

Information Technology Implementation Issues: An Analysis

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(ABSTRACT)

This research project addresses the issues affecting information technology development and deployment. The issues represented in this study are addressed in the context of IT implementation processes, especially with regard to the question of the needs and perceptions of administrators from the local government arena. In addition, this study will provide an exploratory look at the problematic issues surrounding IT implementation and how local government administrators--in particular--perceive them.

More specifically, this study provides the following: a discussion of management and organizational issues that have a direct relationship to IT and local government implementation needs; a discussion of the problems which are specific to local government executives with regard to IT implementation; a comprehensive view of the overriding problems associated with the IT development and deployment process in local government; descriptive data revealing local government executive's perceptions about the issues surrounding IT development processes; and a basis for development of an IT implementation framework for local government. Each of these provisions is integral to developing a comprehensive understanding of the problems associated with the planning, acquisition, and implementation of ITs in local government. These provisions lay the foundations for future development of an IT implementation framework for local government.

The research in this study suggests that there are three primary results, which are shown here. The first is that—strategic planning for IT is fundamental to the ultimate effectiveness of IT implementation. Planning with regard to IT acquisition and deployment has proven to be a difficult accomplishment regardless of organization type or sector. This study specifically addresses many of the issues surrounding this problem, as it is integral to the implementation process as a whole. Secondly, it is shown that interdepartmental coordination has proven to be a major factor in effective IT implementation. Previous studies in this area have shown a propensity over the course of the development of IT towards decentralization of the acquisition and management of technologies. This trend speaks directly to the issue of interdepartmental coordination and the difficulties local government managers face when attempting to implement ITs in their organizations. Finally, it is shown that the expertise levels of executives with regard to IT has proven to be a contributing factor to effectiveness of the IT development and deployment process.

Dedication

To my parents,

James and Marilyn Beaumaster

Whose support made this endeavor possible.

To my family and friends,

Aaron, Tracey, Karen, Keith, Elaine, Laura, Jack, and Caroline

All of who were instrumental in helping me achieve this goal in so many different ways.

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Our society is being transformed by continuously evolving technologies that are changing the way we do things at the most fundamental levels. This transformation is precipitated by a number of trends: a shift from manufacturing to a service economy; the usage of information as a resource, factor of production, and commodity; and the propulsion of our economic growth through technical innovation and scientific discovery. On an individual level, every aspect of our daily lives is subject to technological innovations. We have become dependent on the flexibility, access, and services that they provide us. Computers, fax machines, networks, cable television, fiber optics, and ATMs have all played a pivotal role in the way we communicate, work, play, and do business. As the information age progresses we increasingly owe more of our economic and technological progress to the free flow of ideas and knowledge. Consequently, it becomes more important that we have access to superior and timely information. As a nation our toehold in the information age relies heavily on technological progress and scientific and technical information.

From an organizational standpoint, the information age is in full swing and both public and private institutions are experiencing an increase in the use of a variety of information technologies (ITs). Realistically, it has become nearly impossible for an organization to operate without the use of one or more ITs. Since their inception, ITs have been held up by many people as the cure-all for a variety of organizational ills, and in many cases viewed as an antidote to poor performance—efficiency through the miracle of automation. What is too often ignored or forgotten amidst all the discussion is that although ITs can provide a number of solutions and benefits, they also introduce their own special problems and concerns into the organizational setting. The implementation and subsequent use of ITs is a process of interrelated steps. Faltering or mis-stepping at any of the implementation stages may actually increase inefficiency, ineffectiveness, and promote any number of additional uncertainties. ITs, in and of themselves, cannot solve all our

problems (organizational or otherwise), nor will they magically remove the variety of organizational and managerial ills that plague us. *It is only through careful design, planning, acquisition, and implementation of ITs that we may benefit from more effective operations and solutions to problems.*

While ITs are not the instant cure-all that many view them to be, they are certainly an asset and can provide a number of advantageous and effective solutions if properly adopted. The successful implementation of ITs in any organization depends on a multitude of important and interrelated factors. For close to 30 years the private sector, in particular, has spent a great deal of time and effort researching the question of how best to plan for and implement ITs in organizations. But even with reams of background research and countless results from institutional studies, they still face a mixture of problems for which there are no easy solutions.

Addressing the dilemmas that are part and parcel of IT implementation and management is a full-time job. The possible approaches and solutions change as rapidly as the technologies themselves. Over the past ten years important efforts have been launched in an attempt to get a better handle on the problems surrounding information technologies, their uses and their impacts on organizations in the public sector.¹ Unfortunately very little of this research specifically addresses the process of IT implementation. Much of what we currently have available in this regard comes from the research and experiences of the private sector. A number of general IT research studies focused exclusively on the public sector began in the early 70s but since then similarly focused concerns have progressed slowly, with real headway being made only intermittently.

Why, with its obvious impact on our society and organizations, is IT such an underrepresented topic in public administration research? The reality is that IT implementation in the public sector, especially at the local government level, is a slippery

¹ Bretschneider, Stuart (1990) "Management Information Systems in Public and Private Organizations: An Empirical Test." *Public Administration Review*. Vol. 50, September/October. Lederer, A. L., and

slope indeed. As with all organizations, small and medium sized local governments (SMLGs) are awash in rapidly changing technologies. However typically, local government administrators and employees have not had the same education and depth of expertise with regard to IT as those in private sector or state and federal governmental organizations. In addition SMLGs often lack the resources for the training and development necessary to deal with current and future technologies.

Slowly, but surely, things are changing. Within the last ten years, the public at large has become more technologically savvy. This has raised awareness of available technologies and what their use may entail for citizens and government organizations alike. With this new awareness has come increased pressure from the public, press, and other organizations for SMLGs to make use of a wider variety of information technologies in enhancing their operations and the often erroneous assumption that they will provide more efficient and effective means of operation. Unfortunately, many localities are unable to react proactively as technologies constantly change and evolve around them. The public sector (particularly SMLGs) suffers from what is known as “IT lag time.”² The research of Kraemer, Danziger, and King in the late 70s and early 80s details some of the concerns with regard to this lag. Their research indicated that local governments, in general, experienced approximately ten years of lag time between the introduction of a new IT and its acceptance and routinization across a significant population of localities. And even then it appeared that only the local governments who were on the leading edge of innovation (generally the largest and wealthiest) regularly adopted ITs within a ten-year time frame. Smaller localities (SMLGs) took longer—generally on the order of fifteen years or more.³

Mendelow, A. L. (1988) “Convincing Top Management of the Strategic Potential of Information Systems”, *MIS Quarterly* December.

² See K.L. Kraemer, J.N. Danziger, and J.L. King, “Local Government and Information Technology in the United States,” in *Local Government and Information Technology*, OECD Informatics Studies #12 (Paris: OECD, 1978), pp. 186-237; K.L. Kraemer and J.L. King, (1977) *Computers and Local Government: A Review of Research*, New York: Praeger Publishers.

³ Ibid.

There is hope on the horizon. In the last ten years ITs have become more powerful, less expensive, and more accessible and user-friendly. These advances can only help IT beleaguered SMLGs make more timely progress in their technology acquisitions and implementations. Unfortunately, even a reduction in lag time by 3/4 still leaves a delay of approximately five years—an eternity in technological terms.

Local government obviously has its share of problems with regard to IT implementation. However, it would be incorrect to think that just one or two factors are responsible for these problems. In actuality there are multitudes of issues, which come into play when SMLGs attempt to implement information technologies. As mentioned previously, most of the localities in question have limited funds, human resources, IT knowledge, and expertise from which to draw.

Larger localities are often in a better position, with regard to resources, to meet the needs of an IT development and deployment process than smaller municipalities.⁴ There is a lot to be learned from the careful analysis of large public organizations as well as those in the private sector. However, it is imperative—considering the role which local governments play in our society—that an increased effort be made to address the specialized needs and issues facing SMLGs with regard to ITs and their deployment. This study takes on a portion of this task with an in-depth view of the specific issues inherent in IT implementation in SMLGs and their subsequent interrelationships.

Research Questions

To get command of the many of issues surrounding the problem of IT implementation in SMLGs, this study breaks down the development and deployment process into three separate areas: IT planning; IT procurement; and IT implementation, each with its own set of issues. Although a number of them may prove to be similar in

⁴ Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger's Guide. New York, NY: Praeger Publishers.

nature, they must be addressed in the context of that part of the process to which they are related.⁵ The actual research questions for this study are broken down into three distinct questions, which are based on the three levels involved in successful implementation of information technologies.

- What are the most problematic issues facing local government executives with regard to **IT planning**?
- What are the most problematic issues facing local government executives with regard to **IT procurement**?
- What are the most problematic issues facing local government executives with regard to **IT implementation**?

Problem Statement

The problems facing SMLGs in their efforts to implement ITs are extensive and varied. One of the ultimate and overriding problems is that there is no model for these localities to follow or consult that is tailored to their specialized issues and needs. One of the first questions that comes to mind in relation to this problem is “Why is a model for IT implementation is so important?” Obviously, no model can completely address all of the issues each individual organization faces. Organizations are each subtly different even from those in the same arena. What a model provides is a framework designed to address the issues and needs of a particular process which are related across organizations of

⁵ A significant portion of the IT related literature refers to the process of IT implementation as the “IT implementation process”. This addresses, in its most simple context, a three-step process involving planning, procurement, and actual implementation (see chapter 3 for further discussion of the process). Titling the process “IT Implementation Process” and having one of the steps of the process labeled as “implementation” appeared somewhat confusing. In order to alleviate some confusion—for the purposes of this study—the process will be labeled, “IT Development and Deployment Process”.

comparable circumstance.⁶ In essence, a model provides an alternative to reinventing the wheel every time an implementation project is undertaken.

A number of IT implementation models exist in the private sector, and some of them are quite advanced and certainly have substantial information which could be translated to the public sector. The problem with appropriating one of these models from outside the public sector is that it may or may not fit the area in question. Any number of issues and needs may be different and therefore must be approached in a different way. While it is certainly problematic and often counterproductive to create a generalized model for all types of organizations across one particular sector, it is doubly unwise to generalize a model for use in a different sector entirely.⁷

The time is right for the development of an IT implementation model for SMLGs. These localities have reached a point where information technology use has become widespread and integral to almost all operations. IT knowledge levels are increasing within these organizations, and the demand for efficient and effective use of ITs is high. SMLGs are more frequently making use of multiple ITs in their operations. Hardware and software costs have decreased substantially, making it easier and more feasible for SMLGs to afford superior ITs in greater quantity.

This dissertation focuses on smaller to medium sized localities and the myriad of issues they are facing with regard to IT implementation.⁸ Local governments in particular are having significant problems with regard to the effective implementation of information technologies in their organizations. The problems they experience are different from those

⁶ Kraemer, Kenneth L., et al. (1987) Datawars: The Politics of Modeling in Federal Policymaking. New York, NY: Columbia University Press.

