ABSTRACT

Title of Dissertation: **THE IMPACT OF INTERNET USAGE AND ORGANIZATIONAL POLICY UPON MANAGERIAL DECISION-MAKING EFFECTIVENESS IN THE PUBLIC SECTOR**

Michael Belak, Doctor of Management, 2005

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During the past decade, Internet usage has grown rapidly in the public sector.   Today, public sector managers have more information and tools available to them via the Internet than ever before. Recent studies have shown how the Internet exerts a positive influence upon managerial decision-making. However, there is a gap in the current body of knowledge regarding how Internet usage skills and organizational policy for Internet usage impacts managerial decision-making effectiveness in the public sector. This research study investigates the relationship between an individual's Internet usage skills, an organization's support for Internet usage and the decision-making effectiveness of managers in the public sector.

For this study, one hundred and sixty-two managers within thirty-four agencies of the District of Columbia, the capital city of the United States, participated in this research effort. This study adopted a non-experimental, correlational research method using an established survey instrument. Quantitative data analysis techniques are employed to assess the problem area, including descriptive statistics, correlation analysis, factor analysis and multiple regression analysis.

The findings of this research show that a positive, linear relationship exists between an individual's Internet usage skill and an organization's facilitating conditions for Internet usage with managerial decision-making effectiveness. Seven distinct Internet usage skills were identified that have the strongest impact upon managerial decision-making effectiveness in the public sector. Additionally, the more strategic the management position is within the organization, the greater the impact these usage skills have upon decision-making effectiveness. While no conclusive relationship was identified between an organization's Internet management policy and managerial decision-making effectiveness, a correlation was identified between an organization's Internet management policy and the facilitating conditions for Internet usage. This finding provides a fertile ground for future research efforts.

The Internet continues to provide great value for managers in the public sector. Over time, it is anticipated the Internet will continue to evolve, generating new functions capable of providing an even greater impact on managerial decision-making. Future researchers should monitor this situation and work closely with public sector managers to fully capitalize upon these developments.

THE IMPACT OF INTERNET USAGE AND ORGANIZATIONAL POLICY UPON
MANAGERIAL DECISION-MAKING EFFECTIVENESS IN THE PUBLIC SECTOR

By

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List of Figures and Tables

Chapter 1: Introduction

Managers in both the public and private sector spend a great deal of time making decisions. According to Koontz, the central focus of management is decision-making (Koontz, 1969). The study of human decision-making has generated a significant amount of research over the past 50 years, spawning many different frameworks and distinct schools of thought. For an activity so central to individuals and organizations, many new insights continue to be gleaned about human decision-making. Much of the foundational research regarding the decision-making process began in the 1940s and 1950s with the seminal works of L. Savage and H. Simon. From these formative roots, many different and diverse branches of research emerged and rapidly grew. This growth was facilitated by the rapid growth and pervasive use of information technology. Information technology is now well integrated into the many branches of decision-making research.

While numerous authors have recognized the profound impact of technological innovation upon an organization (Bell, 1973; Hamel & Prahalad, 1994; Porter, 1990), only recently has the impact of Internet usage in managerial decision-making received serious attention and scholarly research. During the last ten years, Internet usage has grown rapidly in the public sector. With the Internet, public sector managers have more information and tools available to them today than ever before. With just a few computer keystrokes or "clicks" of a mouse, managers can procure new products, collaborate with their colleagues on policy formulation or rapidly disseminate public announcements to all constituents in their jurisdiction. With a rapidly evolving technology like the Internet, subtle, yet important changes are regularly occurring that systematically affects the way individuals and organizations perform their work

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and make decisions. Public sector managers have become increasingly dependent upon the access and services the Internet provides in their decision-making and policy formulation process.

While there has been a plethora of research and information written about the usage and adoption of information technology and the Internet in the private sector, there has been a barren void of research on the same topics in the public sector. Why? The Internet is already considered a ubiquitous information technology tool whose value is clearly recognized by public sector managers as having a direct positive relationship with effective communications and managerial decision-making (Wood, 2000). Historically, this gap in relevant research is most likely related to two significant factors that affect the technology adoption process in the public sector.

The first major factor is the public sector has historically been plagued by long lead times in the adoption of information technology when compared to the private sector (Kraemer & King, 1977). As a result, introducing business process improvements and new capabilities that traditionally result from the adoption of new technologies have often lagged the private sector. While private sector researchers and the media are "off and running" to document, implement and study the newest technology development, the public sector is just managing to implement the "new" technology already used in the private sector. These technology adoption lag times can be significant – often being approximately ten years (Kraemer, Danizer & King, 1978). An additional organizational factor that complicates the adoption process is the size of a municipality as it also plays a significant role in the adoption process (Kraemer & King, 1977). Larger, more affluent municipalities tend to have more resources to devote to information technology needs and can therefore progress through the adoption process faster than smaller

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municipalities. Over twenty years later, Kraemer & King's findings still provide relevant insights into the challenges faced in the public sector. Public sector agencies are continually beleaguered to increase their adoption rate of Internet-based technologies to improve service to citizens. Surprisingly, as widespread as the Internet phenomenon is, there are still relatively few studies that investigate the factors influencing its diffusion (Tan & Teo, 1999).

The second major factor affecting the adoption of information technology in the public sector is the rapidly changing nature of technology itself (Beaumaster, 1999). The information technology industry has experienced a situation where numerous, rapid improvements to various technologies have occurred leading to rapidly declining prices. A prime example of this phenomenon includes the rapid advances to the computer chip for personal computers. New product launches and technology breakthroughs are routinely occurring at the rate of 18-24 month intervals (Braithwaite, 1996).

These rapid changes in technology create a "risk/reward" scenario for the public sector. While the public sector is now rewarded with technology solutions that previously were not affordable to improve citizen services and internal business processes, the risks associated with this approach include long-lead times that may keep many of the smaller governments behind. Smaller municipalities can now afford good, but "obsolete" technology solutions (International City Management Association, 1989). As a result, a technology chasm can develop that becomes increasingly difficult for a small municipality to close. Once smaller municipalities implement a technology solution to enable their operations, they are compelled to maintain it. These increased maintenance costs further reduce the available funding for new technology solutions. The information technology industry reinforces this technology chasm by sustaining

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the self-perpetuating prophesy of constant change by stimulating the demand for new products and features (Beaumaster, 1999).

Problem Statement

The problem addressed in this study is that there is little evidence or research regarding how Internet usage skills or organizational support for Internet usage impacts the decision-making effectiveness of managers in the public sector. This research study builds upon previous foundational research and an established theoretical framework to determine the relationship between an individual's Internet usage skills or organizational support for Internet usage and the effectiveness of the decision-making process of managers in the public sector. For this study, two hundred and seventy-three (273) managers within the District of Columbia, the capital city of the United States, were asked to participate in this research effort.

In conducting a thorough literature review in this area, previous studies have shown how the Internet exerts a positive influence upon managerial decision-making (Malloy & Schwenk, 1995; Teng & Calhoun, 1996). These studies were mostly performed in the private sector, with only a few recent studies focusing on the public sector (Wood, 2000). While these studies provide the theoretical foundation for this study, there is a gap in the current body of knowledge regarding which Internet usage skills or how an organization's Internet management policy that governs Internet usage within the organization impacts the decision-making effectiveness of public sector managers.

In this study, three important variables are explored, two independent variables related to Internet usage and one dependent variable for the effectiveness of managerial decision-making. The independent variables are: a) An individual's Internet competency skill level; and b) The organizational support provided for the use of the Internet.

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To measure the first independent variable, an individual's Internet competency skill level, a classification framework from Pawar & Shardar (1997) is extensively utilized in combination with the research of Li (2002). To measure the second independent variable, organizational support for use of the Internet, a classification framework by Simmers (2002) is used for Internet management policy along with previous research on facilitating conditions for Internet usage (Cheung, Chang and Lai, 2000; Li, 2002). To measure the dependent variable, managerial decision-making effectiveness, four factors are used. The four factors contributing to managerial decision-making effectiveness are: a) intelligence gained, b) alternatives developed, c) participation involved, and d) speed of decisions made (Simon, 1960, 1977; Wood 2000). The overall research model and relationship between the variables can be seen in Figure 1: Research model - Internet usage and the managerial decision-making process.

Research Model

User
Skills

Computing

Computing use for
Managerial
Decisions

Associated with

Managerial
Decision

Perception of
Internet use
As facilitator
Of
Managerial
Decision-
Making

Managerial
Decision-Making
Effectiveness

• Intelligence
• Alternatives
• Participation
• Speed of Decision
  Making

Dimension of
Internet
Interactivity

Managerial
Decision

Communication

Communication use for
Managerial Decisions

Associated with

Organization
Support

*Independent
Variables*

*Dependent
Variable*

* Adapted from Teng and Calhoun (1996) and Wood (2000)

Figure1: Research Model - Internet usage and the managerial decision-making process

Research Objectives

The objective of this research study is to determine the relationship between an individual's Internet usage skills or the amount of organizational support provided for Internet use and the decision-making effectiveness of managers in the public sector. For this study, a manager is defined as an individual managing a government agency, service or program. Managerial decisions are defined as non-routine, consequential decisions with a long time horizon designed to ensure the achievement of work group objectives, where a substantial expenditure of money and manpower is made (Teng & Calhoun, 1996). Each manager's position in the organization is classified into one of three managerial levels. These levels are top (Strategic), middle (Tactical) or lower (Operating) (Long and Long 1990).

The unit of analysis in this study is all thirty-four District of Columbia agencies that comprise the Mayor's cabinet. While this study provides valuable insights regarding the public sector managers within the District of Columbia, care must be taken not to generalize the findings of this study to all public sector managers in the United States or other countries. Further research needs to be performed in these areas. Public sector managers residing in other countries or government agencies possessing similar characteristics and levels of Internet adoption may benefit from the findings of this study.

This study seeks to address two gaps in previous research. Previous research identified several principal factors regarding Internet usage that can impact the managerial decision-making process. These factors include the amount of Internet usage, intensity of Internet usage, a user's skills in using the Internet and the facilitating conditions for Internet access (Teng & Calhoun 1996, Wood 2000). While it is generally accepted that a user's ability to effectively use the Internet can influence the effectiveness of the decision-making process, there has been only a

few, embryonic attempts to discern which user skills have the greatest impact upon decision-making effectiveness, with inconclusive results. This study addresses this first gap in existing research for managers in the public sector.

The second gap this study seeks to explore is the application of an Internet management policy and the facilitating conditions for Internet usage within public sector organizations. Existing research is rapidly building regarding the implications of an Internet management policy within an organization. In a recent Dataquest survey of 200 U.S. business executives, 82% stated Internet usage should be monitored at their companies, but only 34% stated their company had instituted such a program (Simmers, 2002). This study may be the first to explore the impact of how an organization's support of its Internet usage, as defined by its Internet management policy and facilitating conditions, affects the decision-making effectiveness of managers in the public sector.

Research questions

The specific research questions addressed in this study are:

Q1: What are the characteristics of public sector managers using the Internet in the decision-making process? These characteristics include: (a) Gender, (b) Age, (c) Functional area, (d) Management seniority, and (e) Type of government.

Q2: What impact does an individual's skill in using the Internet have upon managerial decision-making effectiveness in the public sector?

Q3: Which Internet usage skills have the greatest impact upon managerial decision-making effectiveness in the public sector?

Q4: What is the effect of an organization's support for the use of the Internet, as defined by its Internet management policy and facilitating conditions, upon managerial decision-making effectiveness in the public sector?

Topic Relevance and Managerial Implications

This research study explores the impact of an individual's Internet usage skills and an organization's support for Internet use upon the decision-making effectiveness of managers in the public sector. It further describes the perceptions of public sector managers regarding their ability to use the Internet's communication and computing capabilities to improve managerial decisions.

Should the findings of this research study identify the Internet usage skills most beneficial for improving the managerial decision-making process, public sector managers will be able to better use and enhance these skills. Public sector managers can also obtain training to develop these skills, both for themselves and their subordinates, to enhance their decision-making effectiveness. These findings may also provide the foundation for building intelligent tools to assist managers in making better decisions or the design of tools to facilitate the acquisition of these skills thereby improving the competitiveness of enterprises. Should this study identify how an organization's Internet management policy and facilitating conditions affects the managerial decision-making process, public sector managers can then adapt their policies and programs to provide the organizational support most conducive to effective managerial decision-making and improve organizational performance.

Should the findings of this study show there is no relationship or a negative relationship between an individual's Internet usage skills and the managerial decision-making process, it could indicate the need for further investigation regarding the limitations of user competency skills to aid managerial decision-making effectiveness. Should the findings of this study highlight there is no relationship or a negative relationship between an organization's support for

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Internet usage and the managerial decision-making process, it could indicate the need for further investigation regarding the limitations of organizational support in using the Internet to aid managerial decision-making effectiveness.

Regardless of the result of this study, it is expected this research study will improve management practice and enhance future research efforts in the areas of information technology and social science research. It will also contribute to the practice of public administration in the areas of information technology and managerial decision-making.

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Chapter 2: Representative Literature

In reviewing the prevailing literature, a great deal of research and information on the decision-making process has accumulated over the past fifty years. The responsibility for making decisions is a key differentiator of management from other occupations in the workforce. In his research on decision-making, Simon (1977) identified four principal phases in the decision making process. These phases were:

1. Intelligence. This phase searches the environment for conditions that require decisions.

2. Design. This phase develops and analyzes possible courses of action.

3. Choice. This phase selects a particular course of action from the available choices.

4. Review. This phase assesses past choices and their effectiveness.

Simon (1977) also characterized decisions on a continuum that ranges from programmed decisions at one end to non-programmed decisions at the other end. This continuum reflects the amount of structure inherent in the decisions. Programmed decisions tend to be highly structured, address routine events and can follow specific procedures. Non-programmed decisions are highly unstructured, address non re-occurring events and usually do not follow a regular process or procedures.

There are other conceptual frameworks depicting a manager's decision-making process. Early studies, pre-1980 and before the advent of the personal computer, did not include the role of information systems and the Internet in the decision-making process. Instead, these studies focused on the overall process of decision-making and the behavioral implications. In the 1980's, the ramifications of information technology began to be introduced in the research, along

with differing views on the impact and influence information technology had in a manager's decision-making process. These differing views include:

- Wildavsky (1983) stated management information systems are aids for converting large amounts of information into summarized forms that are useful management aids.

