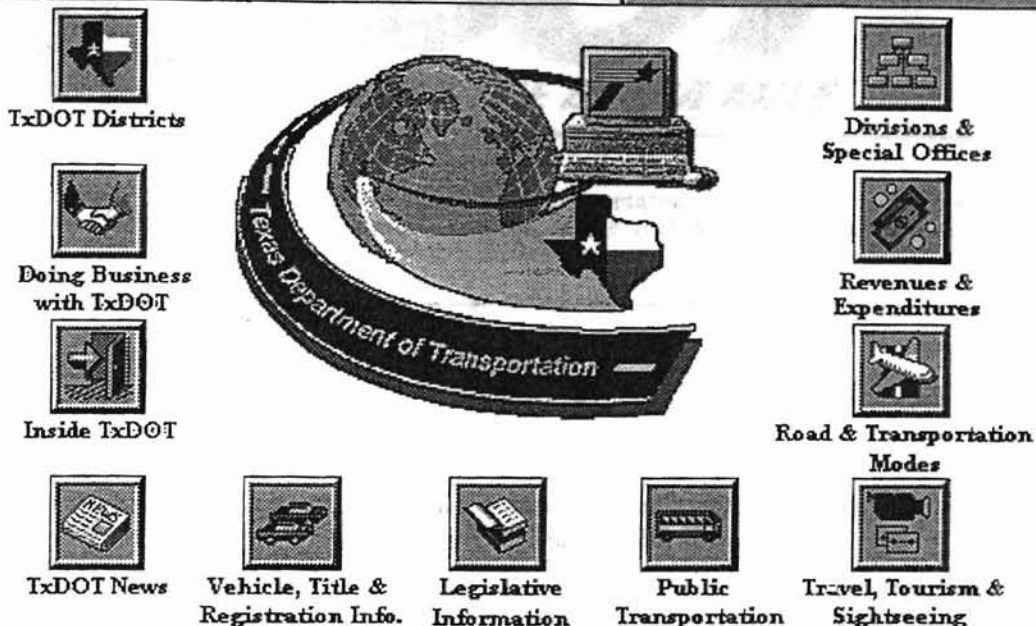
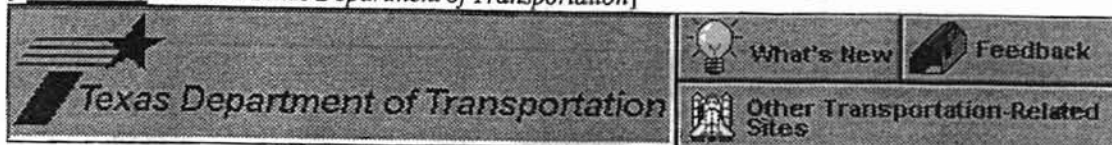
In the winter, for example, transportation maintenance crews sometimes get up at 3 a.m., or may stay out all night, keeping roads clear of snow and ice. These same workers are called out at all hours after accidents to clean up glass and debris on the road. In the spring and summer, they stay busy filling potholes, cutting grass and picking up litter. These functions all run hand-in-hand with the department's ongoing task of planning and constructing new highways to meet growing traffic demands while weighing environmental concerns and maintaining a state highway system of which Tennessee road users can be proud.

Today, Tennessee's road system stretches 84,852 miles, enough to circle the world more than three times. Of that figure, 13,552 miles are on the state highway system, which is totally maintained by the state. These 13,552 miles represent 16 percent of the total highway miles within our state; however, they carry approximately 75 percent of the traffic. Included in the state highway system are 1,062 miles of interstate highways, completed and opened to traffic. Although the interstate system makes up just over one percent of our total highway mileage, it carries approximately one quarter of all the traffic in Tennessee.

The Tennessee Department of Transportation also has responsibilities for other forms of transport--aviation, public transit, waterways and railroads. For these areas, the department provides various types of financial and technical assistance to local governments and transportation operators throughout the state. The department's involvement ranges from construction of airport improvements to helping pay for transit buses to planning for riverports that can stimulate economic development.