⁷ Ibid.

⁸ The local governments referred to in this study are made up of small to medium sized cities, towns and/or counties in the State of Virginia having a population of 10,000 to 300,000 and/or 4 or more distinct departments. See Chapter 3 for more detail on the population. The terminology of small to medium was selected based on discussions in ICMA publications relating to local government and the management of information technologies. Specifically see J. L. King "Local Government Use of Information Technology: The Next Decade", in Managing New Technologies: The Information Revolution in Local Government (Washington, DC: ICMA, 1985).

of organizations within the federal and state governments as well as those in private organizations and as such their dilemmas must be addressed from a view specific to them.

At the local government level, the specifics of how we will function in the information age and what direction we will take have become increasingly important. At this time we are at the crossroads of information technologies—so many choices, so little money, so much confusion. Over the last decade and a half, competition and innovation have led to a development that is somewhat unique to the area of information technology. IT has improved exponentially while at the same time prices for technologies have continued to drop. This fortunate chain of events has put many of the more recent technological innovations within the fiscal grasp of local government—a situation that was unheard of 20 years ago. Unfortunately, some of the same factors that have made this particular situation possible have also produced an even greater problem—the rapidly changing nature of the technologies themselves. Information technologies become affordable quickly but the rapidity of change in the environment keeps small and medium sized local governments a step behind. In essence, they can afford really great obsolete ITs.⁹ In light of this and a number of other situations in the information technology arena, all organizations who make use of ITs must pay special attention to the planning, acquisition, and implementation of these technologies.¹⁰ They must be acutely aware of the copious number of issues which play a part in the ability of the organization to effectively implement ITs.

This study adheres to the Information Resource Management (IRM) and Management Information Systems (MIS) schools of thought, which provide a management philosophy purporting that information is a crucial asset in the ultimate success of an

⁹ International City Management Association, (1989) *Local Government Yearbook: 1989*. Washington, D.C.: International City Management Association.

¹⁰ Ward, John (1995). *Principals of Information Systems Management*. New York, NY: Routledge.

organization and as such should be managed rigorously.¹¹ Beginning in the 1960s a discipline has grown, primarily out of the field of business administration, that seeks to deal with the growth, care, and feeding (management) of information technologies. This field is most commonly referred to (at least in the 1970's and 1980's) as MIS or "management information systems."¹² MIS focuses on the automation of many business activities, especially those of a clerical nature, in an attempt to provide better methods of planning, reporting, and operations control. Recently MIS (often referred to today as "information systems" or IS) has sought to provide approaches to deal with the ever-changing problems and situations surrounding all aspects of the management of information.¹³

To manage aggressively, SMLGs must have the tools and knowledge with which to address or meet their specific needs appropriately in regard to information technology implementation. The view of this study is that to do this effectively an in-depth knowledge of the issues affecting IT implementation must be reviewed with regard to local government organizations (especially those smaller to medium sized localities). *The problem that this study will specifically address is the rationale that numerous and varied issues exist across multiple levels of the process of implementation which are problematic to the IT development and deployment process as a whole.*

In most cases, IT implementation problems can be viewed in layers corresponding to each stage in the overall process. One thing that all of the layers appear to have in common is that they are all comprised of multiple issues that create or aggravate the problem. This particular study will focus on these issues in order to determine which are the most problematic for SMLGs with regard to the implementation of ITs. Furthermore,

¹¹ Synott, William R., and Gruber, William H. (1981) Information Resource Management. New York, NY: John Wiley & Sons, Inc.; Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc.

¹² Theiruf, Robert J., (1994) Effective Management and Evaluation of Information Technology. New York, NY: Quorum Books.

these issues will be examined from the standpoint of their relationships and impacts. In addition it will explore how the issues are perceived by the executives who must manage them in their attempts to lead their organizations to effective implementation of ITs. Ultimately, the information gathered here should prove useful to the development of an effective and usable IT implementation model for SMLGs.

Description of the Issues

Organizational and management process issues encompass those factors that affect control over planning, procurement, and implementation of information technologies. In general these kinds of issues provide a window for viewing a variety of organizational operations with regard to IT. For example: What degree of centralized or decentralized control exists in the organization? Are different technologies controlled at different levels or areas of the organization? Are technological distinctions relevant or is standardization called for? How has the organization structure developed, by design or default? These are just a few of the kinds of questions that are spoken of within the contexts of organizational and managerial issues.

At the outset it appeared that the broad umbrellas of management processes and organizational processes were ideal for categorization of the issues to be discussed. However, after careful review of the literature and through an initial series of interviews, it became clear that more specific categorizations were necessary as a basis for better understanding of the issues. To that end, this study will make use of the following issue types: management process issues, organizational environment issues, leadership issues, technical systems issues, and personnel issues. Those characterized as management process issues speak to the functional operations of organizations, such as: budgeting, personnel, and general management. Issues characterized as organizational environment will be broader, addressing factors which are less tangible and more difficult to define such

¹³ McFarlan, F. Warren, and McKenny, James L. (1983) Corporate Information Systems Management:

as: organizational culture, change, and behavior. Leadership issues refer to those areas which require the interaction and direction of the organization executive such as: interdepartmental coordination and administrative support. Technical systems issues are primarily those related to the hardware and software considerations of information technologies. Finally, personnel issues are those issues surrounding each individual in the organization such as: individual expertise levels, staffing levels, and resistance to change. In chapter 4 this issue breakdown will be further discussed with regard to the interrelations of the issues and their specific categorizations. Table 1.1 provides a representation of the issue categorizations.

Table 1.1 *IT Issues, Initial Categorizations*

Leadership Issues	Management Process Issues	Organization Environment Issues	Technical Systems Issues	Personnel Issues
<ul style="list-style-type: none"> • Inter-departmental Coordination • Individual Support • Organizational Support • Timeframes and Scheduling 	<ul style="list-style-type: none"> • Strategic Planning • Budgeting • Organizational Directives • Written Guidelines 	<ul style="list-style-type: none"> • Organizational Culture • Internal and External Politics • Contracts • Changing Technologies • External Consultants 	<ul style="list-style-type: none"> • Existing Systems • Standardization • Compatibility 	<ul style="list-style-type: none"> • Organizational Expertise • Individual Expertise • Internal Leadership • Staffing • Resistance to Change • Training

As discussed previously, the issues relevant to this study are broken down by issue type and the specific part of the IT development and deployment process which they affect. A number of the issues are important factors in more that one part of the process. Appendix One provides general descriptions and characteristics of the 24 main issues relevant to this study.

Significance of Study

An in-depth understanding of the specific issues related to IT implementation is essential for the establishment of appropriate principals and effective approaches with regard to the management of information systems in an organization. Each individual issue is important in its own context as well as producing multiple impacts which affect the organization and implementation of ITs within it. Subsequently, effective management of ITs across the board can only take place when a more comprehensive understanding of the myriad of issues is achieved.¹⁴

In the area of information technology, a good portion of the research conducted prior to this study tended to focus primarily on private sector systems and was based on what Ward terms “supply-side” issues, or those issues related to how IT based systems can be “made to work effectively, economically, and in the end—deliver the expected benefits”.¹⁵ In this case the issues were those which surround the cost to benefit ratios of specific ITs and were usually earmarked for singular applications or projects. While these issues are certainly very important they are not the be-all end-all of IT implementation. The bottom line remains that if you are unsure of what you want to do, and why you are doing it, then it really doesn’t matter how you accomplish it, because in the end you’ll end up disappointed, dissatisfied or both. Development of future models for IT implementation need to take into account not just the *how* issues but also the *what* and *why* issues that impact the implementation process across the organization. This study will identify and address the issues that SMLG managers face when attempting to implement ITs in their organizations. The focus of this study is on the IT development and deployment process as a whole and not on one specific part, since it is only through a complete review of the spectrum of issues that greater success can be achieved in this relatively new and volatile environment.

¹⁴ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge.

This study is significant because it provides discourse on an area that is too often glossed over or addressed with a standard formulaic approach. While many of the issues represented in this study have been addressed individually they have not been adequately viewed in the context of IT development and deployment processes, especially with regard to the question of the needs and perceptions of administrators from the local government arena. In response to these shortcomings, this study will provide an exploratory look at the problematic issues surrounding IT implementation and how local government administrators perceive them.

More specifically, this study will provide the following: a discussion of management and organizational issues that have a direct relationship to IT and local government implementation needs; a discussion of the problems which are specific to local government executives with regard to IT implementation; a comprehensive view of the overriding problems associated with the IT development and deployment process in local government; descriptive data revealing local government executive's perceptions about the issues surrounding IT development processes; and a basis for development of an IT implementation framework for local government. Each of these provisions is integral to developing a comprehensive understanding of the problems associated with the planning, acquisition, and implementation of ITs in local government. These provisions should lay the foundations for future development of an IT implementation framework for local government.

The preliminary research undertaken for this study suggests that there are at least three results that can be expected by completion of this project. The first is that—strategic planning for IT is fundamental to the ultimate effectiveness of IT implementation. Planning with regard to IT acquisition and deployment has proven to be a difficult accomplishment regardless of organization type or sector. This study will specifically address many of the issues surrounding this problem as it is integral to the implementation process as a whole.

¹⁵ Ibid. p.23.

Secondly, it is expected that interdepartmental coordination will prove to be a major factor in effective IT implementation. Previous studies in this area have shown a propensity over the course of the development of IT towards decentralization of the acquisition and management of technologies. This trend speaks directly to the issue of interdepartmental coordination and the difficulties local government managers face when attempting to implement ITs in their organizations. Finally, it is expected that the expertise levels of executives with regard to IT will prove to be a contributing factor to effectiveness of the IT development and deployment process. The nature of information technologies necessarily carries with it an almost prohibitive learning curve and creates an air of mystique and fear that can have a significant impact on a manager's ability to plan for and manage ITs.

The current literature, which specifically addresses information technologies, and their acquisition and implementation in the public sector, is somewhat sketchy. Most of the literature focuses on specific case studies or is quite dated. The very nature of IT requires constant vigilance due to the field's volatility. This same volatility makes it very difficult to produce a study that is not almost instantly dated or lacking in some substantial way. It is the intent of this study to provide important information that will present a backbone for future study into the problems surrounding the management of information technologies in the public sector. To that end, this study will contribute—specifically to the field of public administration—a broader perspective of IT implementation issues. In addition, it will provide a distillation of the perceptions of local government executives about what kinds of issues factor into effective IT implementation. Finally, this study will produce a descriptive issues database and an evaluation of the issues that surround IT implementation in the public sector, specifically with regard to local government.