- Dearden (1983) concluded that computer generated reports did not contain the information needed by senior management for decision-making.

- King (1985) stated the use of information technology does not benefit chief executive officers.

As the usage of information technology increased and the computer applications became increasingly sophisticated and mature, more conclusive research emerged depicting the role of information technology in the decision-making process.

Huber (1990) was an early pioneer in the study of the impact of advanced information technology on decision-making. He proposed that advanced technologies possess more sophisticated properties than previous information technology systems provided. These properties now provided users a greater choice of the type of technology to assist them with the task at hand. Additionally, for those users taking advantage of information technology, information technology would increase the accessibility of information. As a result, task performance is improved and users create a reinforcing loop that leads to increased use of advanced technology. The advanced information technologies defined by Huber included devices in which a computer processed information integral to a user's task or communications. These information technology devices then transmitted, analyzed or exploited information to a greater degree than did pre-1971 technologies. Examples of these information technologies

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include expert systems, online management information systems, and external information retrieval systems.

Slightly more than a decade after Huber's pioneering work, many of the advanced information technologies included in Huber's definition are standard in today's Internet environment (Li, 2002). The Internet functions available today are even more advanced than those described in Huber's research. The Internet routinely provides the functions to:

- Communicate easily with a diverse, geographically dispersed audience.
- Retrieve, store and send information in a wide variety of digital formats.
- Search, index and store vast amounts of information quickly and inexpensively.
- Allow large groups of users to easily communicate in online chat forums.

Molloy and Schwenk (1995) conducted the first study to test several tenets of Huber's theory. In this study, they confirmed several of Huber's (1990) propositions by conducting an intensive examination of eight decisions in four companies. Their results showed that with the use of advanced technology, the overall quality of decision-making and the level of comprehensiveness of the decision process are improved.

Teng and Calhoun (1996) conducted another important study in the 1990s on the impact of information technology with the decision-making process. Their study concluded that information technology use, in general, had positive effects on improving managers' skills and decision quality. Their work extended Huber's (1990) work and confirmed that information technology aided strategic and operational decision-making capability. The results of this study showed the intensity of information technology usage by managers for decision-making improved the timeliness of information and accuracy of forecasts. The intensity of information

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technology usage also increased communication and improved the effectiveness of decision-making.

In a recent study performed by Cheng, Chang, and Lai (2000), they furthered Huber's work by showing that facilitating conditions were a critical factor affecting Internet usage, where facilitating conditions were defined as the objective factors in the environment that enabled a person to use the Internet. Facilitating condition factors included all the needed hardware, software, support services and network services.

Other research efforts have also recently completed that was helpful to this current research study. Both Wood (2000) and Li (2002) extended the body of knowledge in the area of Internet usage and managerial decision-making. Wood (2000) performed some of the first research regarding Internet usage and decision-making in the public sector. Wood's (2000) study showed there was a direct positive relationship between the use of the Internet's computing and communication capabilities and managerial decision-making in the public sector. Li (2002) also completed what may be the first research on the importance of Internet usage skills for the managerial decision-making process with information technology managers of large, multi-national corporations in China. Li's (2002) study showed that decision-making effectiveness was positively associated with intensity, skill and the facilitating conditions of Internet usage for information technology managers in China.

A rapidly developing technology area that is receiving increased attention and research is an organization's Internet management policy. An Internet management policy is defined as having four principle components (Simmers, 2000). These four components are:

- An explicit and clearly communicated Internet usage policy (IUP).

- Tools for monitoring and recording Internet and email usage.

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- End-user training for the proper usage of an Internet usage policy.

- The application of discipline measures for the Internet usage policy.

An Internet usage policy seeks to control Internet activities so desired outcomes remain within acceptable limits for an organization (Simmers, 2002). Organizations need to proactively manage Internet usage to provide a safe, efficient and effective work environment that is not dysfunctional for their employees. To assist with the management process, numerous vendors and tools have emerged to monitor and restrict Internet usage within an organization. In a recent Dataquest survey of 200 U.S. business executives, Internet monitoring was expected to increase in organizations from 34% in 1999 to nearly 66% in 2001 (D'Antoni, 2000).

While managers seem to intuitively accept the need to regulate Internet usage within their organization, little research has been performed on the impact of this regulation upon a manager's decision-making effectiveness. This study may be the first to explore the impact of an organization's support for Internet usage via its Internet management policy upon managerial decision-making effectiveness in the public sector.

Chapter 3: Methodology

The methodology used for this research study is integrative, building upon prior research in the subject areas of public administration, information technology and managerial decision-making. Many research methods can be employed for this type of study. These methods include case, experimental, correlational predictive, and other approaches (DeLone and McLean 1992). Based upon previous research and methods successfully employed, this study uses a non-experimental, correlational research method with an established survey instrument. This research method measures statistically significant correlation coefficients between relevant phenomena, including the determination of the extent to which variations in one or more factors correspond with variations in one or more other factors and the use of the findings in formalizing predictions (Mauch and Birch 1993).

There are numerous benefits associated with using this research method (Nachmias and Nachmias, 1992). These benefits include:

- The research is performed in natural settings.
- Random probability samples can be performed.
- Statistical inferences can be made to broader populations.
- Strong external validity of the study.

This study employs quantitative techniques to assess the problem area, leveraging and expanding upon an established survey instrument successfully used in prior research. The survey instrument used in this study and accompanying documentation is included in Appendices A-C. The previous studies using this survey instrument include Cheung, Chang and Lai (2000) researching the critical factors that affect Internet usage; Wood (2000) researching the Internet as

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a decision-support technology for public managers; and Li (2002), researching the impact of Internet usage and decision-making for information technology managers in China.

The variables measured in this study, such as usage skill and facilitating conditions, are derived from published literature and previous research as described in the representative literature section of this paper. This approach provides a sound foundation for the content validity of the survey instrument. In previous studies, pilot tests of this survey instrument were also performed prior to the actual research. Additionally, Wood (2000) performed a reliability analysis on this survey instrument and Li (2002) performed a factor analysis to confirm the discriminant validity of the scales of measurement. The unidimensionality of the scales was verified with a Principal Component Analysis. Finally, a Cronbach Alpha model was also deployed in each of these studies for the survey instrument as it conducts a reliability analysis that measures the internal consistency and reliability of the measurement scales. Wood's (2000) research instrument carried a Cronbach Alpha value of 0.84, (70% response rate with 95 completed questionnaires). Cheung, Chang, and Lai's (2000) research instrument carried a Cronbach Alpha value of 0.85, (83% response rate with 241 completed questionnaires). Li's (2002) research instrument was greater than 0.70 (68% response rate with 123 completed questionnaires). These results indicate the scales of measurement are valid and reliable.

Chapter 4: Hypotheses

The base theory supporting this study allows the development of the following null and alternative hypotheses:

H_o: Decision-making effectiveness of public sector managers is not associated with the use of the Internet.

H_a: Decision-making effectiveness of public sector managers is associated with the use of the Internet.

In this study, the independent variables are an Individual's Internet usage skill and organizational support for the use of the Internet. These variables are measured by: a) A manager's Internet competency skill level, b) An organization's Internet management policy, and c) The facilitating conditions for Internet usage.   As a result, we can further subdivide the alternative hypothesis as:

H_1: Decision-making effectiveness of public sector managers is associated with an individual's Internet competency skill level.

H_2: Decision-making effectiveness of public sector managers is associated with an organization's Internet management policy.

H_3: Decision-making effectiveness of public sector managers is associated with the facilitating conditions of Internet usage.

Variables Assessed in this Study

In this research project, the two independent variables studied are: a) An individual's Internet competency skill level, and b) Organizational support for use of the Internet. To measure the first independent variable, an individual's Internet competency skill level, a classification framework from Pawar & Shardar (1997) was extensively utilized in combination with the

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research of Li (2002). Pawar & Shardar's (1997) classification framework for Internet utilities is presented in Figure 2: Internet utility classification. Internet utilities can be considered as consisting of four primary classes. These classes are: communication utilities, resource locator utilities, information retrieval utilities and browser utilities. For this study, the results of an individual's Internet usage skills are measured by the survey's responses using a scale of 1-5 from the respondents.

Internet Utility Classification

Communication Utilities
•Email
•Newsgroups
•Online Chat

Information Retrieval Utilities
•Search engines
•File Transfer Protocol

•*Live discussions*
•*Secondary databases*
•*Institutional library Systems*

Search Utilities
•New web search engines
•Archie & Veronica

Browsing Utilities
•Telnet
•World Wide Web (WWW)

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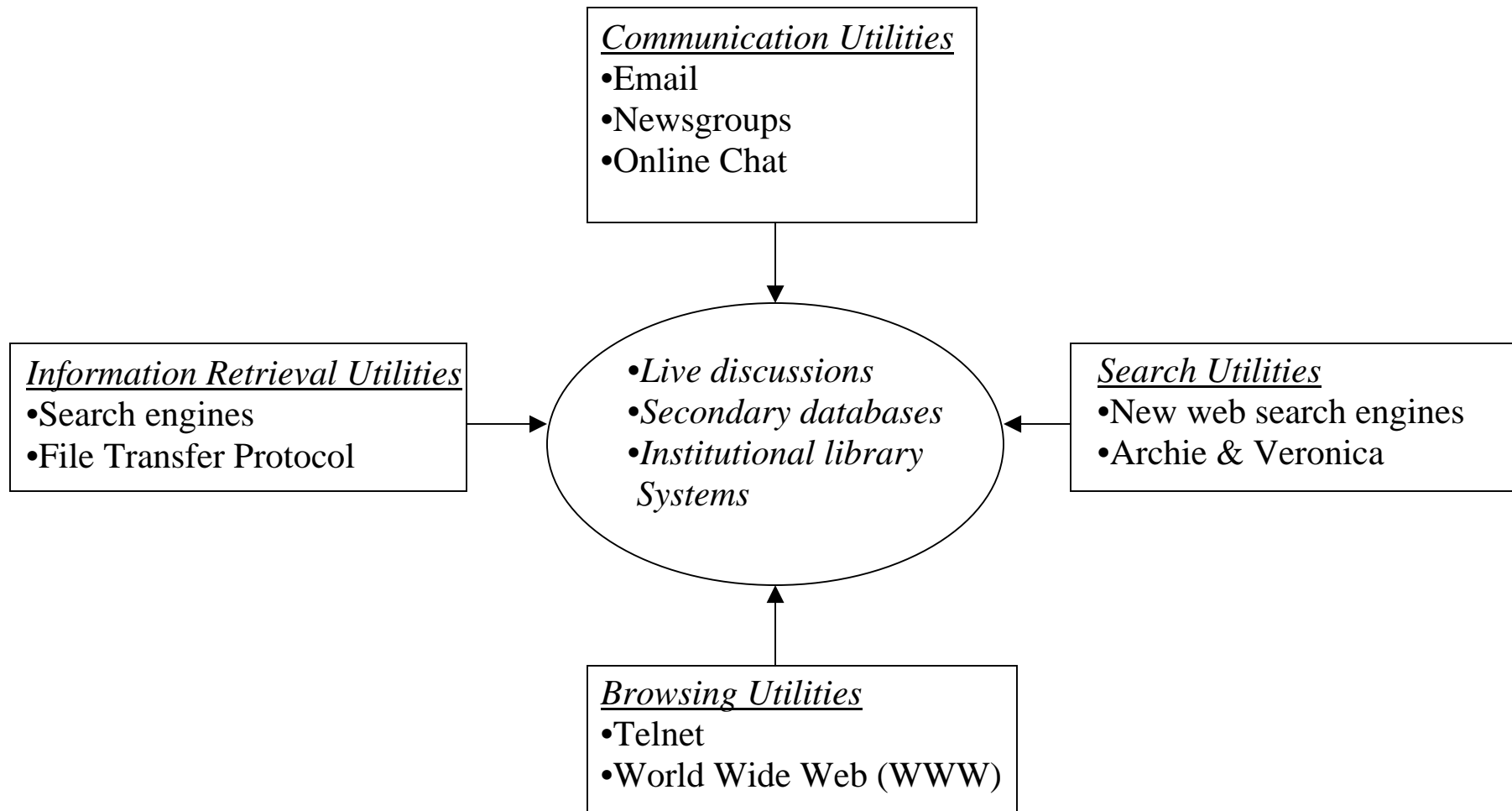
Li's (2002) research was probably the first attempt to assess the impact of Internet usage skills on managerial decision-making. In his research, he also utilized Pawar & Shardar's (1997) classification framework for Internet utilities and studied ten distinct Internet usage skills and their impact upon decision-making effectiveness of information technology managers in China. His results were inconclusive as to which Internet skills had the greatest impact upon decision-making. He attributed this result to the lack of a sufficiently large number of skill items and an uneven distribution of individual skills among the Internet skill categories. This study made adjustments to learn from these results in the desire to overcome these previous difficulties.

To address the first issue encountered by Li (2002) regarding a sufficiently large number of skill items in this study, a broadened selection of Internet utilities were utilized from Pawar & Shardar's (1997) framework that were not included in Li's (2002) study. The additional utilities included File Transaction Processing (FTP) for retrieval, Newsgroups for communications, and Telnet for retrieval/browsing.

To address the second issue encountered by Li (2002) regarding an uneven distribution of individual skill among the skill categories, a different survey population was used for this study that is selected from a different industry and country possessing a vastly different national and organizational culture. Additionally, many of the technical infrastructure problems (i.e. telecommunications reliability, data connection speeds, etc.) encountered in Li's study are not encountered in the selected population in this study. As Li's (2002) study may have been the first attempt to discern the relationship between individual Internet usage skills and managerial decision-making, this study seeks to determine if Li's inconclusive findings will be replicated. If this study also shows there is no relationship or a negative relationship between Internet usage skills and managerial decision-making effectiveness, it could indicate the need for further

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investigation regarding the limitations of user competency skills in using the Internet to aid managerial decision-making.