[Text Only | © 1996 Texas Department of Transportation]



IF you are not using a browser that supports Client-Side Image Mapping, [CLICK HERE!](#)

The Texas Department of Transportation has a customer comment line available for questions or comments regarding department activities around the state. Callers who dial 1-800-55TxDOT (1-800-558-9368) will reach the district office responsible for activities in the vicinity of the caller's location. There are 25 district offices located around the state to serve the citizens of Texas.

Utah Department of Transportation



UDOT Mission Statement: "Provide a quality transportation system that is safe, reliable, environmentally sensitive, and serves the needs of the traveling public, commerce and industry."

Welcome to UDOT!



This page is currently under heavy construction. Don't mind our dust. As you travel the information highway, please HONK and WAVE!



Check in here for comments on new additions

Popular Documents and Features

- [Current road conditions report - updated as conditions change](#)
- [News - Press Releases](#)
- [Public Hearings](#)
- [Statewide Transportation Improvement Program \(STIP\)](#)
- [Minutes from Commissioner's Meetings](#)
- [PREVIEW of Coming Attractions...](#)
- [Consultant and Contractor Information](#)
 - [Engineering Services](#)
 - [Construction](#)

Divisions and Departments

- [Project Development](#)
 - [Engineering Services](#)
 - [Right of Way](#)




Virginia Department of Transportation

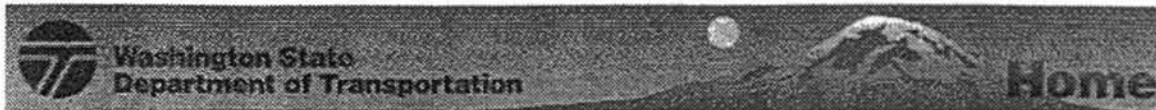
Welcome to VDOT. If you live in Virginia, plan on visiting, or are just passing through, you will want to look at these sections for information about Virginia's transportation network.

- [BUSINESS OPPORTUNITY](#) NEW
 - [Current highway construction projects](#) (map and list)
 - [Driving through highway work zones](#)
 - [Transportation Directory](#) (telephone numbers and e-mail addresses)
 - [Free VDOT publications](#)
 - [Open to the public](#)
 - [Virginia toll facilities](#)
 - [Adopt-a-Highway Program information](#)
 - [VDOT's purpose, mission and values](#)
-

Other useful web sites:

Fastoll [Automatic toll collection-Dulles Toll Road](#) NEW

 [Northern Virginia TRAFFIC VIDEO NOW test page](#)



Have a question regarding this site ? Send it to WEBMASTER@WSDOT.WA.GOV

Transportation Commission

- [Next Commission Meeting Agenda](#)
- [Previous Commission Meeting Minutes](#)
- [Washington State Transportation Policy](#)
 - [Advanced Technology Policy-- Report and Survey](#) **New**
- [Washington State's Transportation Plan](#)
- Commission's E-Mail address is: TRANSC@WSDOT.WA.GOV

Current Topics

- [North Cascades Highway is now open](#) **New**
- [Washington Interstate Speed Limit Plan](#) **New**

Washington State Ferries

- [Schedules and Information](#)

Central Puget Sound Regional Transit Authority

- Look at the [Transit Master Plan](#) for King, Snohomish, Pierce counties.

Northwest Region

- [Construction Update Report](#) Greater Puget Sound area
- [NW Region Daily Construction Closures](#) **New**
- [A Traffic Flow MAP](#) for the Seattle Freeways
- [Puget Sound HOV System Information](#) **New**

Olympic Region

- [Construction reports and much more !](#)

Eastern Region

- [Construction, Eastern region speed limit survey](#) and other information from Spokane and the surrounding areas **More**

Transportation Economic Partnerships Division **New**

Public Transportation and Rail Division

"Leave your car at home!!" Public Transportation and Rail can help you explore your transportation choices, including:



Wisconsin Department Of Transportation

Welcome to the Wisconsin Department of Transportation's Home Page! We've created this network of information so that you, the public, can get the latest information about the state's diverse transportation system of highways, airports, rails, harbors and bus systems, and WisDOT resources. We welcome your comments and suggestions on how we can continue to make our transportation system more responsive to your needs.