As previously noted, the focus of this project will be on small and medium local governments (SMLGs). Managing information technologies in a broad, decentralized, user-interactive manner in the SMLG arena is a relatively new concept. Most of the approaches in the past have dealt almost entirely with the acquisition and usage of

microcomputers and, in some instances, mainframes. While this is surely an important endeavor, it in no way forms a complete discussion of the complexities which the current information age and subsequent technologies have produced for SMLGs.

Over the course of the last 30 years researchers have developed a large body of literature and research related to management of information systems and implementation of information technologies in the private sector.¹⁶ This literature is helpful in the initial stages of developing such a framework for SMLGs. However, it cannot provide a complete approach because of the differences which exist in the fundamental makeup of a private organization versus smaller public ones. In private organizations, information technologies are a crucial factor in assuring the competitive advantage and eventual profitability of the firm.¹⁷ Information technologies are just as crucial in the public sector, but for different reasons. At the local level, there is the expectation that information technologies will help make the organization more responsive to the needs of the public as well as more efficient and productive. This is not to say that private organizations are not interested in responsiveness, efficiency, and productivity—indeed they are—but mainly to the extent that these objectives lead ultimately to profitability and the bottom line.

The ultimate goal of this research is to allay some of the difficulties encountered by local government administrators when trying to implement ITs in their organizations. The primary approach toward accomplishing this goal will be through the identification of the significant problems related to the nature of the public sector organization (specifically small and medium sized local governments) and addressing them within the arena of IT planning and implementation frameworks.

The following chapter will provide a literature review which addresses the study of local government IT development and deployment processes. The study is grounded

¹⁶ Bozeman, Barry, and Bretschneider, Stuart (1986) "Public Management Information Systems: A Special Issue of *Public Administration Review*". Vol. 46.

¹⁷ Theiruf, Robert J., (1994) Effective Management and Evaluation of Information Technology. New York, NY: Quorum Books.

within the underlying planning, procurement, and implementation issues in the field of Management Information Systems (MIS). The following review will also provide a historical basis for the exploration of the myriad of issues which impact the information technology implementation process across all of its levels.

Research Problem

There are multiple, interrelated issues which impact effective IT implementation in SMLGs. These issues must be identified and addressed before an IT implementation model for SMLGs can be developed.

Research Questions

- What are the most problematic issues facing local government executives with regard to IT planning?
- What are the most problematic issues facing local government executives with regard to IT procurement?
- What are the most problematic issues facing local government executives with regard to IT implementation?

The truth of the simple phrase “information is power” has been proven repeatedly over time. In a world where this is true, local government should stand in good stead. American local governments in particular have more information about people, property, and administrative processes than exists anywhere else in the world. As it stands now localities have an overabundance of a resource, which shows no sign of diminishing in the foreseeable future. While it’s one thing to have a resource and the potential power it brings, it is an entirely different matter to make effective use of that resource through management, control, and foresight. How organizations control, process, and disseminate information and how they manage the technologies associated with it as the information/technological age progresses are becoming increasingly critical.

Planning and implementation of information technologies is an involved and complicated endeavor, and becomes more so with each new innovation. It is no longer enough to simply automate clerical tasks or transfer reams of data into a computer. Today’s technologically savvy organization must make use of integrated information systems, which will not only allow them to process data and perform clerical tasks but also provide services in a more effective and user-friendly way. Integrated municipal information systems can offer better ways to provide for government administration and service deliveries but getting there is no easy matter. The following review covers the different areas which are integral to understanding the issues surrounding information technology implementation in local governments.

This literature review will ground the study of local government IT development and deployment processes with the underlying planning, procurement, and implementation issues in the field of Management Information Systems (MIS). This particular grounding will serve to describe issues that are part of a very specific management process which is not nearly as well defined as other management processes. Grounding this study in the MIS literature provides a historical basis which would be unavailable through the review of

IT implementation literature alone. In addition, this particular foundation places MIS and IT implementation in its proper field of study—management—while still allowing for a tractable body of literature. One of the problematic aspects of this grounding has to do with the semantics of the topic area. While the field of management has deep and widespread theoretical underpinnings the field of MIS is much shallower. This is partially due to the addition of the word “information” to the area of management. Once information becomes part of the picture, the “baggage” of data must be addressed. The inherent problem with developing theory around data is that individual constructions of meaning are necessarily attached. Data is only as good as the individual describing it. When dealing with data individuals often lack the necessary expertise or background knowledge to properly express meanings and implications. The same is true for general discussions of information, and it is certainly true with regard to information technologies. Individual constructions of meaning and understanding are quite varied and difficult to express to a diverse or non-expert audience.

In essence this review of the literature related to IT implementation consists of two sections which bring into focus the research and writings that provide the backbone of this study. Specifically, this review will provide a broad spectrum of the information available which is related to IT implementation in local governments. Unfortunately, not much literature exists with regard to information technology and public organizations, and that which does exist lacks breadth. As an area of study, IT implementation in local government is a management issue and as such draws from a number of different areas, management of information systems, planning, procurement, implementation, and general discussions of local government.

The first section of this review provides a general, historical view of MIS over the course of the last 30 years and focuses primarily on its private sector origins. This portion of the literature is quite important as it shows the foundations and diversity of the field of MIS as well as the origins which management of information technology in the public

sector draw upon. Also included in this section is a discussion of MIS or Information Resource Management (IRM) in the public sector, which focuses on the information systems theories that have been adapted for use in public sector MIS discussions across all levels of government. In addition, this section provides a discussion of some of the problems facing the public sector with regard to management of information technology. Finally this section provides a discussion of information technologies and local government, which addresses the literature centering on the unique needs of local level government with regard to management of information technology. The second section of this literature review is a discussion of strategic planning, procurement, and implementation with specific regard to information technology.

Section I General Background Literature

Management Information Systems

The literature, which focuses on management information systems, has developed over a thirty-year period and reflects the maturation of information technology and the attendant management philosophies and practices. John Ward in *Principles of Information Systems Management* describes the evolution of information systems by delineating MIS into three eras: Data Processing 1960-1970; Management Information Systems 1979-1980; and Strategic Information Systems 1980-1990's.¹⁸ Marchand describes a similar evolution identified in four stages, however he begins his discussion with information management practices before the use of information technology, which began around the turn of the 20th century.¹⁹ While this early beginning would seem to be rather premature for a discussion of information technology management, it is a relevant point for this study as it describes the beginnings of the management processes which provide the basis for MIS today.

¹⁸ Ward, John (1995). *Principals of Information Systems Management*. New York, NY: Routledge.

¹⁹ Marchand, Donald A., (1985) "Information Management: Strategies and Tools in Transition," *Information Management Review* 1 Summer, pp. 27-34.

In addition to providing an evolutionary description of information management, Marchand also provides five characteristics which distinguish MIS: precipitating forces; strategic objective; basic technologies; management approaches; and organizational status. In his discussion Marchand focuses mainly on strategic objective and management approaches with very little attention to the other characteristics. He also speaks to the field of information management which is significantly broader than that of information technology management. Regardless of the breadth of his argument, Marchand's discussion adds much to the evolutionary study of MIS. It is important to reiterate that Ward and Marchand's arguments suggest evolutionary patterns. While this is certainly the case to some degree, one must understand that the transitional periods, which are delineated by decade in the text, are actually quite fuzzy in real life, and each information system still exists in some form today.

Discussions of management information systems are punctuated by discussions of objectives, types of applications, and different management styles which represent the corresponding trends of each era in question. The first era—data processing—is primarily viewed as the era when the main focus was on improving the efficiency of business through automation of basic information processes. In essence, the management of actual technologies took precedence over the management of information. At the time, available technologies were pretty much relegated to simple data processing and as a consequence there was little concern for the relationship of management to the technology or information involved. Data processors as well as information specialists and technology professionals were isolated from executive management and planning arenas. These were seen as line functions in the overall management processes, and as such, had very little control over planning or resources.

The second era—or management information systems—focused on the improvement of managerial effectiveness by satisfying widespread information needs. In the mid 1970's the minicomputer arrived on the business scene and microcomputers were

introduced, effectively changing the technical and managerial environments of organizations as well as having a considerable impact on their external environments. Information technology was no longer just for the data-processing center. The power of computing shifted to a more decentralized situation and with it came a shift in overall management practices. Managers at all levels of organizations came to realize the power of information technology resources and began to acquire their own systems to meet the needs that simple data processing could no longer address.²⁰ The attention that information technology was now garnering from a broader range of managers prompted a new focus by business schools and private sector organizations on developing management frameworks that would bring together disparate systems and produce MIS perspectives across a whole organization. McFarlan and McKenny²¹ call this “the Information Systems (IS) function.” Their discussion in *Corporate Information Systems Management: The Issues Facing Senior Executives*, was one of the first to recognize that many organizations manage multiple information systems and IS projects. To accommodate this view the authors address issues specific to coordination of diverse systems.

Particularly interesting in the McFarlan and McKenny text is their discussion of environmental factors which, they argue, are partially responsible for the effectiveness of managing information systems. Included in their argument are: penetration of IS in the work environment, maturity levels of the efforts to develop IS, and planning style. In addition the authors recognize the importance of the systems manager’s status in effective information systems planning, the size and complexity of the organization, and organization management style.²² This is a distinct departure from earlier discussions of MIS.

²⁰ Marchand, Donald A., (1985) “Information Management: Strategies and Tools in Transition,” *Information Management Review* 1 Summer, p. 31-32

²¹ McFarlan, F. Warren, and McKenny, James L. (1983) Corporate Information Systems Management: The Issues Facing Senior Executives. Homewood, IL: Richard D. Irwin, Inc.

²² *Ibid.*, pp. 61-116

In the third and final era, known as strategic information systems, attempts are made to improve organizational or departmental competitiveness by affecting the overall business strategies.²³ Marchand refers to this stage as “knowledge management”.²⁴ Essentially this concerns a shifting of emphasis from physical management of information and associated technologies to management of information content and whole technology systems. According to Marchand the key to managing information content is the successful application of information technology, thereby maximizing the benefits of the information. At this stage the overriding importance of an organization’s technological infrastructure is becoming apparent.²⁵ MIS at this level requires recognition of numerous and diverse information technologies, widespread user involvement, and significant planning and implementation strategies. In his 1990 work, *The Business Value of Computers*, Paul Strassman discusses Corporate Information Management (CIM) one of the latest additions to MIS literature. CIM stresses an organization wide perspective on managing information systems putting much of the responsibility in the user’s hands. This is quite a departure from the purely autonomous and isolated information specialist of the past. Part of Strassman’s vision stresses the need to reexamine and redesign work processes before investing in major IT systems in an effort to reduce functions which would hinder the measurable value which might be produced. He argues that focus must be placed on achieving the core missions of the organization effectively and efficiently.²⁶ The strategic information systems approach to MIS makes use of strategic management techniques in

²³ Weisman, C. (1985) *Strategy and Computers*, Dow Jones-Irwin, pp. 229-36; Ward, John (1995). *Principals of Information Systems Management*. New York, NY: Routledge.; Theiruf, Robert J., (1994) *Effective Management and Evaluation of Information Technology*. New York, NY: Quorum Books.