To help measure the second independent variable, a classification framework by Simmers (2002) is used for an organization's Internet management policy. Facilitating conditions are measured in terms of the availability and level of support for Internet usage (Wood 2000, Li 2002). Internet management policy is divided into four components. These components are:

- An explicit and clearly communicated Internet usage policy (IUP).

- The use of automated tools to monitor and record Internet and email usage.

- Training of end-users regarding the Internet usage policy.

- The application of discipline measures in support of the organization's Internet usage policy (IUP).

Both Internet management policy and facilitating conditions are assessed in the survey instrument. The results are measured by the survey's responses using a scale of 1-5 for the responses received from the respondents.

The dependent variable in this study is decision-making effectiveness of public sector managers. The factors contributing to decision-making effectiveness are: a) intelligence gained, b) alternatives developed, c) participation involved, and d) speed of decisions made. The results are measured by the survey's responses using a scale of 1-5 along with qualitative answers from the respondents. This part of the research model is derived from the seminal work of Simon (1960, 1977) and Wood (2000) on decision-making.

In Simon's (1960, 1977) work, he used a three-stage model on decision-making that included: intelligence, design and choice. Simon's model relates to situations in which a single participant carries out the decision-making process. In organizational settings, there is group

input and influence that often accompanies the decision-making process in organizations. As a result, previous studies and their questionnaires included a fourth stage, interaction/communication, to measure these effects of this process (Wood, 2000).

Data Collection Procedure

The unit of analysis in this study is all District of Columbia agencies that comprise the Mayor's cabinet. These agencies directly report to the Mayor of the District of Columbia and the Office of the City Administrator. To facilitate the efforts of this study, The Office of the City Administrator supplied the list of all cabinet level agencies.   The director's office within each agency was then contacted to obtain the current list of managers that were direct reports to each agency director. This list was then verified with email and telephone directories to ensure the correct email and telephone numbers of each study participant was used. The resulting sample population includes thirty-four distinct agencies with a total of two hundred and seventy three (273) managers.

Permission to distribute the survey was then obtained from the Office of the City Administrator and the Office of the Chief Technology Officer. After those permissions were obtained, a cover letter describing the purpose of the survey, along with the directions for completing the survey, was drafted and signed by the officials representing each office. This cover letter is shown in AppendixA. The corresponding survey for this study is shown in AppendixB. The cover letter and survey was then sent to each participant via email. Participation in the survey was voluntary and encouraged through follow-up email requests to complete the survey, as shown in AppendixC, that were sent during a three-week period of time following the initial survey distribution. All returned surveys were promptly reviewed for any

missing data. For each returned incomplete survey, the respondent was contacted to obtain the missing data.

Previous research studies, Wood (2000) and Li (2002), had encountered numerous technical difficulties obtaining survey responses using interactive forms posted on Internet sites created specifically for the distribution and collection of a survey data. To avoid the technical problems those studies encountered, the medium selected to distribute and collect this survey was email. The District of Columbia had selected and implemented a standard email solution for its government agencies. This solution included the use of the Microsoft Exchange email product for nearly all computer users within the District of Columbia. Additionally, nearly all users had ready access to Microsoft Office and Microsoft Word products on their desktop computers. As a result, this survey's data collection approach to use email enabled a secure, ready access to the sample population. It also promoted an easy update process to complete and return the survey by simply having each respondent attach and return the completed survey via email using the familiar tools already deployed on each user's desktop computer.

Although there is no agreed standard for an acceptable response rate (Fink and Kosecoff, 1985; Nachmias and Nachmias, 1992) the goal of this survey was to yield a 60% response rate or better. Follow-up emails were conducted after the initial survey distribution to achieve this goal.

For the ensuing analysis of survey responses, each manager's position within an agency was classified into one of three managerial levels. These levels are top (Strategic), middle (Tactical) or lower (Operating) (Long and Long 1990). These levels are displayed in Figure three (3): Managerial levels in an organization. Strategic management represents the organizational level where decisions are made that is the broadest in scope and address the longest time frame. Tactical management is the organizational level where decisions address a

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somewhat broad range in scope and time frame. Operating management is the organizational

level that implements the plans of middle (Tactical) management and controls the daily

operations of the organization.

Respondents in this survey select the level that best describes their position in the

organization. This approach is also supported by widespread government focus on re-engineering

business processes, thereby allowing employees to have the required technology and distributed

knowledge necessary to make decisions (U.S. Vice President, 1997).

Managerial Levels in an Organization
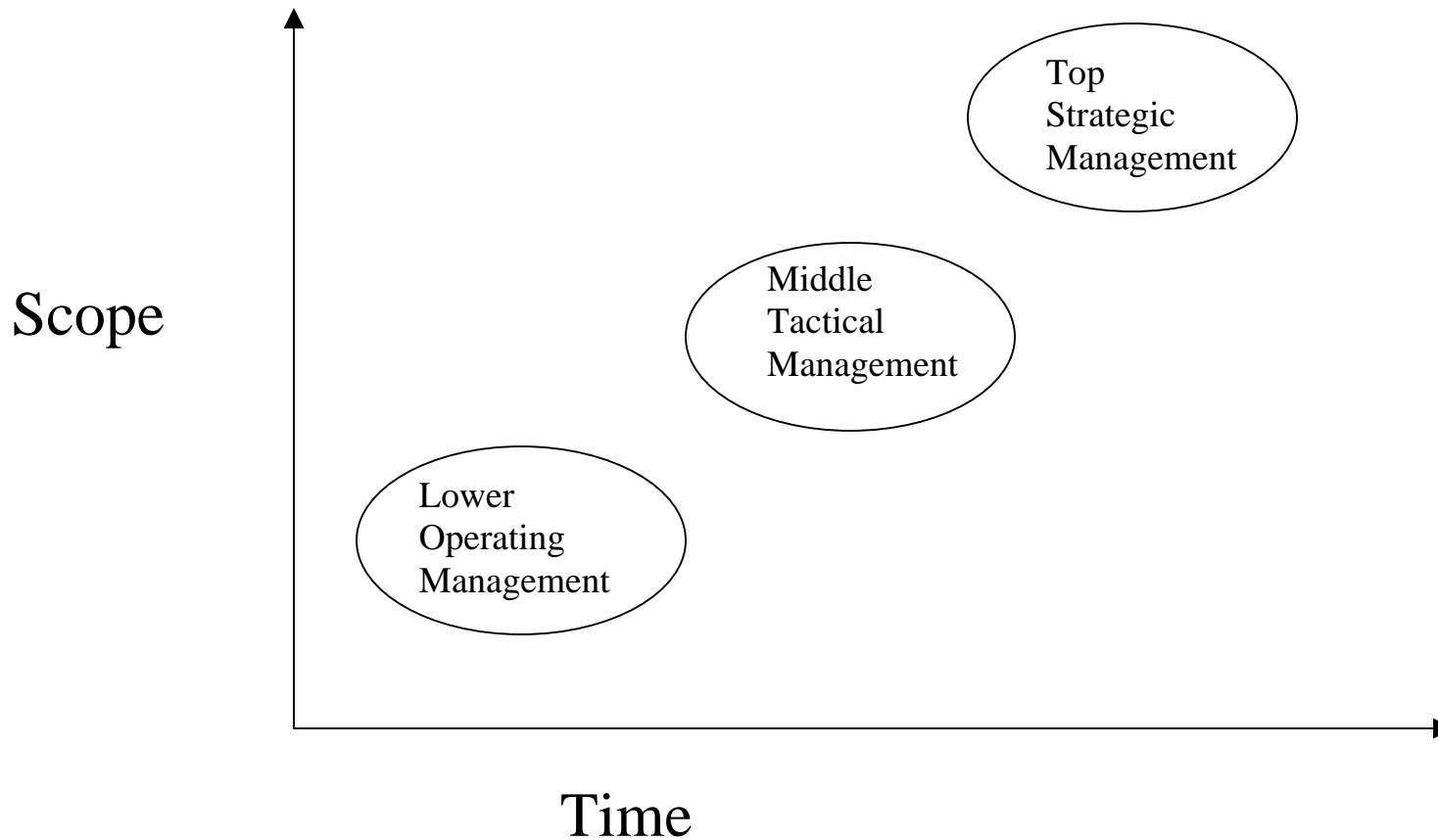
Figure 3: *Managerial levels in an organization (Long & Long, 1990)*

Data Analysis Procedure

This study is empirical research. This type of research is primarily focused on perceptions, experience and observation (Nachmias and Nachmias, 1992). The data gathered for the questions contained in the survey are analyzed in accordance with the guidelines shown in Figure 4: Relationship of survey variables and questions. The Microsoft Office 2000 suite of products is used throughout this study for all documentation and correspondence. For all data coding and analysis, the Statistical Package for Social Science V11.0 (SPSS), the student version, is used.

Statistical Instrument

The instrument used in this study is designed to generate data from the sample population in accordance with the relationship variables and questions shown in Figure 4: Relationship of survey variables and questions. The survey is divided into four sections and is shown in AppendixB. Each section of the survey focused on obtaining a specific data item. Section one obtained general information to characterize each manager. Section two sought information regarding a manager's usage of various Internet utilities and the organization's support for Internet usage. Section three solicited information regarding each manager's perceptions regarding the use of the Internet and managerial decision-making. Section four was an open-ended question to obtain qualitative information from the managers.

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Relationship of Survey Variables & Questions

Use of the Internet		Managerial Decision-Making Effectiveness
General Information	Q 1-8 →	
		Q 28 Knowledge
Individual Usage Skills	Q 9-20 →	
		Q 29 Alternatives
		Q 30 Participation
Organizational Support		
Internet Usage Policy	Q 21-24 →	Q 31 Speed
		Q 32 Overall
Facilitating Conditions	Q25 -27 →	
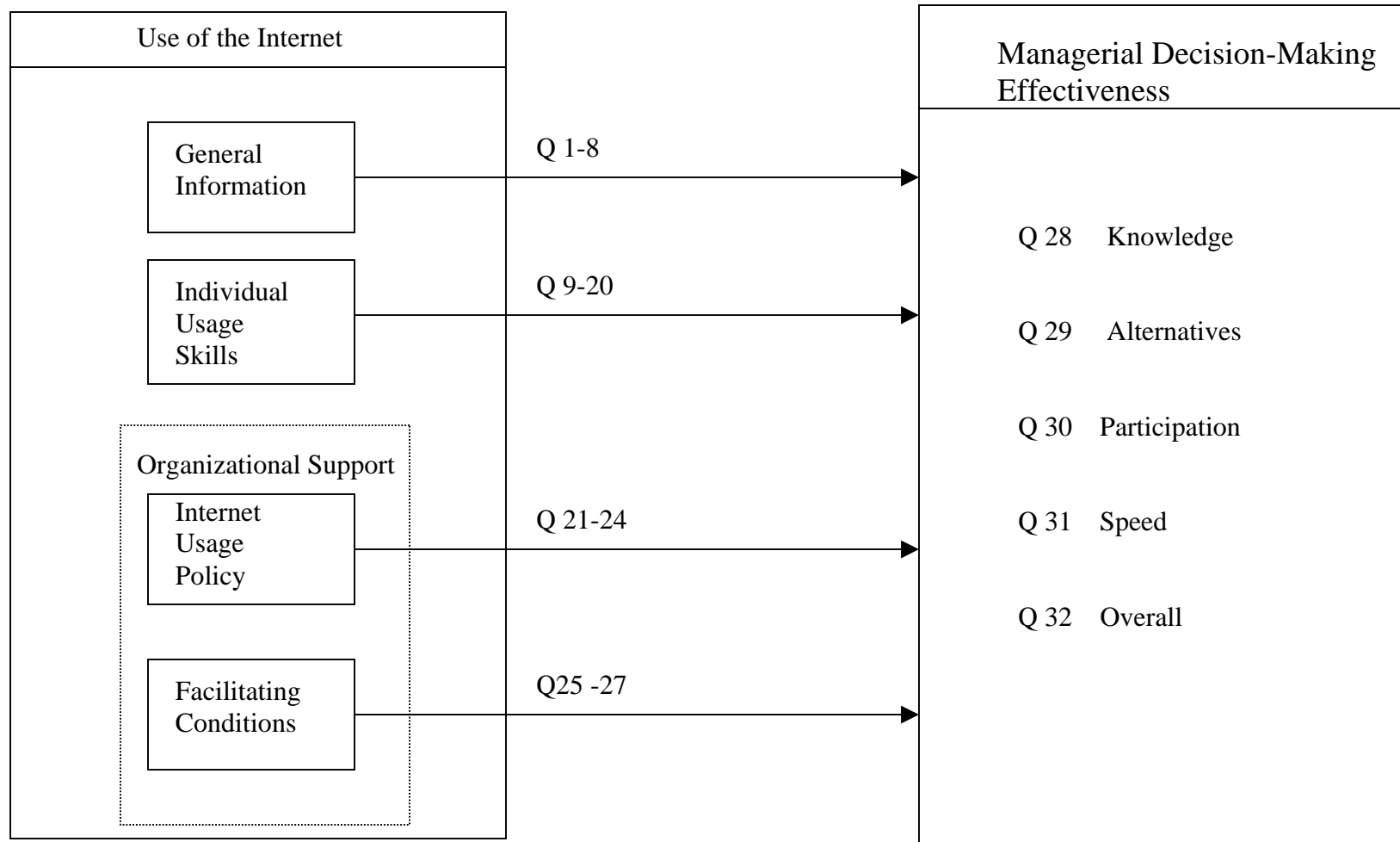
Figure 4: *Relationship of survey variables and questions*

For assessing each manager's usage of Internet utilities in Section two of the survey, a Likert scale with ratings of: Very often (More than one time a day), Often (Once a day), Sometimes (Once a week), Rarely (Once a month) or Never were the choices given to managers. Responses are assigned values ranging from 1 to 5, with 5 assigned to the rating of highest usage (very often) and 1 assigned to the rating of lowest usage (never). For assessing the organizational support received by each manager in Section two and the perceptions regarding Internet usage and managerial decision-making in Section three of the survey, a similar Likert scale with the ratings of: Strongly Agree, Agree, No Opinion, Disagree and Strongly Disagree were the choices given to managers. Their responses are assigned values ranging from 1 to 5, with 5 assigned to the rating of highest importance (strongly agree) and 1 assigned to the rating of lowest importance (strongly disagree), with 3 assigned for no opinion.