Our pages are still under construction. Please visit often and see what's new.

A glance at transportation in Wisconsin

Need a quick fact?? Look here for an overview of Wisconsin transportation facts & figures.

Doing business with WisDOT NEW

Information on bids and contracting, letting and vendors...

Getting around Wisconsin

Whether you travel by bicycle, car, plane, train, boat, or a bus...look up information to help you travel our highways and byways. Find information on motor vehicle customer service centers and motor vehicle FAQs, rest areas, road construction, road conditions, weather, winter driving tips, and more...

Inside WisDOT

An organization guide to the Wisconsin Department of Transportation and a subject oriented directory to help you find the answer to your transportation-related questions.

WisDOT news

Department of Transportation

Director:
Don Diller
Box 1708
Cheyenne, WY 82003-1708
307-777-4375

Major Divisions:

- Accounting
- Administrative Services
- Aeronautics
- Bridge
- CADD
- Commercial Driver Licensing
- Construction & Maintenance
- Contracts & Estimates
- District Offices
- Driver Services
- Employee Safety
- Engineering
- Engineering Services
- Environmental Services
- Equipment
- Facility Maintenance
- Fuel Tax
- Geology
- Highway Development
- Highway Patrol
- Highway Safety
- Human Resources
- Information Technology
- Internal Audit
- Legal Services
- Local Government Coordinator
- Management Services
- Materials Laboratory
- Motor Vehicle Registration & Titling
- Motor Vehicle Services
- Office Services
- Operations
- Photo & Survey
- Planning
- Planning & Administration
- Programming
- Public Affairs
- Purchasing
- Regulatory Program
- Right-of-Way
- Telecommunications
- Traffic Design
- Traffic Operations
- Utilities

APPENDIX F

**GLOSSARY OF CYBERSPACE
TERMINOLOGY**

GLOSSARY OF CYBERSPACE TERMINOLOGY

Access: The means of getting into an online system. Different systems require different types of access. A direct Internet connection that provides a user with access to the graphical version of the World Wide Web requires a special configuration for the user's computer, in addition to an Internet access account.

Address: The network name, or host computer's site where someone can send mail or files to a user.

Asynchronous: Lacking synchronicity.

BBS: Bulletin Board System, an electronic version of the old bulletin boards on which people attached notices with thumbtacks. Generally includes a public message area, a section for storage of files, live chat and e-mail.

Browser: Software designed to let the user view documents created specifically for the World Wide Web. More recent browsers also allow the user to access other Internet services. Mosaic and Netscape are currently among the most popular browsers in use.

Commercial provider service: An online bulletin board-like service that provides an array of services for a fee. CompuServe, America Online and Prodigy are among the more popular services. Some of the early Departments of Transportation to go online did so through a commercial provider service.

Cyberspace: A term referring to the unreal world in which information passes between computers. Originally coined by author William Gibson in the novel, *Neuromancer*, the term has become widely accepted as the geographical name for the place where online conversations, e-mail exchanges and information transfers occur.

DOT: Department of Transportation, an agency given the responsibility of maintaining the state's transportation infrastructure.

Download: The transfer of files from a remote computer to that of the user's.

Electronic Resource Location: See website.

E-mail: Electronic mail, or a message passed from one person to another via

computer.

FAQ: Frequently Asked Questions, or a list of questions about a particular website's topic.

File: A single archive of information recognized as an information unit by a computer. A file may store a text document, a graphic image, an executable program, a sound, a video, or some other computer-based program.