²⁴ Marchand, Donald A., (1985) “Information Management: Strategies and Tools in Transition,” *Information Management Review* 1 Summer, pp. 27-34.

²⁵ Ibid. pp. 32-33.

²⁶ Strassman, Paul A. (1990) *The Business Value of Computers: An Executive’s Guide*. New Caanan, CN: Information Economics Press. pp. 493-510.

their models and focuses on structure, strategy, systems, style, staff, skills, strategy, and shared values, following the McKinsey 7S Model.²⁷

MIS or Information Resource Management (IRM) in the Public Sector

Within the literature on public administration, management topics are generally very well represented. This is not the case with management of information systems. Most of the literature available has been written, researched, and evaluated with the private sector in mind. As a management process, MIS in the public sector draws from a number of different disciplines, including public administration, business management, information sciences, public policy, and state and local government management.

On the whole, early literature in the area of MIS focused almost exclusively on the private sector. It was not until the 1980's that information systems theories were adapted for public administration. A special issue of *Public Administration Review* was produced in 1986 which specifically addressed Public Management Information Systems.²⁸ In their article "Public Management Information Systems: Theory and Prescription" Bozeman and Bretschneider argue for a body of literature which seeks to address the information needs unique to the public sector. This body of theory and practice would take from existing MIS research and add to it based on the needs of public organizations. They termed this research (PMIS) or Public Management Information Systems.²⁹ In their article the authors asserted that existing MIS literature did not address the political environment, personnel systems, work context, or the appropriation processes of public organizations. They cite Mansour and Watson who argued that "Government organizations function in an environment that is much different from that faced by private business organizations."³⁰ In essence, conventional MIS research really only addressed the internal characteristics and

²⁷ Gluck, Frederick W. "Strategic Management: An Overview", in Gardner, James R., Rachlin, Robert, and Sweeny, H.W. [Eds.] (1986) *Handbook of Strategic Planning*. New York: NY. John Wiley, p. 23

²⁸ Bozeman, Barry, and Bretschneider, Stuart (1986) "Public Management Information Systems: A Special Issue of *Public Administration Review*". Vol. 46.

²⁹ *Ibid.*, p. 475.

needs of the organization to the exclusion of environmental factors. Bozeman and Bretschneider suggested that a PMIS framework was necessary to address information management by applying public-private management differences to current MIS theory.³¹

The work of Bozeman and Bretschneider brought some much needed attention to the field of MIS in the public sector but it failed to generate the necessary body of literature. Instead of viewing information technology management as complete integrated systems requiring inclusive planning and implementation approaches, it, like its MIS counterparts, continued to examine the development of one specific application of technology at a time. In a similar vein Newcomer and Caudle³² provide a theoretical base for the evaluation of individual information systems projects. In their article they argue that the evaluation of public sector IS should extend beyond mere “return on investment” views. The evaluation framework that they suggest includes both qualitative and quantitative measures which recognize the many and varied uses of public information systems.

Stevens and McGowan³³ have produced one of the most complete texts to date addressing the management of information technology in the public sector. They provide an overview of MIS from the local to federal level. Using contingency-based organization theory the authors explain how public sector organizations process information in order to effectively respond to their environment. As with other works addressing PMIS, this book focuses on the management of individual IS applications and fails to provide a view of managing information technology across a whole organization.

With the passing of Public Law 96-511 in 1980 (the Paperwork Reduction Act, PRA), it looked as if Congress was making a commitment to government-wide information technology management. The PRA created the term “information resources management”

³⁰ Mansour and Watson, *op. cit.*, p. 525.

³¹ *Ibid.*, p. 478

³² Caudle, Sharon L. et al. (1989) *Managing Information Resources: New Directions in State Government*. Syracuse, NY: Syracuse University School of Information Studies.

³³ Stevens, John M., and McGowan, Robert P. (1985) *Information Systems and Public Management*. New York, NY: Praeger Special Studies.

(IRM) and argued the need for the management of information and its attendant technology as a resource similar to that of human resources.³⁴ Also at the federal level, the OMB and OTA both published periodic reports commenting on and analyzing federal efforts in the area of managing information technology. Beginning in the 1980's the OMB has published a five-year plan including, among other things, an analysis of MIS which offers an oversight perspective on how well agencies are complying with OMB technology policy.³⁵ In a similar report the OTA offered an assessment of IT management status in the federal government.³⁶ The OTA report used contractor-collected data to make recommendations on congressional oversight of applications for information technology. The report also alluded to the possibility that congressional policy framework had fallen short of current advances in technology but made no specific recommendations to address that particular situation. In a similar report the GAO³⁷ suggested that information technology management should be a major issue in the, then new, Bush administration. In this report the GAO argued that agency level planning for information technology was near nonexistent or completely ineffectual. The summation of the report concluded that agencies had failed to plan strategically for IT and were therefore not properly focused on investments or necessary budgeting measures.

In the late 1980's Caudle³⁸ produced a study which examined information resources management and subsequently information technology in state governments. The study used surveys of 2,200 managers and IS directors which characterized their outlooks on the state of IRM activities within their organizations. This research provided

³⁴ Caudle, Sharon L. (1987) *Federal Information Resources Management: Bridging Vision and Action*. Washington, D.C.: National Academy of Public Administration, Academy Studies, p.3

³⁵ Office of Management and Budget, (1984) *A Five-Year Plan for Meeting the Automatic Data Processing and Telecommunications Needs of the Federal Government*. Vol. 1: Planning Strategies. Washington, D.C.: Government Printing Office.

³⁶ Office of Technology Assessment, (1986) *Federal Government Information Technology: Management, Security and Congressional Oversight*. OTA-CIT-297. Washington, D.C.: Government Printing Office.

³⁷ General Accounting Office, (1988) *Information Technology Issues*, GAO/OCG-89-6TR. Washington, D.C.: Government Printing Office.

³⁸ Caudle, Sharon L. et al. (1989) *Managing Information Resources: New Directions in State Government*. Syracuse, NY: Syracuse University School of Information Studies.

excellent information on IT usage and acquisition procedures but fell short on discussions of planning and implementation for information technology.

The 1990's have brought with them a new dimension to the literature on MIS and information technology in the public sector in the form of the Clinton administration's technology initiatives. The initiatives envision the use of information technology by the federal government to make it more responsive and service-oriented. In a publication produced by the Office of Science and Technology Policy a discussion is provided for the use of IT to reach out to the public and provide a more timely and higher quality of services. In essence the key to this new initiative is responsiveness rather than efficiency through automation.³⁹ At this time most of the literature attempting to focus on the new technology initiative has fallen short of discussions of information technology in their efforts to produce detailed arguments for strategic management of resources. While these discussions are quite valid and useful in the sense that they produce effective methods of planning for public resource management, they do not provide the focus on IT necessary for this study. There has been some literature produced on the problems agencies have in managing information technology. In 1992 the GAO produced a report which detailed a panel discussion on perceived barriers to effective management of information resources.⁴⁰ This panel detailed shortcomings in agency content, internal policy problems in performance measurement, and strategic planning initiatives as barriers to effective management of IT.

Information Technologies and Local Government

As early as 1977 Kraemer and King argued that study of local government computer technology use and development should reorient itself to two major tracks of research. The first was integration and standardization of data processing and the second

³⁹ Office of Science and Technology Policy, (1993) *Technology for America's Economic Growth, A New Direction to Build Economic Strength*. Washington, D.C.: Government Printing Office, p. 20-21.

was increased attention to the relationship of information and computerization to management processes. The essence of this argument is that local government information resources needed to be organized and consolidated in such a way as to be useful for both management and planning within the organization, i.e. information resource management. Kraemer and King produced a “Manager’s Guide” for computers and local government which provided an extensive look at information management possibilities of the time. Unfortunately after such a prodigious start, subsequent literature did not measure up to the task.

Most of the literature available has been slanted towards a “how to” approach to information technology. In essence this was a look at “potential problems and their solutions”.⁴¹ Additionally, the local government-related literature focuses on one specific technology at a time, i.e., computers and local government.⁴² Most of the literature of the last three decades could be grouped into one of the following categories: computers and their uses for local government; automation and data processing; computer literacy and training techniques; impacts of automation on workforce; and costs of automation/computers.

Early literature was simplistic and procedural, most focusing on specific technologies and their possible uses or costs and benefits. While this was valuable information, in and of itself, it did not provide the necessary conceptual framework for management of information technologies. In the 70’s and early 80’s a number of authors addressed the impact of new technologies on local government and it’s environment.⁴³ In

⁴⁰ General Accounting Office, (1992) Information Management and Technology Issues, GAO/OCG-93-5TR. Washington, D.C.: Government Printing Office.

⁴¹ Ball, Mary C., et. al. (1983) Computers and Local Government: A synthesis and annotated bibliography. Oklahoma State University and Mississippi State: SRDC Synthesis--Bibliography Series No. 13. p. 1.

⁴² Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger’s Guide. New York, NY: Praeger Publishers; and Ibid.

⁴³ Whisler, T. L., (1970) Information Technology and Organizational Change. Belmont, CA: Wadsworth Publishing Co., Inc.; Whorton, J. W. (1981) “Working Attitudes and Computer Utilization: A National Study of the Relationship Between Organization Climate and Computer Utilization.” *State &*

addition Dutton and Kraemer and Harrell focused on the impact of technology on an organizations staff and their reaction to automation. This area was generally approached with relation to three areas: service delivery, work environment, and decision making.⁴⁴

King and Kraemer provide a discussion of the benefits of information technology, specifically computing.⁴⁵ This argument provides a useful look at how circumstances within an organization may change what is regarded as a benefit of a particular technology. To King and Kraemer a benefit is not just the opposite of a cost but must be viewed in a particular context to judge the value and usefulness of a given technology.⁴⁶

Aside from cost benefit analyses of technology, the 80's also provided discussions of the implications of information technology use in local governments. Sellers proposed that local governments could make better use of computing than mere automation tasks. He argued that "more farsighted and innovative local governments make use of the computer in information-oriented analyses and decision-making".⁴⁷ As Sellers argument suggests, the literature of the 70's and early 80's did little to recognize true management of information systems, instead focusing on the utilization of a number of computerized applications.