The statistical analysis performed upon the results of this survey incorporates different analytical methods. The analytical methods include: a) descriptive statistics, b) correlation analysis, c) factor analysis, and d) multiple regression analyses. Descriptive statistics reveal patterns on how respondents are clustered and their common characteristics. The descriptive statistics used include the mean, median, standard deviation and variance. This analysis is important as it illustrates what manner the managers could be clustered and what commonalities exist. A review of the data distribution of each independent and dependent variable is also performed to assess patterns in the data and the fit of the data to a normal distribution. Skewness and kurtosis coefficients are reviewed along with normal probability plots and normality tests. Correlation analysis is performed to assess the strength of the linear relationships between the variables being investigated. Spearman's rho is used to measure association at the ordinal level

between the variables. The Spearman correlations are also used to affirm the final outcome of this study for the relationships between the variables. Factor analysis is used to further identify the relationships that exist in the data for the independent variable Internet usage skills. A principal component analysis is used along with a Varimax rotation of the identified factors. Multiple regression analysis is used to measure the relationship between the independent variables (individual Internet usage skill and organizational support for Internet usage) and the dependent variable (decision-making effectiveness).

Assumptions and Limitations of this Study

The following assumptions are postulated for this study:

A. Public sector managers have varied decision-making functional roles in their organizations and use various types of decisions.

B. The respondents used structured and unstructured decisions in performing their managerial responsibilities.

C. The experience, amount of training and frequency of a manager's use of the Internet are expected to vary, thus the value of the Internet as a resource for decision-making information may result in a non-symmetrical distribution from the respondents.

D. Other factors contribute to the knowledge of the respondents that includes personal knowledge, personality type, interaction with others (Choo, 1995; Lan and Scott 1996)

As is common with other research studies, each study is subject to limitations. While many different information technology tools can be used with managerial decision-making, the goal of this study is to investigate one specific technology, the Internet, and to further delineate

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the specific relationship of Internet usage skills and organizational support for Internet use with managerial decision-making effectiveness in the public sector.

This study employs a correlational research method using an established survey instrument. This survey instrument reflects the perception of the respondents in various decision-making situations. This approach has some inherent limitations that include:

- The subjectivity of the respondents.

- Interpretations of the questions by the respondents.

- Responses are dependent upon the memory of the respondent.

It is likely that regardless of how a researcher develops a survey and/or prepares the respondents to objectively assess the use of the Internet in decision-making, the results may not offer a truly objective appraisal.

The outcomes of the decisions can also be affected by other organizational and personal factors that include re-organization, business processing re-engineering, the respondent's experience, constraints on time, money and available knowledge, etc. As a result, the population in this study is heterogeneous. The findings of this study may not be generalizable to a homogeneous population.

This study addresses managers residing within the government of the District of Columbia. While this study provides valuable insights regarding public sector managers within the District of Columbia, care must be taken not to generalize the findings of this study to all public sector managers in the United States or other countries. Further research needs to be performed in these areas. Public sector managers residing in other countries or government agencies possessing similar characteristics and levels of Internet adoption may benefit from the findings of this study.

Both the limitations and the findings of this study suggest several interesting areas for future research.

Data Analysis and Results

The data collection for this survey was conducted during the months of March and April 2004. The survey was distributed to two hundred and seventy-three managers across thirty-four operating agencies within the District of Columbia. One hundred and sixty-two responses usable responses were received for this survey, representing a 59% response rate. Ten responses were received that were unreadable due to transmission problems.

To ensure the continued internal consistency of the survey instrument scales, a Cronbach Alpha test was first conducted for all independent and dependent variables.   The Cronbach Coefficient Alpha values consistently ranged above (0.70). The Cronbach Coefficient Alpha values for each variable are:

Variable	Questions involved	Cronbach Coefficient
Skill	Q 9 - 20	0.766
Internet management policy	Q 21 - 24	0.768
Facilitating conditions	Q 25 - 27	0.898
Decision-making effectiveness	Q 28 - 32	0.847

Table 1: Cronbach Alpha Coefficient Values

Research Question #1 Analysis

To determine the characteristics of public sector managers using the Internet in their managerial decision-making process, an assessment of the survey responses was performed and various descriptive statistics were generated. For the survey participants, 38% were female and 62% were male as shown in Figure 5: Gender distribution of survey managers.
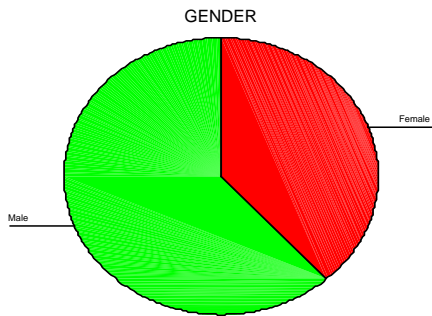
GENDER

GENDER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	62	38.3	38.3	38.3
	Male	100	61.7	61.7	100.0
	Total	162	100.0	100.0	

Figure 5: *Gender distribution of survey managers.*

The managers in this survey were at least 31 years of age or older. Eighteen percent of the managers were between the ages of 31 – 40 years of age; 31% of the managers were between the age of 41-50 years of age; and 51% of the managers were more than 50 years of age as shown in Figure 6: Age distribution of survey managers.

AGE

AGE
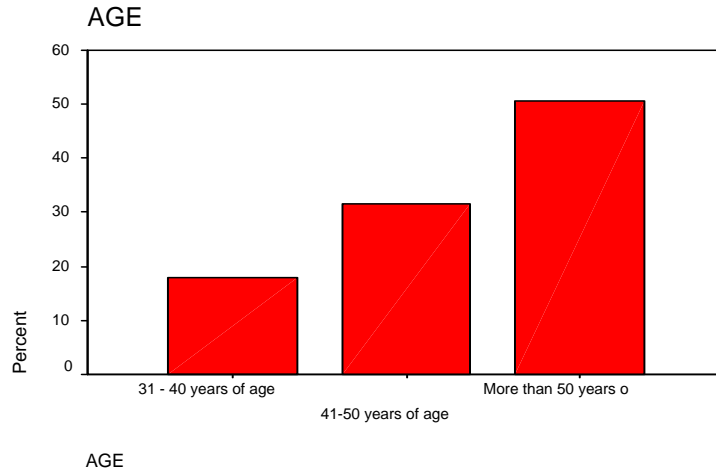
AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31 - 40 years of age	29	17.9	17.9	17.9
	41-50 years of age	51	31.5	31.5	49.4
	More than 50 years old	82	50.6	50.6	100.0
	Total	162	100.0	100.0	

Figure 6: Age distribution of survey managers.

The survey participants worked in several different functional areas as shown in Figure 7: Functional work areas of survey managers. The largest functional area was general agency management, with a total of 54% of all participants.
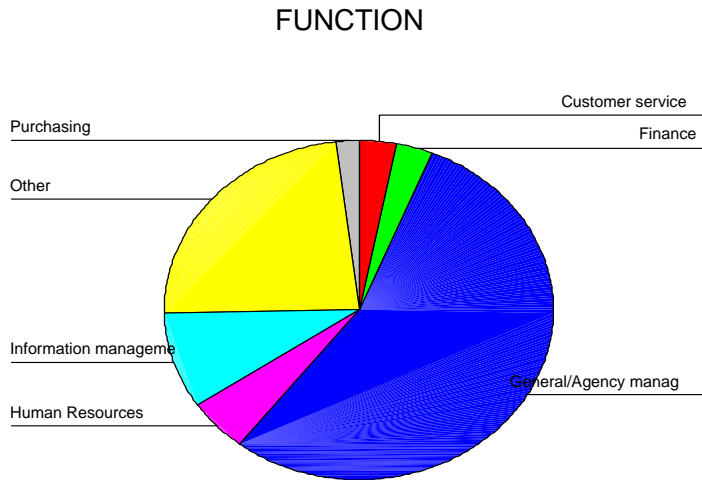
FUNCTION

FUNCTION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Customer service	5	3.1	3.1	3.1
	Finance	5	3.1	3.1	6.2
	General/Agency management	88	54.3	54.3	60.5
	Human Resources	8	4.9	4.9	65.4
	Information management	15	9.3	9.3	74.7
	Other	38	23.5	23.5	98.1
	Purchasing	3	1.9	1.9	100.0
	Total	162	100.0	100.0	

Figure 7: *Functional work areas of survey managers.*

The vast majority of survey participants worked in their position more than one year as shown in Figure 8: Tenure in current position. Approximately 54% percent worked in their current position for at least one to three years; 20% worked in their current position for three to five years; 9% worked in their current position between five to seven years; and 11% worked in their current position more than seven years.

POSTIME

POSTIME

POSTIME
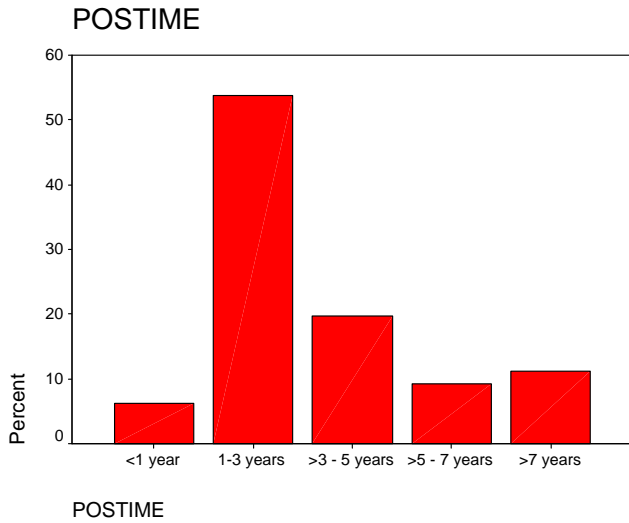
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 year	10	6.2	6.2	6.2
	1-3 years	87	53.7	53.7	59.9
	>3 - 5 years	32	19.8	19.8	79.6
	>5 - 7 years	15	9.3	9.3	88.9
	>7 years	18	11.1	11.1	100.0
	Total	162	100.0	100.0	

Figure 8: Tenure in current position.

As this study focused on the use of the Internet as it impacts managerial decision-making, the results of this survey showed that greater than 89% of the participants had used the Internet for more than a year with 61% of the participants using the Internet for more than five years.

Finally, nearly 44% of the respondents were top (Strategic) managers, while 49% were middle (Tactical) managers and 7% were lower (Operating) managers. These results are shown in Figure 9: Distribution of management positions in the organization.
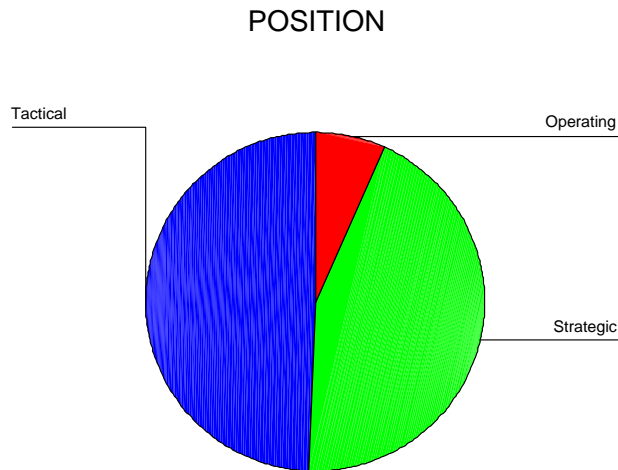
POSITION

POSITION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Operating	11	6.8	6.8	6.8
	Strategic	71	43.8	43.8	50.6
	Tactical	80	49.4	49.4	100.0
	Total	162	100.0	100.0	

Figure 9: Distribution of management positions in the organization.

For the remainder of the survey, questions 9 – 32, the answers to these questions are described in ordinal measurements for both the independent and dependent variables. Statistical measures, such as the mean and standard deviation, are the most appropriate ways to present measures for these variables. AppendixD displays the descriptive statistics for all of these variables.

The independent variables addressed in this study are an individual's Internet usage skill and organizational support for Internet usage as measured by an organization's Internet management policy and facilitating conditions. These variables were obtained by averaging the responses from the relevant survey questions. Questions 9 –20 measure an individual's skill

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(AVGSKILL) in using Internet utilities. Questions 21 – 24 measure Internet management policy

(AVGIUP). Questions 21 – 24 measure the facilitating conditions of Internet usage

(AVGFACL). The dependent variable assessed in this study is managerial decision-making

effectiveness. Questions 28 – 31 measure managerial decision-making effectiveness

(AVGDEC).

Further analysis was performed for each of these variables in preparation for the

correlation and multiple regression analyses. The skewness and kurtosis coefficients for these

variables were reviewed to determine the data distribution and fit to a normal distribution. The

data distribution of each variable showed a mild degree of skewness and kurtosis. Histograms

and normal probability plots were then reviewed for each variable to detect significant departures

from normality. No significant deviations were found.

Research Questions #2 – 4 Analysis

To understand the relationships between the dependent and independent variables, a

correlation analysis, factor analysis and a series of multiple regression analyses were performed.

The multiple regression analysis model used in this study is:

$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3$

Where:

Y = Dependent variable (Decision-making effectiveness)

X_1 = Independent variable #1 (Internet usage skill)

X_2 = Independent variable #2 (Internet policy management)

X_3 = Independent variable #3 (Facilitating conditions)

B_0 = Intercept on the Y Axis

B_{1-3} are the regression coefficients.

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To assess the overall relationship between an individual's Internet usage skills, organizational support for Internet usage and managerial decision-making effectiveness, a correlation analysis was first performed. This correlation analysis was performed on all independent and dependent variables using the averaged values of all independent and dependent variables. The data distribution of each variable was first assessed to ensure it complied with the assumption of normality. The Spearman rho correlation coefficient was used to measure correlation since it is a rank-ordered coefficient that measures association at the ordinal level. The results of the correlation analysis are displayed in Figure 10: Correlation of Internet usage skill, Internet management policy and facilitating conditions with decision-making effectiveness.