Gatekeeping: A term describing the regulation of information through a particular source.

Homepage: The initial page of a website, usually listing major files which can be accessed through this location and an e-mail contact address.

Host: A local "on-ramp" to the Internet, usually furnished through a provider service.

HTML: Hypertext Markup Language, the layout coding system for the World Wide Web.

Hypertext: In HTML, a highlighted area of text or image that, when clicked on with a mouse, will automatically generate a command to go to a new place within a document, or to an entirely new document elsewhere on the World Wide Web. Linked documents do not have to be on the same host — or even on the same continent.

Internet: A vast network of computer networks connected together, allowing computers in one part of the world to instantly access computers in another. Used to send e-mail or to find information.

Link: See hypertext.

Network: Two or more computers linked together comprise a network.

Online: Any situation when two computers are "talking" to each other.

Provider: An entity, such as a university, corporation or private business, that provides a user with Internet access. See also "Commercial Provider Service."

Quicktime: A process in which brief segments of motion pictures, often with sound, can be viewed through a computer.

Realtime: A process which can place information on the Internet as it occurs or within minutes of its occurrence.

Search Engine: Software designed to allow the user to search for information on the

World Wide Web by topic or keyword. Popular search engines are Lycos, Webcrawler and Gopher.

Server: An Internet-based computer providing services and information.

Synchronicity: Possessing the ability to be synchronous, or immediate.

Synchronous: Immediate.

URL: Short for Uniform Resource Locator, an Internet "address."

Webmaster: A person with technical knowledge of the Internet who has the responsibility of maintaining information on a website.

Website: A site on the World Wide Web where information can be found. It may consist of a single "page" or file, or as many as 1,000 pages, depending upon the memory capacity of the host server.

World Wide Web: A hypertext-based distributed information system that combines sounds, images and text on a single "page" filled with links to other sites. Also called "WWW" or "W3."

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

153

APPENDIX G

**OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS
REVIEW FORM**

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

153

Date: 02-06-96

IRB#: AS-96-046

Proposal Title: CYBERSPACE: ITS IMPACT ON THE PUBLIC RELATIONS
FUNCTION OF STATE DEPARTMENTS OF TRANSPORTATION

Principal Investigator(s): Maureen J. Nemecek, Brian K. Mitchell

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved


ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD
AT NEXT MEETING.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A
CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD
APPROVAL.

ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR
APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval
are as follows:

Signature:



Chair of Institutional Review Board

Date: February 9, 1996

2

VITA

Brian Keith Mitchell

Candidate for the Degree of
Master of Science

Thesis: CYBERSPACE: ITS IMPACT ON THE PUBLIC RELATIONS FUNCTION
OF STATE DEPARTMENTS OF TRANSPORTATION

Major Field: Mass Communication

Biographical:

Personal Data: Born in Hobart, Oklahoma, on February 22, 1959, the son of Donald and Lela Mae Mitchell, Mountain View, Oklahoma.

Education: Graduated from Mountain View High School, Mountain View, Oklahoma, in May 1977; received Bachelor of Arts degree in Communication/Journalism from Cameron University, Lawton, Oklahoma, in December 1989. Completed the requirements for the Master of Science degree with a major in Mass Communications at Oklahoma State University in July 1996.

Experience: Editor and publisher of the *Mountain View Times*, 1979-80; Managing Editor of the *Frederick Daily Leader*, 1980-84 and 1985-90; Managing Editor of the *Altus Times*, 1984-85; Community Traffic Safety Program Specialist/Public Information Representative for the Oklahoma Department of Transportation, 1990-91; Program Manager for Public Information and Education for the Oklahoma Highway Safety Office, 1991-94; Information Representative/Publications Editor for the Oklahoma Department of Transportation, 1994-96; Editor, *Access* magazine, 1994-96; Director of Information Services for Cameron University, Lawton, Oklahoma, 1996-present.

Professional Memberships: Society of Professional Journalists, Cameron University Chapter.