Along these same lines of thought Sjo and Biere made the observation that the use of computers in local government was little more than a task in data handling and that there lacked a "comprehensive management of information systems that provide anything more than assistance to conduct daily business."⁴⁸ To this end the Massachusetts OCD produced a report which cautions local government administrators about the realm of computer services. The committee argues that local administrators must reevaluate their

Local Government Review, vol. 13; Worthley, J. A., and Hempey, J. J. (1978) "Computer Technology and Public Administration in State Government: The Need for a New Perspective." *The Bureaucrat*, vol. 7.

⁴⁴ Dutton, W. H., and Kraemer, Kenneth L., (1977) "Technology and Urban Management: The Power Payoffs of Computing." *Administration and Society*, Vol. 9.; and Ibid. pp. 24-25.

⁴⁵ King, John L., and Kraemer, Kenneth L. (1980) Analyzing the Benefits of Computing Systems. In Auerback Editorial Staff (Ed.), *Computers in Local Government: Finance and Administration*. Pennsauken, NJ: Auerback Publishers, Inc.

⁴⁶ Ibid., pp. 3.1.3:3-5

⁴⁷ Sellers 1981, p.92

communities data processing needs continually as well as reassessing decisions about computer services and equipment.⁴⁹ The suggestion is to cautiously enlist the services of outside consultants to aid in the task of planning and implementation of computerization.

Another direction that the literature has taken with regards to local government information technology is to provide some information on the availability of IT at the local level. In one survey the ICMA looked at use of computers in local and county governments.⁵⁰ In similar surveys Kraemer et. al. published the findings of an Urban Information Systems URBIS research project.⁵¹ The URBIS project addressed the use of IT in local governments but with little emphasis on management of information resources.

Section II IT Development and Deployment Process Literature

The previous section provided much needed background information which serves as the foundational literature of this research. All three of the sections to follow are actually part of the IT development and deployment process as a whole but need to be addressed separately as they are a distinct processes in and of themselves.

Planning and Information Technology

Planning is a major facet in the study and discussion of IT implementation. While it is not the purpose of this research project to explain the development and usage of strategic planning, it is important to review the current thinking on the subject because this area provides one of the primary focal points for this study. A significant number of the issues that will be addressed are directly related to the planning phase of IT implementation.

⁴⁸ Sjo, J., and Biere, A. "Management Information Systems for Local Governments". *American Journal of Agricultural Economics*, 1981, vol. 63, p. 967

⁴⁹ OCD 1980 p.1

⁵⁰ International City Management Association, (1986) *Local Government Yearbook: 1986*. Washington, D.C.: International City Management Association.

⁵¹ Kraemer, Kenneth L., et. al. (1989) Managing Information Systems: Change and Control in Organizational Computing. San Francisco, CA: Jossey-Bass.

Over the course of the last decade public organizations have increasingly made use of the process of strategic planning. It should be noted that strategic planning arose out of the private sector as a process designed to minimize risks and maximize profits, by “establishing formal planning systems to replace, older, informal, intuitive methods”.⁵² Because it has been a primarily private sector project, most of the research and writing done on the topic focuses on market share and profit. This factor does not detract from the reality that strategic planning can certainly have an impact on a public organization’s success and effectiveness.

Local governments can certainly benefit from strategic planning because of their need to address the present—and plan for future possibilities with regard to the viability of their operations. Strategic planning is a process which creates a product, usually in the form of a written, comprehensive, long-term strategy for determining priorities, allocating limited resources and measuring progress.⁵³ In his discussion of strategic planning in local governments, Gordon argues that strategic plans provide five important aspects for localities. The first, anticipation of the future, can prove instrumental in improving the chances of organizational success by helping leaders comprehend the future and the position of their organization within it. This particular aspect includes processes for the anticipation of future problems and opportunities so that they may be appropriately addressed. The second aspect, assessment of the organization, forces individuals within the organization to come together in order to discuss strengths and weaknesses of the organization—where it’s going, and how best to get there. Community goal setting and consensus building is the third aspect described by Gordon. This stand promotes specific short and long-term goal setting towards ultimate achievement of consensus around these goals. Through consensus the likelihood of achieving goals is enhanced and in addition, promotes compromise across the organization. A fourth aspect, allocation of resources,

⁵² Gordon, Gerald L. (1993) Strategic Planning for Local Government. Washington, D.C.: ICMA. p.1.

⁵³ Ibid.

facilitates the difficult process of personal and capital resource allocation. In the process of allocation, all of the potential demands and impacts of providing resources to one particular project over another (possibly equally important) proposal must be considered. The final aspect which Gordon addresses deals with the establishment of benchmarks. This particular view speaks to the ability of organizational leaders to make use of predefined goals and objectives to provide direction at the outset of any new project or directive. Benchmarks, as discussed here, also provide measurement standards by which performance can be ascertained.⁵⁴

While formal strategic planning is not, “a panacea for resolving organizational or community conflicts” it should produce the following results: an organizational mission statement; an environmental scan with a three to five year horizon; basic long-term goals and basic one year goals; strategies and steps for action to move the organization toward set goals; and, finally, implementation plans with assigned responsibilities for action.⁵⁵ Above all, strategic planning should not be regarded as the end point or an unalterable product. It should not fail to question preconceived notions or assumptions before adding or incorporating into the plan. Gaining organizational commitment is important, but not adopting wrong or un-implementable goals should also be stressed. According to Gordon, “In order for strategic planning to be effective, it must be fully accepted at the senior-most levels and integrated into the local government organization as both a product and a process.”⁵⁶

Strategic planning is a tool that can be used by organizational decision-makers to enhance their decisions and help them make more informed choices. In order to be effective, strategic planning must be ongoing, always adapting to the changes in

⁵⁴ Gordon, Gerald L. (1993) Strategic Planning for Local Government. Washington, D.C.: ICMA. pp. 5-7.

⁵⁵ Ibid, p. 9.

⁵⁶ Ibid., p.61. Also see Bandrowski, James F. (1983) Creative Planning Starts at the Top. New York, NY: American Management Association. and Braithwaite, 1996.

organizational environment and direction. If used in a proactive manner, strategic planning can assist or facilitate direction, consensus, and resource prioritization.

The relationship of information technology and strategic planning essentially developed out of two trends which occurred in the 60s and 70s.⁵⁷ The first of these trends began in the early 1960s with the push for a single integrated approach to MIS which could be used across entire organizations. It quickly became apparent that this approach was doomed to failure due to the complexities inherent in the process of managing ITs across multiple levels of organizations. By the late 70s, an approach which integrated separate but interrelated information systems throughout the organization became the norm, especially for larger organizations. This approach developed into a second trend which still exists in organizations today—that is, information systems interwoven into the management processes of the organization. With this trend comes a recognition of the pressing need for long range planning with regard to information systems and the activities of MIS departments. This direction also speaks to the importance of interrelating these long range IT plans with the comprehensive corporate planning subsystems. Current IT planning trends recognize that each strategic plan is unique to the specific characteristics of each individual organization. In addition they must be equipped to cope with the fact that system changes are inevitable and for that reason, the strategic plan must be flexible.

McLean and Soden view IT planning as a conjunction of two basic perspectives: time horizon—referring to short, medium, and long term planning; and focus--relating to the principal concerns of the plan which may be strategic, managerial, or operational. According to these authors strategic planning for MIS is “vital to ensure that the role played by MIS will be congruent with that of the overall organization”.⁵⁸

Information technologies and their applications for organizations have evolved exponentially over the last 30 years, essentially becoming an integral and imperative part of

⁵⁷ McLean, Ephraim R., and Soden, John V. 1977 Strategic Planning for MIS. New York, NY: John Wiley and Sons, Inc.

all organization processes. The symbiotic nature of IT and organizational operations necessitates the increased involvement of all levels of management in the IT development and deployment process. No longer is it acceptable or suggested to leave total discretion over key IT decisions to an IT department or individual IT specialist—its impact on the organization is too great. According to Ward the more dependent that an organization becomes on IT “the more centralized and structured the approach to planning and control should become”.⁵⁹ This does not mean that IT planning should be exclusively the domain of top management, on the contrary, the facilitation of IT innovation and effective use demands the participation of users at all levels of the organization in the planning process. Sullivan, describes this situation and calls for a complex but balanced set of management approaches--referring to this as “eclectic IT management”.⁶⁰ Essentially, Sullivan’s eclectic management approach is a prescription for IT planning processes that are tailored to the specialized and individual circumstances which are determined by the industry of a given organization and it’s particular organizational culture.⁶¹

By the late 1980’s, organizations across the board were recognizing the need for strategic plans specific to information technology implementation. In 1988 Lederer and Mendelow conducted a survey of 20 private sector organizations in an attempt to determine the problems senior management were having with regard to the development and implementation of IT strategic plans.⁶² In their study the researchers found five reasons for the problems that were occurring with IT planning: (1) managers tended to view ITs as operational tools and did not recognize their impact on the organization; (2) managers perceived a gap between industry claims of what ITs could do and the difficulties of their

⁵⁸ Ibid. p. 4.

⁵⁹ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge. p. 30

⁶⁰ Sullivan, C. H. (1985) “Systems Planning in the Information Age”. *Sloan Management Review* Winter.

⁶¹ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge.

⁶² A survey done by Lederer and Mendelow prior to their 1988 survey had determined that the commitment of top management was essential to the success of strategic planning for IT. This survey also found that obtaining this commitment was difficult.

organizations in duplicating those claims; (3) managers tended to view ITs as critical to the organization only when it impacted their needs for information or services—otherwise they failed to see their facility as a resource; (4) managers constantly focused on financial justification for IT investments; (5) finally, top management had become increasingly action-oriented with a short-term focus to the detriment of long-term planning especially for IT.

A similar survey of UK companies was conducted to identify a variety of deterrents to effective strategic planning and implementation of ITs. This survey found that the perceptions and attitudes of top management towards IT planning and implementation were not as critical as the ability to measure the benefits of the strategic plan, the provision of IT skills to users, and the ability to make use of ITs to deal with business uncertainties.⁶³

The main point to be garnered from the existing literature on strategic planning and IT implementation is that, for most organizations, making use of some form of IT strategy which makes the attempt to link organizational objectives and priorities to IT plans is preferable to not having any formalized plan at all. There are a variety of problems which plague organizations which stem, at least in part, from the lack a strategic plan of some sort.⁶⁴

While there are a number of writings and research studies on strategic planning in the public sector and local government--there are very few which focus on the specific nature of strategic planning for information technology within that arena. Information technology planning differs from the standard planning process due to a number of factors: IT planning must generally be oriented on the budget year as opposed to a more strategic 3-6 year horizon; much of the focus of IT planning is directed toward the organization as opposed to citizen or customer usage; IT strategic planning focuses on the technologies

⁶³ Wilson, T. D. (1989) "The Implementation of Information System Strategies in UK Companies: Aims and Barriers to Success", *International Journal of Information Management* Vol. 9.