In this analysis, the Spearman coefficient showed both Internet usage skill and facilitating conditions are positively correlated with decision-making effectiveness. These findings also confirm previous research findings obtained (Teng & Calhoun 1996,Wood 2000, Li 2002). While no statistically significant correlation was detected between Internet management policy and decision-making effectiveness, a moderate, positive correlation (0.44) was detected between Internet management policy and facilitating conditions at the $(p<0.01)$ significance level. The results also show that Internet usage skill has a higher correlation (0.31) to decision-making effectiveness than facilitating conditions (0.25).

Correlations

			AVGSKILL	AVGIUP	AVGFACL	AVGDEC
Spearman's rho	AVGSKILL	Correlation Coefficient	1.000	.069	.006	.313**
		Sig. (2-tailed)	.	.382	.941	.000
		N	162	162	162	162
	AVGIUP	Correlation Coefficient	.069	1.000	.445**	.083
		Sig. (2-tailed)	.382	.	.000	.296
		N	162	162	162	162
	AVGFACL	Correlation Coefficient	.006	.445**	1.000	.259**
		Sig. (2-tailed)	.941	.000	.	.001
		N	162	162	162	162
	AVGDEC	Correlation Coefficient	.313**	.083	.259**	1.000
		Sig. (2-tailed)	.000	.296	.001	.
		N	162	162	162	162

**. Correlation is significant at the .01 level (2-tailed).

Figure 10: *Correlation of Internet usage skill, Internet management policy and facilitating conditions with decision-making effectiveness.*

To further explore and quantify the relationships between these variables, a series of multiple regression analyses were performed to assess the impact of Internet usage skill, Internet management policy and facilitating conditions upon managerial decision-making effectiveness.

The results of the multiple regression analyses shows that for the independent variables of Internet usage skill and facilitating conditions, they are positively and linearly associated with decision-making effectiveness. The analyses also established that Internet management policy did not have a statistically significant impact upon managerial decision-making effectiveness.

Referencing the Coefficients of Multiple Determination (R Square) in Figure 11 below, Internet usage skill accounted for 6.9% of the variance in decision-making effectiveness, facilitating conditions accounted for 3.5% of the variance in decision-making effectiveness. The results of the multiple regression analyses in this study regarding the relationship between Internet usage skills and facilitating conditions with decision-making effectiveness also confirm previous research results obtained (Teng and Calhoun, 1996; Li 2002). Additionally, these

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previous studies showed a dominant factor having a positive effect upon decision-making effectiveness was the intensity of Internet usage. Other factors having a positive effect included the duration and frequency of Internet usage.

The results of these multiple regression analyses are shown in Figure 11: Multiple regressions for Internet usage skill, Internet management policy, and facilitating conditions with decision-making effectiveness. These analyses were performed using the default ENTER method provided by SPSS for multiple regression analysis. After exploration and comparison with the STEPWISE method, no difference in the results was noted. Additionally, the author had no reason to believe suppression was occurring with any of the independent variables. Scatterplots were also reviewed of the dependent and independent variables, revealing the variability of the dependent variable to be similar at different levels of the independent variables. Further analysis of the scatter plots of the studentized deleted residuals vs. standardized predicted values revealed that greater than 95% of the residuals were within an acceptable range of –2 to +2 standard deviations, confirming the homogeneity of variance. Additionally, as all respondents worked within the same government and followed the same policies, no differences were expected. For each multiple regression analysis, the Durbin/Watson statistic was also reviewed and was in an acceptable range from 1.84 to 1.89, confirming the independence of observations.

Linear Regression 1: Internet usage skill with decision-making effectiveness

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	AVGSKILL [a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: AVGDEC

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.262 [a]	.069	.063	.54424

a. Predictors: (Constant), AVGSKILL

ANOVA [b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.491	1	3.491	11.785	.001 [a]
	Residual	47.391	160	.296		
	Total	50.882	161			

a. Predictors: (Constant), AVGSKILL

b. Dependent Variable: AVGDEC

Figure 11 – *Multiple regressions for Internet usage skill, Internet management policy, facilitating conditions with decision-making effectiveness*, **cont.**

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Multiple Regression 2: Internet usage skill, facilitating conditions with decision-making effectiveness

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	AVGFACL, AVGSKILL [a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: AVGDEC

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.323[a]	.104	.093	.53540

a. Predictors: (Constant), AVGFACL, AVGSKILL

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.304	2	2.652	9.252	.000[a]
	Residual	45.577	159	.287		
	Total	50.882	161			

a. Predictors: (Constant), AVGFACL, AVGSKILL

b. Dependent Variable: AVGDEC

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.292	.254		12.973	.000
	AVGSKILL	.284	.081	.262	3.492	.001
	AVGFACL	.107	.043	.189	2.515	.013

a. Dependent Variable: AVGDEC

Figure 11 – *Multiple regressions for Internet usage skill, Internet management policy, Facilitating conditions with decision-making effectiveness*, **cont.**

Multiple Regression 3: Internet usage skill, Internet management policy with decision-making effectiveness

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	AVGIUP, AVGSKILL [a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: AVGDEC

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.266[a]	.071	.059	.54535

a. Predictors: (Constant), AVGIUP, AVGSKILL

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.593	2	1.797	6.041	.003[a]
	Residual	47.288	159	.297		
	Total	50.882	161			

a. Predictors: (Constant), AVGIUP, AVGSKILL

b. Dependent Variable: AVGDEC

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.614	.258		14.013	.000
	AVGSKILL	.279	.083	.257	3.351	.001
	AVGIUP	3.11E-02	.053	.045	.587	.558

a. Dependent Variable: AVGDEC

Figure 11 – *Multiple regressions for Internet usage skill, Internet management policy, Facilitating conditions with decision-making effectiveness, concluded.*

To answer research question three and identify which Internet usage skills had the greatest affect upon decision-making effectiveness, a principal component factor analysis was used as the model to obtain factor solutions for all individual Internet usage skill variables. The identified components were then reapplied in the multiple regression analyses to determine the specific Internet usage skills having the greatest impact upon managerial decision-making effectiveness.

The results of the factor analysis are shown in Figure 12: Factor analysis of Internet usage skills. Three components were extracted that represented nearly 54% of the total variance. Each of these components had Eigenvalues greater than one (1), with the first component accounting for 29.6% of the variance, the second component accounting for 12.6% of the variance and the third component accounting for 11.4% of the variance.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.767
Bartlett's Test of Sphericity	Approx. Chi-Square	446.871
	df	66
	Sig.	.000

Communalities

	Initial	Extraction
EMAIL	1.000	.317
WBROWSE	1.000	.733
CHATROOM	1.000	.361
DOWNLOAD	1.000	.540
SEARCH	1.000	.666
HOMEPAGE	1.000	.732
PROCURE	1.000	.656
ALERT	1.000	.546
PUBLISH	1.000	.452
VIDAUDIO	1.000	.441
NEWSGRPS	1.000	.499
FTPTELNT	1.000	.508

Extraction Method: Principal Component Analysis.

EMAIL: *Abbreviation for sending and receiving electronic mail messages.*
WBROWSE: *Abbreviation for browsing the web.*
CHATROOM: *Abbreviation for chatting and/or instant messaging.*
DOWNLOAD: *Abbreviation for downloading software.*
SEARCH: *Abbreviation for searching for industry-related reports.*
HOMEPAGE: *Abbreviation for creating a personal home page.*
PROCURE: *Abbreviation for online shopping and/or procurement.*
ALERT: *Abbreviation for alert messages.*
PUBLISH: *Abbreviation for web publishing.*
VIDAUDIO: *Abbreviation for video and/or audio conferencing.*
NEWSGRPS: *Abbreviation for newsgroups.*
FTPTELNT: *Abbreviation for File Transmission Protocol usage and Tellnet usage.*

Figure 12: ***Factor analysis of Internet usage skills, cont.***

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Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.557	29.645	29.645	3.557	29.645	29.645	2.322	19.347	19.347
2	1.517	12.641	42.285	1.517	12.641	42.285	2.284	19.032	38.379
3	1.377	11.471	53.757	1.377	11.471	53.757	1.845	15.377	53.757
4	.996	8.296	62.052						
5	.816	6.798	68.850						
6	.802	6.686	75.536						
7	.659	5.492	81.028						
8	.552	4.602	85.630						
9	.528	4.400	90.030						
10	.480	3.997	94.027						
11	.374	3.114	97.141						
12	.343	2.859	100.000						

Extraction Method: Principal Component Analysis.

Component Matrix [a]

	Component		
	1	2	3
EMAIL	.143	.465	.283
WBROWSE	.546	.634	.181
CHATROOM	.591	-5.0E-02	9.63E-02
DOWNLOAD	.691	-.100	.230
SEARCH	.545	.602	-7.7E-02
HOMEPAGE	.471	-.489	.520
PROCURE	.634	-7.2E-02	.500
ALERT	.676	-.108	-.279
PUBLISH	.545	-.169	-.355
VIDAUDIO	.393	-7.9E-02	-.530
NEWSGRPS	.546	.140	-.426
FTPTELNT	.534	-.462	-9.9E-02

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Figure 12: ***Factor analysis of Internet usage skills, cont.***

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Rotated Component Matrix ^a

	Component		
	1	2	3
EMAIL	5.61E-02	-.170	.534
WBROWSE	.178	.149	.824
CHATROOM	.464	.313	.217
DOWNLOAD	.634	.281	.243
SEARCH	3.45E-02	.348	.737
HOMEPAGE	.845	-4.0E-02	-.125
PROCURE	.750	3.71E-02	.305
ALERT	.316	.658	.115
PUBLISH	.212	.637	-8.3E-03
VIDAUDIO	-3.4E-02	.663	-2.9E-02
NEWSGRPS	2.98E-02	.660	.250
FTPTELNT	.494	.467	-.215

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
  a. Rotation converged in 5 iterations.

Figure 12: *Factor analysis of Internet usage skills, concluded.*

Factor loadings consist of the correlation of each variable with the factor. Factor loadings of (0.3) represent the minimal acceptable level for significance, (0.4) an acceptable level and (0.5) are considered practically significant for a sample size of at least one hundred (Hair et al, 1998). A Varimax rotation was performed to simplify the factor structure. For the purposes of this study, any Internet usage skill that did not have a value greater than (0.5) on the rotated component matrix was excluded. The resulting rotated component matrix is also shown in Figure 12: Factor analysis of Internet usage skills.

The three resulting factors are advanced Internet activities, communication activities and information processing activities. Advanced Internet activities include the Internet usage skills of: creating a personal homepage, performing online shopping and procurement, and downloading software. Communication activities include the Internet usage skills of: receiving alert messages, publishing information on the web, participating in newsgroups and using

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audio/videoconferencing. Information processing activities includes the Internet usage skills of:

sending and receiving email, browsing Internet pages and using search engines to obtain reports.

The relationship of these three factors and the corresponding Internet usage skills is displayed in

Figure 13: Internet Usage Skill Factors.

Factor	Internet Usage Skills
Advanced Internet Activities	• Creating a personal homepage • Performing shopping & procurement • Downloading software
Communication activities	• Receiving alert messages • Publishing information on the web • Participating in newsgroups • Using audio/video conferencing
Information processing activities	• Sending / receiving email • Browsing web pages • Using search engines for reports

Figure 13: Internet Usage Skill Factors

Using these three components, a second series of multiple regression analyses were

performed using the three principal components as the independent variables representing

Internet usage skills with decision-making effectiveness again as the dependent variable. The

results showed a positive and linear association between the components and decision-making

effectiveness. The regression model is contained in Figure 14: Multiple regression analysis with

Internet usage skill factors and Decision-making effectiveness. The regression model now

accounted for 14.8% of the variance with decision-making effectiveness.

A detailed review of the regression coefficients and their statistical significance showed

the first component, advanced Internet utilities, did not have a statistically significant

relationship with decision-making effectiveness. The remaining two Internet usage skill

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components/factors, communication activities and information processing activities, yielded the greatest impact upon decision-making effectiveness. As a result, the seven Internet usage skills contained in these two components have the greatest impact upon managerial decision-making effectiveness. These Internet usage skills are:

- Receiving alert messages

- Publishing information on the web

- Participating in newsgroups

- Using audio/video conferencing

- Sending / receiving email

- Browsing web pages

- Using search engines for reports

Additional multiple regression analyses also revealed the more strategic the management position in the organization, the greater the impact these factors had upon decision-making effectiveness. The management levels assessed in this study are shown in Figure 3: Managerial levels in an organization. When a series of multiple regression analyses were performed using these factors as the independent variables based upon the managerial level in the organization, it was found that these factors accounted for 17.7% of the variance of decision-making effectiveness for top / strategic managers while these factors accounted for 11.8% of the variance in decision-making effectiveness for middle / tactical managers.

For each of these multiple regression analyses, the significance of each regression factor was the primary focus of the analysis, not the value of the regression coefficients. This approach enabled the identification of the Internet usage skills having the greatest impact upon managerial decision-making effectiveness without the need to institute controls for limiting the potential

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introduction of familywise error generated from multiple comparisons. Additionally, each

regression factor is independent of the other; providing further assurance there is no correlation

between the factors.   A summary of the results from all of these multiple regression analyses are

presented in Figure 15: Summary of multiple regression analyses.

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	REGR factor score 3 for analysis 2 , REGR factor score 2 for analysis 2 , REGR factor score 1 for analysis 2[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: AVGDEC

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.384[a]	.148	.131	.52395

a. Predictors: (Constant), REGR factor score 3 for analysis 2 , REGR factor score 2 for analysis 2 , REGR factor score 1 for analysis 2

Figure 14: Multiple regression analysis with Internet usage skill factors and decision-making effectiveness, cont.

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ANOVAᵇ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.506	3	2.502	9.114	.000ᵃ
	Residual	43.375	158	.275		
	Total	50.882	161			

a. Predictors: (Constant), REGR factor score   3 for analysis   2 , REGR factor score
   2 for analysis   2 , REGR factor score   1 for analysis   2

b. Dependent Variable: AVGDEC

Coefficientsᵃ

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	4.363	.041		105.978	.000		
	REGR factor score 1 for analysis 2	-4.8E-02	.041	-.085	-1.160	.248	1.000	1.000
	REGR factor score 2 for analysis 2	.168	.041	.299	4.075	.000	1.000	1.000
	REGR factor score 3 for analysis 2	.127	.041	.225	3.064	.003	1.000	1.000

a. Dependent Variable: AVGDEC

__Figure 14:__ Multiple regression analysis with Internet usage skill factors and Decision-making effectiveness, concluded.