⁶⁴ Ward (1995) describes this as a total lack of strategy, or organizations who "merely add up lists of projects, summing resources and buying whatever technology seems to fit each system best and calling it a plan". p.32

themselves as opposed to solutions to organizational problems; and, finally, IT strategic planning must focus on incremental changes.⁶⁵

Early on in the development of information technologies, researchers recognized the importance of formalized planning processes with regard to IT.⁶⁶ They delineated the importance of IT planning specifically for executives and department heads in local governments. Kraemer and King went so far as to say that the “ultimate success or failure of an organization’s use of computerized systems can be traced back to decisions made during planning or management”.⁶⁷

Strategic planning which specifically addresses the area of IT implementation can have a number of benefits which impact the entire organization. Among other possibilities this approach allows for continual adjustments and alignment to the needs of the IT end users. It also permits the development of a formalized framework for the coordination of previously duplicated actions and more economical use of limited resources. This in turn can lead to a more formalized framework for the prioritization and allocation of resources across the board. By achieving an IT specific strategic plan, a more process oriented approach to identifying shifts in technology may be realized thereby placing an organization in a better position to adjust to a rapidly changing environment. Another important benefit is that it provides a more holistic view of the role of IT in an organization and allows for a process which facilitates strategic thinking with regard to IT instead of an approach that is doomed to the constant task of putting out fires. Finally, a strategic plan specific to IT implementation may allow for an organization to go further towards the realization of its goals with regard to ITs.⁶⁸

⁶⁵ Boar, Bernard H. (1993) The Art of Strategic Planning for Information Technology: Crafting Strategy for the 90’s. New York, NY: John Wiley & Sons, Inc.

⁶⁶ Kraemer, 1969; Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manager’s Guide. New York, NY: Praeger Publishers., Horton and Marchand, 1982

⁶⁷ Ibid, p. 29.

⁶⁸ Boar, Bernard H. (1993) The Art of Strategic Planning for Information Technology: Crafting Strategy for the 90’s. New York, NY: John Wiley & Sons, Inc.

This process of putting out fires is a recurring theme in IT implementation. IS professionals and those who have to deal with IT seem to be constantly on fire patrol rather than working ahead of the problems and ultimately defining their destinies.⁶⁹ Synott and Gruber address this problem with what they term a “fire prevention cycle”. Their cycle is essentially a call for more proactive IT planning. The cycle starts with creating specific time to plan for IT--which in turn should lead to less problems that need to be solved--which in the end should provide more time for future planning. In order to achieve this the authors state clearly that planning for IT demands the involvement of not just the IT professionals but also all levels of management and representation from throughout the organization (stakeholders) via an IT planning committee.⁷⁰

Planning is one of the most important aspects of any IT implementation project. ITs have a substantial impact on personnel, fiscal concerns, and organizational issues. These impacts must be anticipated, analyzed, and planned for. Effective implementation of ITs in a local government can be enhanced if organization executives take care to deal with anticipated problems before they occur, and are quick to act on problems that do arise. Most of the literature which speaks to the relationship between planning and information technology agrees on a number of points: planning is a key first step in successful IT implementation; the involvement and expertise of top management is essential to success; the planning process as well as organization personnel must be ready to anticipate and adapt to changes in ITs; and, finally, evaluation of the planning and implementation process is key to facilitating decision-making and future acquisitions.

⁶⁹ Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc.

⁷⁰ Ibid. Kerr 1991; Synott, William R., and Gruber, William H. (1981) Information Resource Management. New York, NY: John Wiley & Sons, Inc.

Procurement and Information Technology

IT procurement processes exist, formally or informally, in every organization that acquires information technologies. Procurement involves all aspects of IT acquisition: competitive bidding, purchasing equipment and services, and evaluation of implemented systems. Part of the complication of IT procurement in particular is that the acquisition of ITs is not just about the purchase and use of hardware and software, it is also inherently tied to the acquisition of a variety of services, support personnel, intellectual properties, and any items that have either a direct or indirect affect on information or information technologies. The IT procurement process is interdisciplinary and in most circumstances involves staff members from all through an organization--IT staff; purchasing, legal, and financial employees, not to mention a number of end users from all departments across the organization and its planning and implementation procedures. This multi-dimensional aspect makes IT procurement especially complex with relation to the organization. This complexity, in conjunction with the huge number of available products and services, and the speed with which new products are introduced to the market, makes the area of IT procurement an extremely intricate and volatile process area.

Literature surrounding this domain is relatively scarce aside from the many prescriptions and guidelines for actually carrying out the procurement process. Much of what is available speaks primarily to major trends like cost/benefit analysis of IT and specific procurement practices in particular individual organizations. Essentially, the procurement of information technology consists of budgeting for ITs and the ultimate acquisition of ITs. The early literature in this area in essence discussed procurement as a set of alternatives for IT acquisition, the first of which is internal information technology appropriation. At it's most fundamental level this means that each individual municipality must take care of all the budgeting, cost-benefit analysis, IT selection, purchasing, and implementation on its own. The second alternative, known as external, is the contracting

out for all, or a significant portion of all, IT equipment and services for a given municipality.⁷¹

Most of this early discussion was based on the need for an organization to achieve economies-of-scale with regard to their IT processes.⁷² To have an internal procurement process meant that the organization could provide IT services for itself and still achieve a greater cost/benefit ratio than contracting out would allow. In the 60s and 70s only the larger local governments could afford the luxury of internal procurement. For smaller municipalities the economies of scale were much smaller and they had to contract out to external agencies who could provide IT services for them at a substantially lower cost than they could achieve by doing it themselves.⁷³

Much of this situation changed in the early 1980s with the arrival on the technology scene of the microcomputer which created an environment where most IT processes could be provided internally by the local government. Even with this technological boost there still remained a contracting out factor. The hardware had become much more cost effective for a locality to own but in many cases some of the operations (like network management) continued to exist beyond the fiscal grasp and expertise level of the organization. Currently, and in the foreseeable future, contracting out still occurs for the provision of certain IT services.

More recent literature with regard to IT procurement discusses the process of acquiring IT equipment and services but it refers mostly to the state and federal levels of government. This discussion provides an overview of the bidding and contracting process which is often defined in statutes and regulations. According to Andersen and Dawes this aspect of the procurement process creates special problems for the management of ITs.⁷⁴

⁷¹ Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger's Guide. New York, NY: Praeger Publishers.

⁷² Watlington, 1970, p. 5

⁷³ Kraemer and King, 1977.

⁷⁴ Andersen, David F., and Dawes, Sharon S. (1991) Government Information Management: A Primer and Casebook. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Most of the procurement regulations require the acceptance of minimum bids for equipment and services which meet proposal guidelines. The procedures are often quite slow and stretch out over a number of planning cycles. In this environment it is difficult to handle system and software upgrades which are an integral part of today's information technologies.⁷⁵ To make matters more problematic--personnel costs and equipment service costs are often ignored in the process.

As in the earliest stages of information technology procurement of ITs the area of cost benefit analysis remains a prominent concern. Many of the problems with IT implementation that local governments face today are drawn from the history of a strict cost benefit approach to the development of information systems. Over time, the level of concern and frustration that managers have developed with regard to IT acquisitions has grown substantially. Their main consideration has become a question of how IT can best be made to work efficiently and economically, and deliver the expected benefits. This view often comes from unrealistic expectations of technology, ignorance of the systems, and excessive expense. Unfortunately, these issues have taken focus away from other important issues which come into play.⁷⁶

Local governments must look on the acquisition of information technologies as an investment decision which necessarily requires careful evaluation of the risks as well as the benefits. As Kraemer and King point out, IT acquisitions entail future costs which go far beyond initial procurement decisions. There must necessarily be a substantial commitment to future upgrades, operating expenses, software, and personnel.⁷⁷

Typical cost/benefit analysis of an IT investment does not fully realize the implications of the IT procurement process. IT investments can not be calculated the same

⁷⁵ Ibid.

⁷⁶ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge.

⁷⁷ Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger's Guide. New York, NY: Praeger Publishers.; Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc p.19; Andersen and Dawes, 1991.

as other capital investments, that is—by using internal rates of return or net present values to determine whether to invest in specific systems or not. According to Ward this method only works when the costs and benefits can be accurately predicted over the life-cycle of the system and since the actual life-cycle is extremely hard to determine, it is very difficult to evaluate ITs on a financial basis alone.

In order to effectively evaluate (in an appropriate manner), IT investments it is necessary to secure a more holistic view of the process--taking into account infrastructure investments, personnel investments, and incremental capacities.⁷⁸ Part of the problem with quantifying the benefits of ITs lies in the inability to convert the many “intangibles” of information technologies into financial figures. In effect it is really not possible to quantify all of the benefits of IT nor does it make sense to try and force these types of quantitative measures on the unquantifiable. M.M. Parker [et al.] in Information Economics provides: an analysis technique specifically for IT which takes into account possible IT applications and then justifies five basic techniques for evaluation.⁷⁹ They maintain the traditional cost/benefit analysis and add to it value linking (improvement to performance), value acceleration (improvements in time use), value restructuring (productivity through organizational change), and innovation evaluation (the value of new processes and practices). This approach is one of the more creative of the limited offerings in the literature on this area and provides a better way of interpreting the long-term values of IT for an organization.

In order to determine the tangible benefits of ITs they must be broken down into distinct divisions which represent the types of technology categories. Parker [et al.] provide three main ways in which IT systems benefits accrue: (1) Substitutive--replacing people power with machine power. This approach is generally driven by economic factors

⁷⁸ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge., Andersen and Dawes, 1991; and Garson, G. David. (1995) Computer Technology and Social Issues. Harrisburg, PA: Idea Group Publishing.

⁷⁹ M.M. Parker et al. in Information Economics 1988 Prentice hall in Ward (1995).

with the ultimate goal of improving efficiency. (2) Complementary--improving productivity and personnel effectiveness by providing new ways to perform tasks through IT. (3) Innovative—increasing a competitive edge by creating new applications for IT. In this particular model the authors provide a way of looking at IT acquisitions which provides for a view which is neither purely based on efficiency nor solely on innovation.⁸⁰ Instead they provide a framework where integration between cost/benefit analysis and innovative evaluation is possible depending on organizational needs and directives.

On the whole, this particular area has proven itself very resistant to change. Guidelines for IT procurement are still floundering in a traditional approach to budgeting and acquisitions. The most recent publication from the federal government which actually addresses the procurement process is the 1995 guide to IT investments published by the OMB for the Office of Information and Regulatory Affairs. This guide lays out a step by step acquisition process which is based on a standardized evaluation of risks, benefits, and costs. Their proposed process begins with a prioritization of all funding requests in an organization in an attempt to maximize the value of scarce public resources. This part of the process requires the balancing of any potential benefits against the costs and risks, while at the same time aligning the organizations strategic and tactical goals with any proposed IT investments. A critical factor to this particular guide's approach is the eventual clear evidence of the positive net benefits that the public has garnered for their tax dollars invested.

Inherent problems with this process are obvious and intrinsic in IT procurement efforts. As stated by the GAO report *Information Management Issues*, the IT acquisition and management process is reasonable from an ideal view of how the process should function: that is, the delivery of IT systems that operate as intended, within specific time parameters, and in a measurable and cost-effective manner. For overall government

⁸⁰ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge. p.123.

efficiency it is desirable that the procurement process achieve economy through the standardization and sharing of systems across agencies.⁸¹ Unfortunately, in practice, the process continually fails to meet these ideal objectives—primarily because the realities of IT systems procurement and implementation are not taken into account.⁸² As Ward and others have pointed out, the IT acquisition process is risk-averse and demands a high degree of certainty. Both demands are the exact opposite of the reality of IT procurement--which is both uncertain and high risk.⁸³ The typical acquisition process, as illuminated by the federal government's guide to technology investment, calls for the formulation of precise long-term plans and budgets which essentially assume that all systems requirements can be identified and forecasted at the outset.⁸⁴ Process models like this one assume that IT hardware and software development are predictable and that there is a high degree of accuracy in long-term budgeting for ITs.⁸⁵ Typical acquisition processes do not work well within the complex and long-term life cycles of IT systems. The very nature of information technologies makes traditional acquisition processes ineffective and problematic. ITs change rapidly and defy predictions as to costs, development time, and ultimate performance measures.

For authors such as Braithwaite, one of the most crucial aspects in the IT procurement and acquisition process is what he terms "Alternatives Analysis and

⁸¹ General Accounting Office, (1992) Information Management and Technology Issues, GAO/OCG-93-5TR. Washington, D.C.: Government Printing Office.

⁸² General Accounting Office, (1992) Information Management and Technology Issues, GAO/OCG-93-5TR. Washington, D.C.: Government Printing Office.

⁸³ GAO, 1992; Andersen, David F., and Dawes, Sharon S. (1991) Government Information Management: A Primer and Casebook. Englewood Cliffs, NJ: Prentice-Hall, Inc.; and Garson, G. David. (1995) Computer Technology and Social Issues. Harrisburg, PA: Idea Group Publishing.

⁸⁴ General Accounting Office in conjunction with the Office of Information and Regulatory Affairs, Information Policy and Technology Branch. (1995) *Evaluating Information Technology Investments: A Practical Guide*. Washington, D.C.: Government Printing Office, November.

⁸⁵ Ward, John (1995). *Principals of Information Systems Management*. New York, NY: Routledge. Ward, John (1995). *Principals of Information Systems Management*. New York, NY: Routledge., Kraemer and King, 1977

Feasibility”.⁸⁶ This part of the process takes on the job of deciding whether or not a future IT acquisition is headed in the right direction and feasible with relation to the organizations goals and directives. For Braithwaite this requires a full review of the financial situation, system possibilities, existing systems needs, and specific guidelines for use.

Braithwaite also argues that all IT planning and implementation must be subjected to a “series of feasibility and trade-offs tests that examine each according to technical, operational, and economic factors”.⁸⁷ A number of important issues arise in an examination of technical feasibility. Is the planned for IT a reliable use of technology? Is it compatible with existing systems? Does it require specialized training or rely on unfamiliar techniques, hardware and software? In the end, IT solutions must be compatible and in line with users skill levels and expertise. It should also be implementable using existing staff and not overly tax their capabilities and time. Ideally, information technologies are supposed to enhance an organizations effectiveness not detract from it. The reality of the situation is that if proposed acquisitions cannot meet certain technical requirements it is more than likely that problems will occur on implementation.⁸⁸

According to Braithwaite, operational feasibility is the most critical but most often overlooked aspect of the procurement process when dealing with the planning, acquisition, and implementation of ITs. Operational feasibility speaks to the attempt to determine how well the predetermined technical alternatives will work within the context of the organization’s day-to-day operations and environment. In an ideal situation, implemented ITs will enhance the effectiveness of an organization--at the very least it should not detract from, or disrupt existing operations. In order to be feasible in this way, the technologies must be in line with organizational needs and directives. A main part of the difficulty in this area stems from the fact that in many instances operational procedures must be changed

⁸⁶ Braithwaite, Timothy (1996) The Power of IT: Maximizing Your Technology Investments. Milwaukee, WI: ASQC Quality Press. p. 69.

⁸⁷ Ibid. p.72

to accommodate ITs and in a few cases the fundamental culture of the organization may require some modicum of change. Ideally, these sorts of changes should be addressed early on in the planning stages in order to lessen some of the more detrimental impacts (perceived or otherwise) of implementation. In essence, the operational feasibility of any specific information technology affects both the social and work processes of an organization and as such must be treated as a fundamental factor in IT implementation.

Finally, Braithwaite discusses economic feasibility and specifically places this aspect last to deal with a management predilection toward the pure cost benefit analysis of IT. In his words “Economic feasibility should be considered last or else the probability is high that technological direction could be determined for the wrong reason; that is, low cost.”⁸⁹ Braithwaite recognizes that funding decisions for IT are usually dependent on the justification of increased revenue, reduced costs, or better services. In his discussion, Braithwaite cautions that pure evaluation of costs to benefits does not necessarily provide a full picture of the economic feasibility of any given IT. He proposes that they must be evaluated in terms of the whole work process and only on those IT alternatives deemed technically and operationally feasible. He argues that this is the only way to make sure that the analysis is a true evaluation of all favorable alternatives. Potential benefits should not be masked by unanticipated costs associated with trying to make an unfeasible system work. For any IT implementation to be successful it must be funded and justified by enough benefits across the board to allow for full development and implementation. To achieve this, benefits must be projected for the full “useful” life cycle of the system. As discussed previously, this is quite difficult to do and requires the analysis of all three types of feasibility.⁹⁰

⁸⁸ Ibid.; and Martin, James and McClure, Carma (1985) Structured Techniques for Computing. Englewood Cliffs, NJ: Prentice Hall.

⁸⁹ Ibid. p.75.

⁹⁰ Ibid.

One of the earliest recognized problems for IT implementation in local government has been poor IT acquisition and development procedures. “Many local governments, and particularly those adopting integrated ITs for the first time, are unsure how to go about procuring...systems...that will really meet their needs.”⁹¹ As has always been the case, there is a great deal of difference, with regard to capability, among the range of ITs available for any given solution. Procuring a system which is too limited for the tasks a local government wants to utilize generally leads to immediate upgrade needs. This in turn creates a disruption of the whole process of implementation—particularly if a system must be upgraded prior to full systems implementation. The opposite situation can also have detrimental effects. If too much systems capacity is acquired there may be desire to “fill-in” the slack capacity so as not to appear underutilized in evaluation. This may result in the establishment of processes that are not needed by the municipality, but that may eventually become entrenched. In the end it is very important that IT procurement be tied to the development of specific but integrated systems over a particular period of time.

In their 1995 report, “*Evaluating IT Investments: A practical guide*”, the Office of Information and Regulatory Affairs Information Policy and Technology Branch proposed a process model for IT investments which outlined the major aspects of the IT procurement process, figure 2.1 shows a model of their process.

Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger’s Guide. New York, NY: Praeger Publishers, p.26.

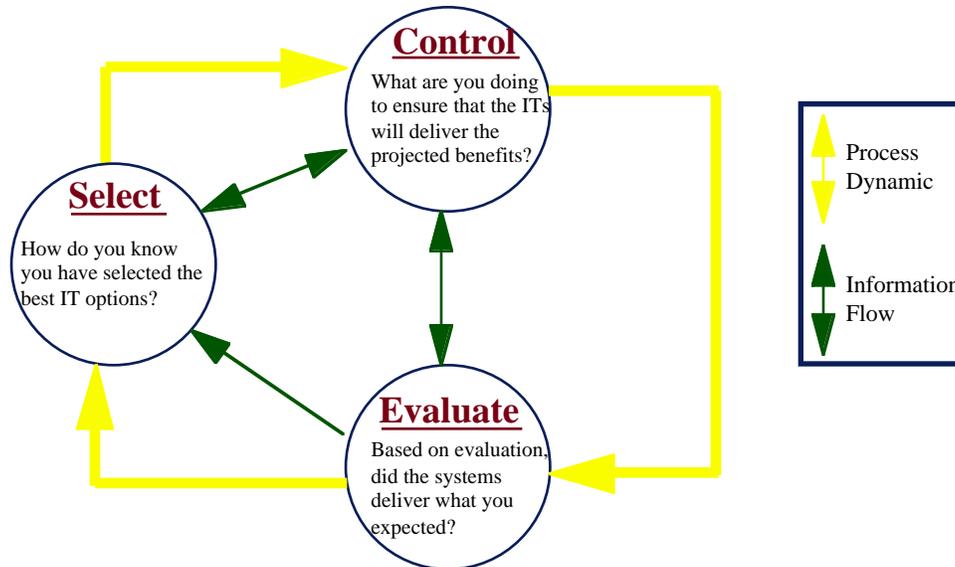


Figure 2.1 IT Investment Process Model⁹²

In this particular model, three specific processes exist. Select refers to the screening of all possible projects requiring Its. It also requires an analysis of risks and cost/benefit ratios resulting in the prioritization of projects based on rate of return to risk. The ultimate objective is the determination of the right mix of projects for the organization.

The second step in this IT procurement process refers to control of the selected projects. As ITs are acquired for any given project they must be evaluated against projected costs, implementation schedules, and predefined performance measures. As acquisition and implementation take place action may be taken to correct any deficiencies with regard to the ITs and their relationship to the given project.

Finally, the ITs must be evaluated to determine whether or not they met expectations and/or cost to benefit ratios. This step allows for adjustments to the systems and/or their usage in existing or future projects. While this acquisition process model appears to be fairly standard it does speak directly to the implementation of information technologies and it does allow for course correction within the process. Unfortunately, as

⁹² General Accounting Office in conjunction with the Office of Information and Regulatory Affairs, Information Policy and Technology Branch. (1995) *Evaluating Information Technology Investments: A Practical Guide*. Washington, D.C.: Government Printing Office, November. p.12.

with a multitude of other available models, it places most of its focus on cost/benefit analysis.