Model	R	R Square	Adjusted R Square	Std. Error Estimate
1 Skill	.262	.069	.063	.544
2 Skill, Facilitating conditions	.323	.104	.093	.535
3 Skill Factors	.384	.148	.131	.524
4 Skill Factors - strategic managers	.421	.177	.140	.597
5 Skill Factors - tactical managers	.344	.118	.084	.467

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Skill					
Regression	3.491	1	3.491	11.785	.001
Residual	47.391	160	.296		
Total	50.882	161			
2 Skill, Facilitating condition					
Regression	5.304	2	2.652	9.252	.000
Residual	45.577	159	.287		
Total	50.882	161			
3 Skill Factors					
Regression	7.506	3	2.502	9.114	.000
Residual	43.375	158	.275		
Total	50.882	161			
4 Skill Factors - Strategic Managers					
Regression	5.123	3	1.708	4.797	.004
Residual	23.849	67	.356		
Total	28.972	70			
5 Skill Factors - Tactical Managers					
Regression	2.227	3	.742	3.402	.022
Residual	16.585	76	.218		
Total	18.812	79			

Figure 15: Summary of Multiple Regression Analyses.

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Finally, to answer research question four, what is the affect of an organization's support for the use of the Internet, as defined by its Internet management policy and facilitating conditions, upon managerial decision-making effectiveness, the results of the previous correlation analysis and multiple regression analyses are used. No statistically significant relationship was found between an organization's Internet management policy and managerial decision-making effectiveness. For facilitating conditions, the findings of this study confirm the results of previous studies (Teng & Calhoun 1996, Wood 2000, Li 2002) that facilitating conditions have a positive, linear relationship upon managerial decision-making effectiveness. These findings are shown in Figure 10: Correlation of Internet usage skills, Internet management policy and facilitating conditions with decision-making effectiveness; and Figure 11: Multiple regressions for Internet usage skills, Internet management policy, facilitating conditions with decision-making effectiveness. Although no conclusive relationship was identified between an organization's Internet management policy and managerial decision-making effectiveness, a positive, moderate correlation was identified between an organization's Internet management policy and the facilitating conditions for Internet use. This result is shown in Figure 10: Correlation of Internet usage skills, Internet management policy and facilitating conditions with decision-making effectiveness. As this study was possibly the first study to research the impact of an organization's Internet management policy upon managerial decision-making effectiveness in the public sector, these results provide a useful foundation for future research into this important area.

Qualitative Analysis

Section four of the survey instrument used in this study included an open-ended question that solicited feedback from the respondents. This part of the survey asked respondents to

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describe their perceptions if the use of the Internet made any difference in enabling them to make managerial decisions when compared to traditional media. Traditional media included books, newspapers, telephones, in-person meetings, etc.

There were one hundred and sixty-two respondents to the survey. One hundred and twenty-seven respondents provided feedback to this question on the survey, yielding a 78% response rate for the qualitative portion of the survey. A complete list of the feedback from all respondents is shown in AppendixE. This narrative information collected in the survey reflects the manager's perception of their use of the Internet and describes their views and experiences.

Based on these comments, the results were classified into different categories as shown in Table 2: Qualitative survey responses and analysis. The classification categories show the variables that correspond to the key words that were extracted from the narrative responses of the survey's managers. The classification categories were initially derived from the survey categorization of Wood (2000) and Li (2002) with additions and modifications that correspond to respondent's feedback contained in this study.

The classification variables shown in Table 2: Qualitative survey responses and analysis, serve as the framework that explains the manager's feedback and perceptions regarding Internet usage and its relationship to managerial decision-making. Positive feedback was received from 95.8% of survey respondents, neutral feedback accounted for 0.7%, while negative feedback accounted for 3.5%.

Classification/Variable	Count	Percentage
Positive comments:		
Faster decision making	14	9.7

More effective decisions	5	3.5
Better knowledge	11	7.6
Greater group participation	8	5.6
More alternatives	6	4.2
Improved information gathering	63	43.7
Improved communication	29	20.1
Better business processes	2	1.4
Subtotal	138	95.8
Neutral comments:		
Not Certain	1	0.7
Subtotal	1	0.7
Negative comments:		
Too much information	2	1.4
Data quality problems	1	0.7
Data communication problems	1	0.7
Takes time to analyze information	1	0.7
Subtotal	5	3.5
Grand total of comments	144	100

Table 2: **Qualitative survey responses and analysis**

Chapter 5: Summary and Conclusions

This research study investigated the relationship between an individual's Internet usage skills, the amount of organizational support provided for Internet use and the decision-making effectiveness of managers in the public sector. For this study, a manager is defined as an individual managing a government agency, service or program. Managerial decisions are defined as non-routine, consequential decisions with a long time horizon designed to ensure the achievement of work group objectives, where a substantial expenditure of money and manpower is made (Teng & Calhoun, 1996). Each manager's position in the organization is classified into one of three managerial levels. These levels are top (Strategic), middle (Tactical) or lower (Operating) (Long and Long 1990). Managers in this study's sample population resided within multiple agencies in the District of Columbia government, the capital city of the United States.

This study addressed two gaps in previous research. While it is generally accepted that a user's ability to effectively use the Internet can influence the effectiveness of the decision-making process, there has been only a few, embryonic attempts to discern which user skills have the greatest impact upon decision-making effectiveness, with inconclusive results. This study addressed this first gap in existing research for managers in the public sector.

The second gap this study explored is how an organization's Internet management policy and the facilitating conditions for Internet use impact managerial decision-making effectiveness within public sector organizations. This study may be the first to explore the impact of how an organization's support of its Internet usage, as defined by its Internet management policy and facilitating conditions, impacts the decision-making effectiveness of managers in the public sector.

This study answered the following research questions:

Q1: What are the characteristics of public sector managers using the Internet in the decision-making process? These characteristics include: (a) Gender, (b) Age, (c) Functional area, (d) Management seniority, and (e) Type of government.

Q2: What impact does an individual's skill in using the Internet have upon managerial decision-making effectiveness in the public sector?

Q3: Which Internet usage skills have the greatest impact upon managerial decision-making effectiveness in the public sector?

Q4: What is the effect of an organization's support for the use of the Internet, as defined by its Internet management policy and facilitating conditions, upon managerial decision-making effectiveness in the public sector?

This study employed quantitative techniques to assess the problem area, leveraging and expanding upon an established survey instrument successfully used in prior research. The statistical analysis performed upon the data of this survey incorporated different analytical methods. These analytical methods are: a) descriptive statistics, b) correlation analysis, c) factor analysis, and d) multiple regression analyses.

For research question one, it was found the Internet was used in all levels of management in the public sector. For this study, nearly 44% of the managers were strategic, 49% were tactical and 7% were operating. These managers were found to work in multiple functional areas, be at least 31 years of age, consist of 38% female and 62% male in gender and the majority had tenure in their position between one to three years. These results were obtained by applying descriptive statistic measures to the survey data.

For question two, it was found there is a positive, linear relationship between an individual's Internet usage skill and managerial decision-making effectiveness in the public sector. This relationship was determined by applying a correlation analysis and a series of multiple regression analyses to the survey data. It was also found that the more strategic the

management positions in the organizational hierarchy, the greater the impact Internet usage skill had upon managerial decision-making effectiveness.

For question three, it was found that seven distinct Internet usage skills had the strongest impact upon managerial decision-making effectiveness. This relationship was found by applying a factor analysis and a series of multiple regression analyses to the survey data. These Internet usage skills can be classified by two primary factors: communication activities and information processing activities. Communication activities include the Internet usage skills of: receiving alert messages, publishing information, participating in newsgroups and using audio/videoconferencing. Information processing activities includes the Internet usage skills of: sending and receiving email, browsing Internet pages and using searching engines to obtain reports. It was also found the more senior the management position, the more these Internet usage skills contributed to managerial decision-making effectiveness.

For question four, it was found a positive, linear relationship exists between an organization's facilitating conditions for Internet use and managerial decision-making effectiveness. While no statistically significant relationship was identified between an organization's Internet management policy and managerial decision-making effectiveness, a moderate correlation was identified between an organization's Internet management policy and the facilitating conditions for Internet usage. These results were determined by a correlation analysis and a series of multiple regression analyses with the survey data. This area should provide fertile ground for future research efforts to further explore this relationship.

The implications of these findings are that managers should employ the Internet usage skills found to be most beneficial for managerial decision-making effectiveness. Senior managers can obtain the greatest benefit from using these skills. Organizations need to ensure the

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facilitating conditions for Internet usage are sufficient to enable optimal decision-making effectiveness. Further research needs to be performed regarding an organization's Internet management policy and its relationship with managerial decision-making effectiveness and the facilitating conditions of Internet usage.   As the information technology industry continues to rapidly grow and evolve, it is recommended that managers stay abreast of new technology developments and research findings and adopt those developments most beneficial to them.

Recommendations for Future Research

As with many other research studies, the scope of this study is limited and only explored a specific inquiry regarding how the use of the Internet impacts managerial decision-making effectiveness in the public sector. During the course of this study, many other valuable research topics emerged for future scholars, researchers and industry practitioners. An agenda of future research topics includes:

- How do managers in the public sector and private sector differ in their use of Internet utilities in the decision-making process?

- How does an Internet management policy impact other managerial functions, such as strategic planning, organizing, staffing and budgeting?

- What is the impact of Internet-enabled business process applications, such as Collaboration software, Enterprise Resource Management (ERP) and Customer Relationship Management (CRM), upon managerial decision-making effectiveness in the public or private sectors?

- Is there a difference in decision-making effectiveness between managers who use the Internet and managers that do not?

- What is the impact of an Internet management policy upon an organization's culture?
- How does an organization's Internet management policy impact an organization's facilitating conditions for Internet use?

Conclusions

This research study realized its objectives and identified Internet usage skills most beneficial to the decision-making effectiveness of public sector managers. This study also explored and identified relationships between an organization's Internet management policy, facilitating conditions and managerial decision-making effectiveness for public sector managers. This research study sought to improve management practice and enhance future research efforts in the areas of information technology and social science research. Its findings contribute to the practice of public administration in the areas of information technology and managerial decision-making. It is sincerely hoped future researchers will build upon this knowledge to realize even greater organizational value.

Appendix A – Survey instructions

MEMORANDUM

TO: All Survey Participants

From: Edward Reiskins, Chief of Staff
               Office of the City Administrator;

               Suzanne Peck, Chief Technology Officer
               Office of the Chief Technology Officer

SUBJECT: Internet Usage Survey

Dear Survey Participant:

Your participation in the attached survey is requested. The Office of the City Administrator and the Office of the Chief Technology Officer are sponsoring this survey as part of a research study with the University of Maryland. This research study is being conducted to determine how the use of the Internet affects managerial decision-making in the public sector. All responses will be kept confidential and will only be used for this research study.

Please take a few moments to complete this survey within *one week of receiving this email message*. It should take you approximately 15-20 minutes to complete this survey.

For the purpose of this study, the Internet includes one or more of the following common functions and features:

    E-mail
    Worldwide web (www) search engines
    Chat rooms
    Instant messaging
    Online shopping and procurement

This survey contains four parts with thirty-two multiple-choice questions. <u>Please answer all questions and select only one answer for each question</u> by selecting the empty check box next to the answer that best represents your choice. The questionnaire will be processed only when all questions are answered. If you have any questions how to complete this survey, please contact Michael Belak at (202) 671-2814 or send an e-mail to michael.belak@dc.gov.

A final research report will be shared with all survey participants who request a copy. The summary report will be sent to the e-mail address supplied in question seven (7) of this survey.

Thank you for your support and participation.

Appendix B – Internet usage survey

Part 1 -General Information

Questions 1-8 obtain general organizational and personal information regarding all survey participants. Please answer each question.

1. Please select the choice that best describes your position in the your agency and indicate the number of employees under your direct supervision.

    ☐   Top (strategic) management - one who deals with decisions that are the broadest in scope and cover the longest time horizons. Typical titles are: Director, Administrator, CEO, General Manager, Executive Vice President, etc.

    ☐   Middle (tactical) management - one who deals with decisions that cover a somewhat broad scope and cover a long time horizon. Typical titles are Deputy Administrator, Division Chief, Director of Sales, Director of Finance, etc.

    ☐   Lower (operating) management - one who actualizes the plans of the middle management, and controls daily operations of the organization. Typical titles are: Manager of Accounting, Sales Unit Manager, Section Head, Supervisor, etc.

    Number of employees directly supervised. None ☐ 1-5 ☐ 6-10 ☐ 10+☐

2. Please specify your gender.

    ☐   Male
    ☐   Female

3. Please specify your age.

    ☐   Less than 31 years old
    ☐   31-40 years old
    ☐   41-50 years old
    ☐   More than 50 years old

4. In what functional area of the organization are you employed?

    ☐   General/Agency Management
    ☐   Human Resources
    ☐   Finance
    ☐   Information management
    ☐   Customer Service

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$\square$ Purchasing

$\square$ Others - please specify (**Please type**   )

5. How long have you been in your current job position?

   $\square$ Less than 1 year

   $\square$ 1-3 years

   $\square$ >3 years to 5 years

   $\square$ >5 years to 7 years

   $\square$ More than 7 years

6. How long have you been using the Internet at work?

   $\square$ Less than 1 year

   $\square$ 2-3 years

   $\square$ >3 years to 5 years

   $\square$ More than 5 years

7. My e-mail address is (**Please type**   ).

8. The name of the agency I work for is: (**Please type**   ).
   _____

Part 2 – Individual Internet Usage and Organizational Support

Questions 9-20 ask you to describe how you use the Internet, its tools and utilities, your frequency of use and level of proficiency. Please answer each question and select only one   answer that best describes your use of the Internet.

9. I use the Internet to send and receive e-mail.

   $\square$ Very often -More than one time a day

   $\square$ Often -Once a day

   $\square$ Sometimes -Once a week

   $\square$ Rarely -Once a month

   $\square$ Never

10. I use the Internet to do web browsing.

   $\square$ Very often -More than one time a day

   $\square$ Often -Once a day

☐   Sometimes -Once a week

☐   Rarely -Once a month

☐   Never

11. I use the Internet to participate in chat rooms and/or instant messaging.

☐   Very often -More than one time a day

☐   Often -Once a day

☐   Sometimes -Once a week

☐   Rarely -Once a month

☐   Never

12. I use the Internet to download software.

☐   Very often -More than one time a day

☐   Often -Once a day

☐   Sometimes -Once a week

☐   Rarely -Once a month

☐   Never

13. I use the Internet and various search engines (i.e. Google, Altavista, Yahoo! etc.) to search for industrial statistics or specialized reports.

☐   Very often -More than one time a day

☐   Often -Once a day

☐   Sometimes -Once a week

☐   Rarely -Once a month

☐   Never

14. I use the Internet to create my personal home pages.

☐   Very often -More than one time a day

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☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

1. I use the Internet to do on-line shopping and procurement.

☐ Very often -More than one time a day

☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

16. I use the Internet to receive "alert messages" (information sent to me automatically about a specific interest area or industry that I have registered for) from Internet portals or information providers.

☐ Very often -More than one time a day

☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

17. I use the Internet to publish information (i.e. products, communication updates, policy manuals etc.) on the web about my organization.

☐ Very often -More than one time a day

☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

18. I use the Internet to do video and/or audio conferencing.

☐ Very often -More than one time a day

☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

19. I use the Internet to participate in Newsgroups on topics of interest to me.

☐ Very often -More than one time a day

☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

20. I use the Internet to directly access specific sites and remote computers with the File Transfer Protocol (FTP) or Telnet utilities.

☐ Very often -More than one time a day

☐ Often -Once a day

☐ Sometimes -Once a week

☐ Rarely -Once a month

☐ Never

Questions 21-27 ask you to evaluate the organizational support you receive in using the Internet and your organization's Internet Usage Policy. Please answer each question and choose only one answer that best represents your opinion to the following statements. Choosing "no opinion" should only be done if you absolutely have no agreement or disagreement.

21. My agency has an explicit and clearly communicated Internet Usage Policy.

☐ Strongly agree

☐ Agree

☐ No opinion

☐ Disagree

☐ Strongly disagree

22. My agency uses tools to effectively monitor and record Internet and email usage.

☐ Strongly agree

☐ Agree

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☐ No opinion

☐ Disagree

☐ Strongly disagree

23. My agency has a formal training program regarding the Internet Usage Policy for all users.

☐ Strongly agree

☐ Agree

☐ No opinion

☐ Disagree

☐ Strongly disagree

24. My agency enforces the Internet Usage Policy with specified disciplinary measures for violations of the policy.

☐ Strongly agree

☐ Agree

☐ No opinion

☐ Disagree

☐ Strongly disagree

25. A person (or group) is available to assist me with Internet usage difficulties.

☐ Strongly agree

☐ Agree

☐ No opinion

☐ Disagree

☐ Strongly disagree

26. Specialized instruction concerning the use of the Internet is available to me when I need it.

☐ Strongly agree

☐ Agree

☐ No opinion

☐ Disagree

☐ Strongly disagree

27. Overall, my use of the Internet is very well supported.

☐ Strongly agree

☐ Agree

☐   No opinion

☐   Disagree

☐   Strongly disagree

Part 3 -Internet Usage and Managerial Decision Making

Questions 28-32 ask you to evaluate the use of the Internet compared to other media such as newspapers, books, periodicals, or any print form of information. Please answer each question and choose only one answer that best represents your opinion to the following statements.   Choosing "no opinion" should only be done if you absolutely have no agreement or disagreement.

28. Internet technology provides me with information that enhances my knowledge in the understanding of problems. (For example: Internet websites provide me with information about what other public agencies are doing).

☐   Strongly agree

☐   Agree

☐   No opinion

☐   Disagree

☐   Strongly disagree

29. Internet technology allows me to generate more choices or alternatives to solve decision problems (For example: Posting an inquiry to an expert in a discussion group provides opportunities to brainstorm alternatives to solve a problem).

☐   Strongly agree

☐   Agree

☐   No opinion

☐   Disagree

☐   Strongly disagree

30. Internet technology makes it easier to involve others or exchange information with others in the decision-making process. (For example: Downloading information from the Internet and sending it electronically to other persons).

☐   Strongly agree

☐   Agree

☐   No opinion

☐   Disagree

☐   Strongly disagree

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31. Internet technology enables me to arrive at managerial decisions faster. (For example: Downloading information instantaneously compared to finding a book or article in a library to make a decision).

    ☐   Strongly agree

    ☐   Agree

    ☐   No opinion

    ☐   Disagree

    ☐   Strongly disagree

32. Overall, the use of Internet technology helps me to make more effective managerial decisions.

    ☐   Strongly agree

    ☐   Agree

    ☐   No opinion

    ☐   Disagree

    ☐   Strongly disagree

Part 4- Summary

Briefly describe what differences (if any) the use of the Internet has made as you make managerial decisions to meet your short and/or long-term objectives as compared to traditional media or technologies such as books, newspapers, telephones, face-to-face meetings, etc.

Please submit your answers by emailing this completed survey to "michael.belak@dc.gov". Should you encounter any difficulties in submitting this survey, please send an email message describing the problem along with your telephone number to "michael.belak@dc.gov", or call: (202) 671-2814.

Do you want to receive a copy of the final research report?
(Please choose)

☐ Yes   ☐ No

<u>THANK YOU</u> FOR YOUR VALUABLE PARTICIPATION! !

Appendix C – Email reminder

Dear _____:

We are concluding the Internet Usage Survey previously sent to you on behalf of the City Administrator and Chief Technology Officer. If you have not yet turned in your response to the survey, please do so this week so your valuable inputs can be included in this study. The instructions and survey are attached below for your convenience and should only take you about 15 minutes to complete.

 Thanks in advance for your participation.

 Best regards,

Michael J. Belak

www.manaraa.com

Appendix D - Descriptive statistics of independent and dependent variables

Statistics

		EMAIL	WBROWSE	CHATROOM	DOWNLOAD	SEARCH	HOMEPAGE	PROCURE	ALERT	PUBLISH	VIDAUDIO	NEWSGRPS	FTPTELNT
N	Valid	162	162	162	162	162	162	162	162	162	162	162	162
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		4.75	3.85	1.47	1.52	3.40	1.15	1.93	2.69	2.17	1.26	1.86	1.42
Median		5.00	4.00	1.00	1.00	3.00	1.00	2.00	3.00	2.00	1.00	1.00	1.00
Mode		5	5	1	1	3	1	1	1	1	1	1	1
Std. Deviation		.789	1.070	.907	.724	1.094	.518	.953	1.394	1.293	.606	1.150	.876
Variance		.622	1.146	.822	.524	1.197	.268	.908	1.944	1.672	.367	1.323	.767
Skewness		-3.378	-.562	2.270	1.623	.027	4.553	1.096	.217	.877	3.539	1.137	2.496
Std. Error of Skewness		.191	.191	.191	.191	.191	.191	.191	.191	.191	.191	.191	.191
Kurtosis		10.623	-.567	5.040	3.521	-.786	25.203	1.380	-1.222	-.277	17.011	.280	6.295
Std. Error of Kurtosis		.379	.379	.379	.379	.379	.379	.379	.379	.379	.379	.379	.379

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
COMUNIUP	162	1	5	4.14	.984
EFFMONIU	162	1	5	3.69	1.024
TRAINIUP	162	1	5	2.81	1.138
ENFIUP	162	1	5	3.59	1.090
ASSTIUP	162	1	5	4.10	1.007
INSTRIUP	162	1	5	3.72	1.203
OVRALIUP	162	1	5	3.96	1.039
Valid N (listwise)	162				

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Statistics

		KNOWLEDG	CHOICES	EXCHINFO	FASTER	OVRALDEC
N	Valid	162	162	162	162	162
	Missing	0	0	0	0	0
Mean		4.55	4.19	4.44	4.28	4.35
Median		5.00	4.00	5.00	4.00	4.00
Mode		5	4	5	4	4
Std. Deviation		.558	.805	.659	.774	.645
Variance		.311	.649	.434	.599	.416

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Appendix E - Qualitative survey comments

The use of the internet has enabled me to make informative decisions in a shorter period of time because of the immediate access to information/statistics. This is particularly true in the areas of personnel issues, legislation, and intra office information.

Greatest advantage is the speed and breadth of real-time access.

Quick access to information.

As an individual, the Internet facilitates by allowing me to exchange information, largely by e-mail, and maintain a record that can be easily referred to at decision time. Personally, the exchange of information in a written document facilitates additional questions, discussion, and/or ideas that might not come to mind in a verbal discussion. As an agency, we have begun to use the Internet as a portal to several information sources for operational crime planning. This permits a more informed tactical response to crime.

It allows me to access, transmit and receive information quickly.

Able to have various communications from integral parties speedily.

The internet has allowed a greater amount of information to become available and to allow managers to sift the that information.

What I appreciate of internet technology is the capacity of obtaining information fast and to get access to data in a form that is easily reproduced and transferred to others. It allows me to do instant research and to make decisions that are science based. I can also learn about models and pilots done by other similar organizations and to uncover best practices already in use.

Having access to statistical information is most helpful in making managerial decisions. For example, benchmarking and looking at like organizations aid in the establishing benchmarks and performance standards for agency programs.

The use of the Internet is a valuable tool that is used on a daily basis to expedite days to day activities.

It has allowed me to identify a broader range of solutions to correctional problems far more quickly.

The Internet supplements the more traditional means of decision-making. It provides data benchmarks and guidelines that are useful resources.

Allows me to find information more quickly.

Internet availability enhances communication with our customers, and provides us instantaneous access to best proactive information and benchmarks. By having feedback mechanisms and the means to find new ideas and explore others' approaches, allows *the agency* to make better decisions faster.

The agency is a fairly new organization (3 years). We use internet for 90% of our decision support materials.

I am more likely to seek out additional information before making a management decision if I can access that information quickly and accurately. The Internet allows me to seek and find this information much faster than if I needed to track down more traditional print media

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or other sources. The benefits of Internet information sharing are enormous for me and my agency.

What used to take hours/days and many phone calls to research is now done in an instant. The resource materials are vast and very comprehensive and are of tremendous business value.

It allows me to receive up-to-date human resources changes, laws and regulations. This current information is used to inform managers as well as employees of their responsibilities in the HR arena.

Use of the Internet has quickened the pace of my access to needed information and has allowed to me reach important decisions much sooner than by other means

Having access to the Internet enables me to search for information quickly on how other law enforcement agencies are handling human resource problems. I have often accessed the annual reports of other police departments via the Internet and conducted preliminary research via the Internet. In addition, I receive updates from the Society for Human Resource Management (SHRM) once a week via the Internet and can access their publications via the Internet. I also belong to the Human Resources Committee of Major City Chiefs that allows me to send group emails and receive information via the Internet on topics of concern.

The internet allows to drastically reduce the time I spend researching and educating myself in the performance of my day to day activities

The internet allows to drastically reduce the time I spend researching and educating myself in the performance of my day to day activities.

Makes conducting research faster and easier.

It's my key medium for obtaining facts on technology, performing procurement research, and gathering general background knowledge. I use it as my principal source of external technical expertise and to keep tabs on standards of practice in my field. As a practical matter, the immediate response means that I rely on it even when other reference materials might be more complete. It's also a principal mechanism for recruiting and finding specialized staff.

The primary the use of the internet has made in the managerial and decision making process is, the availability of e-mail. E-mail messaging has revolutionized communications and the ability to correspond with other managers.

It has enabled me to conduct industry research expeditiously. In my field it's important to stay in tune with what's going on in the industry for competitive reasons as well as technological.

The internet has helped *the agency* to obtain and provide accurate information to our DC residents who are veterans, thereby bypassing long lines, disappointments, lack of proper instruction, by federal entities in retrieving information and/or documents.

The Internet offers a plethora of information and allows for free and rapid communication.

The Internet has helped us to become problem solvers, researchers, and investigators ready to take on the challenges of the 21st Century.

The internet provides easy and quick access to a great deal of information from all over the country to assist with managerial decisions.

Better collation of various information sources data to conduct insurance and securities anti fraud investigations.

The Internet has enhanced my capacity to immediately research specific issues and develop strategic plans to address critical human services concerns that have an impact on *the agency*. If traditional media or technologies were utilized, the identical research would have required a more substantial amount of time.

Google knows everything. Webopedia knows much technical. I can "learn" much faster, and in a much more focused way on the Internet. So, Internet is often better than books, supports consumption of newspapers (online news), is equally helpful to voicemail telephonically, and can't replace face-to-face meetings.

From a public safety and informational side the internet allows for easy access to information on terrorist alerts, mapping, and general information that expedites processes in the agency.

The Internet allows me to browse a wide range of information from different sources to make an intelligent decision.

A paperless work force is a good thing. This medium saves much duplication efforts.

Valuable as a research tool.

Use of the internet allows me to access information and data from various organizations in order to make many of my decisions

I find the internet to be a mixed blessing. I believe it consumes more of my time in terms of dealing with correspondence (emails) and even research (searches) than earlier means. This is because so much information is available faster that becoming overwhelmed is easy.

Internet has provided the opportunity to quickly do background research on many traffic engineering, street lighting and safety issues in support of the departments program. Occasionally follow up telephone calls are necessary for clarification, but a substantial body of work is already out on the Internet and listserve forums.

Ue of the internet has allowed me to gather information, have online discussions with my counterparts in the country and communicate around the world.

It is generally a faster way to find out if there is a universe of information on the topic I am interested in.

I can make decisions much more quickly and with much better information than with other methods.

Provides faster research and answers to managerial questions/situations/scenarios. Can forward information effectively and reach a wider audience when necessary.

Great for getting info to round out articles, publications, or arguments--such as comparing District agency statistics to other states or the nation.

The Internet permits less time consuming research and more comprehensive research, so that managerial decision making can be more timely and based on more known alternatives.

The Internet's greatest advantage for me as a manager is the rapid communication of ideas and documents so that we can obtain the views and suggestions of all interested parties.

Its very useful in obtaining information from my professional organization or to obtain legal direction when needed. I plan to use it more on my Division intranet page and the internet page when its up and running for the Department.

The Internet is a good resource to locate needed information quickly when trying to resolve issues in the workplace.

The differences are in communication and information gathering. E-mail is a fast, effective tool for rapid, documented communication. I rely on it constantly. The internet is a rapid means of research, both within the DC government and far beyond. I can go from completely uninformed to reasonably well-versed on a given topic in a matter of minutes

I often use the U.S. Department of Housing and Urban Development's website to conduct research so that I can provide technical assistance to agency staff. Using the internet, I am able to provide responses in a more timely manner.

The use of the internet has allowed me to communicate daily with my peer organizations in all of the 52 States and territories on a daily basis.

Helps me receive relevant info quicker and more efficiently.

An enormous amount of information is at my fingertips, readily available on many databases through the use of search engines, and swiftly delivered when I request it. The use of

the Internet consumes less time with minimal frustration than the traditional methods of telephones and meetings. However, I still use some traditional methods relative to certain issues.

I am able to seek information on best practices, maximize options based on research and data.

It has become a central part of our communication and management procedures - affecting my decisions and objectives on an hourly basis. I use the internet, telephones and face-to-face meetings the most.

There is no comparison. The internet has improved our business processes far beyond any single technological advance since the advent of the desktop computer.

Provides immediate access to current information that supports agency decisions. Improves communication with staff within the agency and other Departments.

The main difference is time and convenience. Many more sources can be consulted in a shorter period of time than by traditional methods. However, caution is needed to ensure the information is accurate.

I am able to go through trend reports and other information more quickly and get it out to people to help inform our decisions.

I help regulate the securities industry under DC's authority. In this case, DC acts like a state regulator over the securities markets in DC or to DC residents. I rely on the internet to give me instant or quick information about the securities market. Another reliance is on the information available to securities regulators by other regulators. The SEC, NASD and NYSE

all contain information on their websites that answer many day-to-day questions. These answers increasingly aid me by providing me readily-accessible information. Having the information on hand, I can make faster and better-informed decisions. I believe that other areas of regulation are also help out by the internet.

Able to undertake real-time best practices research from planning departments and area-specific projects from around the nation. Able to access free and subscription legal and legislative research services. As "Ask the Director" contact for agency, able to quickly find and disseminate to public relevant information in a very responsive manner.

The Internet (supported by email) allows me to assemble interesting and useful information (often on "best practices" of other organizations) and disseminate it easily and quickly to others in the organization who need to know or may want to know. In addition, subscribing to various news groups and listservs allows me to easily access and disseminate trend or best-practices information from a variety of local, regional, national and international sources. Accessing even one-tenth of these resources through traditional media would be next-to-impossible logistically, time-consuming and cost-prohibitive. One of my roles in the organization is to keep management (especially top management) informed of breaking news and long-range trends in our profession; I cannot imagine performing that role without ongoing access to the Internet.

Benchmarking best practices in both police dept's and other customer oriented service agencies to enhance productivity and efficiency. Ability to communicate with a broader audience.

Although the internet facilitates research, often conducted by my staff, I find that it is widely misused managerially as a routine form of communication about mundane items. Such communication assumes managers are sitting at their computers available to receive messages when, in fact, they are usually busy in meetings or on the phone. Such communication could be easily accomplished by a telephone call.

I have not used the Internet to that extent thus far.

The Internet provides immediate access to information that would otherwise require more time and effort

The Internet provides a much wider range of resources available immediately. Have more information available helps to make better informed and quicker management decisions.

Agency periodicals take several months to receive, but the Internet allows for the exchange of information the day after an event has taken place. We can learn from others and make DC a safer place.

Without question, the Internet has allowed me to research topics and retrieve information in a very small fraction of the time it used to take me. I have learned to be specific in my search requests, in order to stay on task. The Internet can be an endless source of information, which can be a mixed blessing.

Access to the internet enables me to teach subordinates to search for community based resources that may be available to clients and therefore lessens the need for financial assistance from the District to support family needs.

Easier access to and more timely access to trend information, experiences in other jurisdictions and relevant data.

I use the Internet on a daily basis to assist me in my decision making process. Use of the Internet provides me with multiple sources of information that I can factor into managerial decisions and for comparison to information obtained from other sources. Information is available anything and where I have access to a computer with Internet capabilities, akin to having the world's library at my fingertips.

Use of the Internet allows me and the personnel providing me with recommendations and opinions to access more information, quicker, on more subjects, and in a format that ultimately enhances my decision making process.

The Internet provides information and data for decision making faster. Therefore I am able to make managerial decisions faster.

The Intrernet provides ready access to goods and services, with information about new technologies faster than any other available method. Email allows for far quicker communications between interested parties

I can't even measure the enormous benefit that I have received by having access to the Internet in my current capacity.   We use the Internet to survey and review other states and other education organizations' research, policies and procedures around virtually every piece of work that exists in this office. By reviewing practices around the country, we are able to make better-informed, data-driven decisions about our work. I use the Internet to analyze legal concerns and issues related to the agency's work to help address staff's questions and concerns on legal matters

on almost a daily basis.   Recently, I helped to develop appeals processes for the agency for applicants that were denied tuition assistance grants, as well as a process for schools seeking to appeal an auditor's findings. By surveying similar programs around the country, I was able to frame what the design of the appeals processes should include. Most recently, I was responsible for writing a segment of the agency's report on education. I completed virtually 95% of the research on the Internet, and gained a clear understanding of how the report should be framed by reviewing other similar work on the Internet.   The Internet has been an INVALUABLE resource for me, and has significantly cut the amount of time that it takes to do research and opened the door to a whole new world of information. At this point, I can't imagine how humans existed without it.

The Internet has allowed me to stay in contact with persons that I am able to use as resources. However, this contact has really been on my personal computer rather than at the job site.

The Internet provides me with the ability to post issues with managers and get immediate feedback which assists with timelier decisions. Project management is easier as tasks can be sent out to managers with specific timeframes for completion of work. Data collection from many managers is easier obtain via use of the Internet. These are a few of the differences that Internet use has assisted me in my managerial decisions.

It helps me a lot in shopping for the best prices available in procuring both hardware and software for the department.

It has made it easier to obtain information on specific products and services when looking at new projects or initiatives. Also has facilitated peer discussions of topics of general interest or concern.

Allows me to more quickly check the available literature concerning potential solutions to emerging problems. Also facilitates checking with colleagues across the country.

The Internet provides instant information for reviewing and pre-decisions making. However, the traditional media cannot be replaced. (The Internet saves time.)

The biggest difference is the almost instantaneous retrieval of information and data that can be used to assist in making decisions.

I believe the decision making process is most enhanced by the ease of access to information and the expeditious retrieval and dissemination of information (information sharing) to others within my agency.

I can obtain information faster and relay information faster

Access to information for presentations and research requiring little turn around period

The differences the use of the Internet makes for me is tremendous. As the manager responsible for compliance, it is useful to see what other jurisdictions are doing. This has helped me implement strategies to improve the condemnation process for nuisance properties in the District. On the shorter term, as the HR advisor for the agency, ready information from SHRM, NLRB, EEOC and other organizations has been helpful in guiding the agency in developing internal policies and procedures.

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More, timely, and better data seems to be available on any issue.

The use of e-mail has been a transforming experience in the way I work and make decisions at work. I now do a majority of my work by e-mail: responding to requests, drafting notices and information to others, communicating with colleagues, sending and receiving documents. I also use the web as my principal tool for research on issues I am researching.

The Internet has allowed me to access various information from various sources that provide up to date information on topics of interest

The Internet among other initiatives have allowed the agency in partnership with the National Association of Insurance Commissioners (NAIC) and the National Insurance Producers Registry (NIPR) to develop a State-Based System (SBS) that provides a variety of on-line insurance licensing services and functions in real-time to individuals and firms seeking licensure in the District of Columbia. This system along with other Internet enhanced processes have allowed the agency to take the lead and becoming one of the first insurance Regulators to do on-line Insurance Company Appointment Renewal, electronic non-resident licensing and on-line appointments and terminations, just to mention a few.

The Internet provides immediate access to pertinent information that may not be readily available via of other means of communication captioned above.

Provides much faster access to many more sources of information, publications, etc., than were previously available from printed sources.

It allows me to search, research, exchange information, critique information, respond to inquiries, eyeball, buy, send back and evaluate surveys much faster than ever before !!!

The use of Internet is a huge time saver, don't have to wait for someone to coordinate a meeting or to set up a conference call to gather information - you can access at any time.

Reviewing other jurisdictions practices, licensing costs, accessing corporate and licensing data on specific entities

We can quickly access a wide range of research information

Research: One can never maintain a library of all available journals and other publications, and even if you could it would take you much longer to find the desired materials, and they could not be available to many people simultaneously.

Communicating with peers: much quicker and can share high quality attachments.

Has been great for researching Mental health Issues and staying abreast on issues developing in the Mental Health industry both public and private.

The Internet sometimes permits me to quickly obtain benchmarking and other industry or peer information that I need in order to either validate, verify, or vet a proposed decisions or solutions that I have in mind

More information can be gathered quickly. Decisions and policies can be spread quickly.

The internet allows me to access the most current information about supports and services (best practices) across the country

I manage a forensic science laboratory. Many other lab directors post their current issues in discussion groups on the web (i.e. changes to legislation, new products, faulty products, current drug trends, etc) and this enables me to a) adopt new policies before they become an

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issue in my workplace, and b) keep abreast of current technologies and procedures. I have instant access to a much larger amount of current information from around the world, compared to traditional print media, annual conferences, etc. Further, this information is available to me 24/7 wherever I am in the U.S.

The internet makes information more easily accessible, allowing me to verify facts, research a broad range of topics and save time and energy

Short Term: The Internet gives my operation the ability to provide Securities Issuers immediate confirmation of our receipt of their compliance filings and to provide immediate response to questions relating to D. C. Securities Laws and Regulations.   Long Term: The Internet gives me immediate access to information (legal, regulatory, surveys, special studies and etc.) verses having to obtain information from hard copy sources or physically visiting and interviewing individuals for the purpose of performing long range planning and completing day to day projects.

Email communication has greatly superceded memo writing or telephonic communication to push along decision making processes.

Enables research of various emergency management/preparedness efforts in an expedited manner and the collaboration with other states and territories; and, is time beneficial.

It has helped improve the efficiency of my work and communicate with people on a timely manner.

Often times I need federal regulations to define allowable categories or items regarding spending federal funs. Reviewing information on-line reduces research time and provides

information needed to provide to program managers. The quicker I respond to questions, the quicker decisions are be made and actions taken.

Immediacy of access to information allows for expedited decision making.

Just makes it faster to compare decisions to other jurisdictions.

The Internet facilitates up to date information regarding government services, scheduling and agency agenda.   It provides a sense of readiness for managers to communicate and respond to issues facing ones own operation and the interaction with other agencies throughout government.   It is an outstanding vehicle to retrieve information for the purpose of data collection and performance management.

Access to information is readily available without additional human intervention. Proposed short and/or long-term objectives can be researched immediately. The traditional methods of obtaining information to support decision making require the availiablity and accessiblity of hardcopy documentation and extensive coordination of various individuals' calendars to to schedule meetings and teleconferencing. Information and supporting documentation can be obtained at anytime and outside of the traditional office setting.

Internet research and email usage are definitely time-savers from a management standpoint in terms of generating and conveying information quickly. Email can also be time-consuming if not used judiciously.

I have access to the Internet as member of specialized organizations and associations which allows me to access, effectively and quickly, the expert information I may need or desire. The Internet used in this way saves the government time and money.

The use of the internet has allowed me to be better informed, with a faster turnaround time. I can't imagine working without it. I would however, like to see more options and consideration of using the internet/email for meetings and communicate within the district. We are still very tied to the face-to-face meeting activities and many of those meetings could be done electronicly.

There is a significant reduction in the time that communication is relayed to individual managers. Thus the need for immediate paper processing has been diminished. Also, I have found the capability to watch the Council Hearings very effective and encourage all senior level managers to likewise watch the hearings on a regular basis.

1.   It saves time (to some aspects) in terms of gathering the information needed as opposed to going back and forth to the library. 2.   The Internet is basically open for everyone 24 hrs. a day. 3.First hand information or latest news can be obtained. 4.   The Internet is easily accessible once someone has a computer, a modem, and an Internet Service Provider (ISP). 5.

Almost (if not all) any topic can be searched in the web with a very quick response.

Some documents come with visual aids that can better help a researcher analyze a particular interest.

Timely access to a variety of resources and information.

The real benefit has not been in managerial decisions but as a research tool. That said, I believe that the real-time communication made possible by the Internet allows management decisions to be made more quickly. The downside is it means we never really leave work, and

the personal time/work time boundary is completely blurred. I check my work email from home, from vacation, etc., meaning I never really "leave."

The Internet affords one written documentation instantly. Also, it allows me to cross reference information from near and far. Short-term and /or long-term objectives are planned, implemented and tracked utilizing internet resources; When accessing and/or using the internet in conjunction projects, direct contact with information is readily available. The Internet becomes my library, archives, classroom tutor and much more. Decision-making becomes comfortable while making managerial choices using Internet resources.

Internet has given me quick and easy access to pertinent information such as regulations, detailed information about programs and policies of other states, and information about specific subjects I am reviewing. It also gives me a line of communication with individuals with whom I need to collaborate for faster query and response. I use it most often in conjunction with the tradiitonal media or technologies.

I administer a compliance program in the District. The internet has made available numerous resources in effectively achieving the goals of the program

The internet has allow the small business community that we serve to obtain information regarding the agency website, business opportunities and upcoming events.

Access to the Internet saves considerable time over other media due to search capabilities.

It allows me to obtain information from a number of sources in the least amount of time; creating a more efficient use of time.

Our tax operations require a great deal of searching for employers and their parent

companies and are more efficient and reliable then the Telephone Haines Directories and other

published data.

Legend for specific notation used in AppendixE:

"The agency:"   Agency specific references were substituted with this notation to maintain anonymity.
No other changes or substitutions were performed.

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