Information Technology Implementation

Much of the literature available in the area of IT development and deployment recognizes that the relationship that exists between ITs and organizations demands process types that specifically address the special implications of the relationship. To this end, Walton argues that there are five specific aspects that must be part of any IT development and deployment process they are: priority attention and commitment of resources; the process must be an extended one; the process must be inclusive; organizational values must be an integral part of the guiding factors; and technological and organizational aspects must develop in conjunction and parallel with the IT requirements.⁹³ The first aspect provided by Walton has become a common theme. This supports the view that the IT development and deployment process is crucial to the effectiveness of the organization and as such it warrants the direct attention and leadership of top management.⁹⁴ Walton adds that this kind of leadership provides a distinctive dimension to the process and that is, the critical importance of commitment of organizational resources—not just fiscal resources, but those which are educational, and personnel related as well.

A second crucial factor is the life cycle of the IT development and deployment process. The process must extend beyond the development and implementation of ITs in the organization and it must ultimately continue through the evaluation and adjustment stages, as well. In the volatile area of IT, conditions change throughout the development and use of information systems. In addition to being extensive the implementation process

⁹³ Walton, Richard, E. (1989) Up and Running: Integrating Information Technology and the Organization. Boston, MA: Harvard Business School Press. p. 31-32.

⁹⁴ Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge; Lederer and Mendelow, 1988; Walton, 1989

must also be inclusive as the wide-ranging impact of IT on an organization demands the involvement and support of individuals and departments across the entire organization.⁹⁵

The final two aspects which Walton speaks to deal with the value base and ongoing development of IT implementation. The process requires that a framework exist for its development. To be really effective this necessitates the infusion of organizational goals and missions into the process at the very beginning or planning stages. IT has such an impact on organizational outcomes that a clear understanding of the desired organizational effects of IT is crucial. As organization goals and directives are not static, neither are the requirements for ITs. As the organization develops its IT needs will change: the relationship between the organization and ITs is two-way and over time the two must develop consistently intertwined.⁹⁶

Walton's view of IT implementation is so important because of its recognition of the importance of integrating organizational goals and garnering support at a number of different levels. A good portion of the MIS literature views IT implementation with an internal focus which overrides all others.⁹⁷ In other words the goals of IT are viewed as the primary goals for future IT development and implementation. Most of the authors who have delved into the area of IT implementation agree that it is intricately intertwined with the organizational design and culture. Hansen recognizes the alignment of IT development with organizational goals as desirable after the IT implementation goals have been met. Markus provides a view of IT implementation which proposes that resistance is a key factor in achieving effectiveness in that it "guides the behavior and influences the actions taken by

⁹⁵ Ward, John (1995). *Principals of Information Systems Management*. New York, NY: Routledge., Walton, Richard, E. (1989) Up and Running: Integrating Information Technology and the Organization. Boston, MA: Harvard Business School Press.

⁹⁶ Ibid. Ward, 1995; Kraemer and King, 1977.

⁹⁷ Hansen, Hans R. (1995) "Conceptual Framework and Guidelines for the Implementation of Mass Information Systems", *Information & Management*, Vol. 28.; Globerson, S. and Maggart, M.J. (1991), "A Conceptual Model of Self-Service", *International Journal of Operations and Production*, Vol. 11, No. 4.

managers and IT developers who are concerned with the implementation of ITs.”⁹⁸ This argument builds on the view that top management support and user involvement is key to process effectiveness but from the unique standpoint that it aids in the avoidance of resistance.⁹⁹

In addition to organizational support, are the issues of well-designed systems that are technically sound and “user friendly”. The arguments relating to resistance and IT implementation suggest that there are 3 types of resistance.¹⁰⁰ First, individuals or groups may resist based on internal factors specific to that person or subunit. Secondly, the resistance may be technically oriented, based on factors inherent in the ITs themselves or the complete system being implemented. These two types of resistance to implementation are divergent in that the first sees individual and group behavior as internally determined and the second sees the same behavior as being determined environmentally or by the technologies themselves. It is common in the process of implementation to adhere to both of these influences simultaneously, that behavior is determined both internally and externally. Markus and Ginzberg both describe this as the tendency for people to resist regardless of the system but all things being equal they are less likely to resist ITs that are well designed.

The third type of resistance which is seen as a primary impact on IT implementation is the argument that individuals and groups resist ITs because of the interaction of personal characteristics with those of the IT systems. The key here is “interaction”. Keen gives an example where he argues that IT systems which centralize control are resisted in

⁹⁸ Markus, M. Lynne (1983) “Power, Politics, and MIS Implementation”, *Communications of the ACM*, Vol. 26, No. 6, June. p. 430

⁹⁹ Ibid; and Lucas, H. (1975) *Why Information Systems Fail*. New York, NY: Columbia University Press.

¹⁰⁰ Kling, R. (1980) “Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research”. *Computing Survey*, Vol. 12, No. 1; Keen, Peter G.W. (1980) “Information Systems and Organizational Change”. Report CISR-46, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.; and Markus 1983.

organizations that have decentralized authority structures.¹⁰¹ It is important to note that in the IT implementation literature resistance is defined as behaviors that are intended to prevent the effective implementation of ITs. However, resistance may also be applied to behaviors which do not manifest these intentions.¹⁰² Markus makes the distinction by suggesting that when a person's use or interaction with ITs is not critical to overall system operation then the individual's choice not to use the system cannot really be considered resistance.¹⁰³ Instead this behavior may be an indication of other factors such as lack of training, personal fear of IT, or ignorance of the system.

Some of the more recent literature in the area of IT implementation discusses the impact of organizational culture, which was all but absent from most of the early literature. Organizational culture has a variety of meanings in the context of IT. Cooper defines it in his article "The Inertial Impact of Culture on IT Implementation" as "the social or normative glue that holds an organization together and expresses the values or social ideals and beliefs which organization members come to share".¹⁰⁴ One of the more important ideas provided with regard to organizational culture is that changes which are most significant in an organization will breed resistance and ultimately fail if they are not accompanied by cultural changes.¹⁰⁵ Relationships to this discussion can be seen in Schein's analysis that groups in organizations typically build their culture around their underlying technologies. Any adjustment to power (perceptions of power, work habits, or status) which may accompany IT implementation may violate the shared meanings and values of the group bringing about

¹⁰¹ Keen, Peter G.W. (1980) "Information Systems and Organizational Change". Report CISR-46, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.

¹⁰² Ibid; and Ginzberg, M.J., (1974) "A Detailed Look at Implementation Research". Report CISR-4, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.

¹⁰³ Markus, M. Lynne (1983) "Power, Politics, and MIS Implementation", *Communications of the ACM*, Vol. 26, No. 6, June., p. 434

¹⁰⁴ Cooper, Randolph B. (1994) "The Inertial Impact of Culture on IT Implementation" *Information and Management*, Vol. 27. P. 18; and Smircich, L., (1983) "Concepts of Culture and Organizational Analysis", *Administrative Science Quarterly*, Vol. 28.

¹⁰⁵ Schein, E.H., (1985) *Organizational Culture and Leadership*. San Francisco, CA: Jossey-Bass Publishers.; Sathé, V., (1983) "Implications of Corporate Culture: A Manager's Guide to Action", *Organizational Dynamics*, Autumn

cultural based resistance. Although the issue of culture has been relatively absent from IT implementation literature there are a number of indications that it is quite important to the process. In essence, different cultures require different kinds of information and technologies since they process information differently and they play an important role in user satisfaction of ITs.¹⁰⁶ According to Cooper the differences inherent in organization cultures can lead to resistance of IT implementation which can in turn increase the likelihood of failed implementation.¹⁰⁷

Summary

Information technology has become a mainstay in our society: it has an impact on almost every function of our lives. We have truly become an information and technology based society. Considering the toe-hold which technology has on our lives it is doubly important that the institutions which provide the frameworks for our society are able to make use of the tools which have become so important for our organizational operations.

Part of this ability must include the management of information technologies themselves. The need for effective IT implementation has never been more important. The ability to work within this environment can spell the difference between an efficient and effective organization and one that continually falls behind or struggles in vain to keep up. No where is this more apparent than within our local governments. The problems of IT management and implementation are expanded in this environment due to a number of factors: costs and available resources, expertise levels and technical skills, the nature of technology, the nature of the environment, and, ultimately, the organizational culture.

¹⁰⁶ Thompson, M. and Wildavsky, A., (1986) "A Cultural Theory of Information Bias in Organizations", *Journal of Management Studies*, Vol. 23.; Tricker, R.I., (1988) "Information Resource Management: A Cross-Cultural Perspective", *Information and Management*, Vol. 15; and Kendall, K.E., Buffington, J.R., and Kendall, J.E., (1987) "The Relationship of Organizational Subcultures to DSS User Satisfaction", *Human Systems Management*, Vol. 7.

¹⁰⁷ Cooper, Randolph B. (1994) "The Inertial Impact of Culture on IT Implementation" *Information and Management*, Vol. 27.

Information technologies have become primary instruments of reform as they are used in public sector organizations today. However, the use of IT as such an instrument does not necessarily mean that such reform will always lead to positive changes. The implementation and use of IT has negative as well as positive impacts on local government service deliveries.

The potential outcomes of IT implementation are extremely diverse—as diverse as the delivery tasks themselves. The effectiveness of the outcomes depends to a large degree on the nature of the task and its level of complexity. In the end, appropriate and effective outcomes are highly dependent on the implementation of ITs and the context within which they are implemented. Viewed in this light, the need for effective implementation of ITs has never been more important. This literature review has made it possible to pinpoint many of the viable issues in this area, as well as making some of the problem areas more clear by giving them definition and a historical foundation from which to extrapolate. In addition, this review provides a framework for discussion and identification of where these issues come from, and what their origins are.

“There is nothing so practical as a good theory”

-- **Kurt Lewin (1946)**

Introduction

This chapter will provide an overview of the strategy which was used to conduct the research and derive the data necessary to answer the research questions that were outlined previously in chapter one. The three main research questions for this study are as follows:

- What are the most problematic issues facing local government executives with regard to IT planning?
- What are the most problematic issues facing local government executives with regard to IT procurement?
- What are the most problematic issues facing local government executives with regard to IT implementation?

The primary objective of this study was to identify and categorize the perceptions of SMLG executives regarding which issues were most problematic to the information technology implementation process. This study should assist in the future development of an IT implementation model for local government administrators as well as provide an essential framework for the future study of IT planning, procurement, and implementation effectiveness.

The IT implementation process was broken down into a simple system model for the purposes of this particular study. The implementation process is viewed as a combination of three integral parts, each of which involves a separate set of internal factors and processes. Each part is necessary for the success of the following one yet each encapsulates it's own important process. Figure 3.1 shows a simple example of the implementation process as envisioned for this study. As seen in this representation, IT planning has a direct impact on the procurement process, and vice-versa—IT procurement

and acquisition capabilities are directly related to planning efforts. Procurement impacts implementation which has a direct impact on both the procurement and planning efforts.

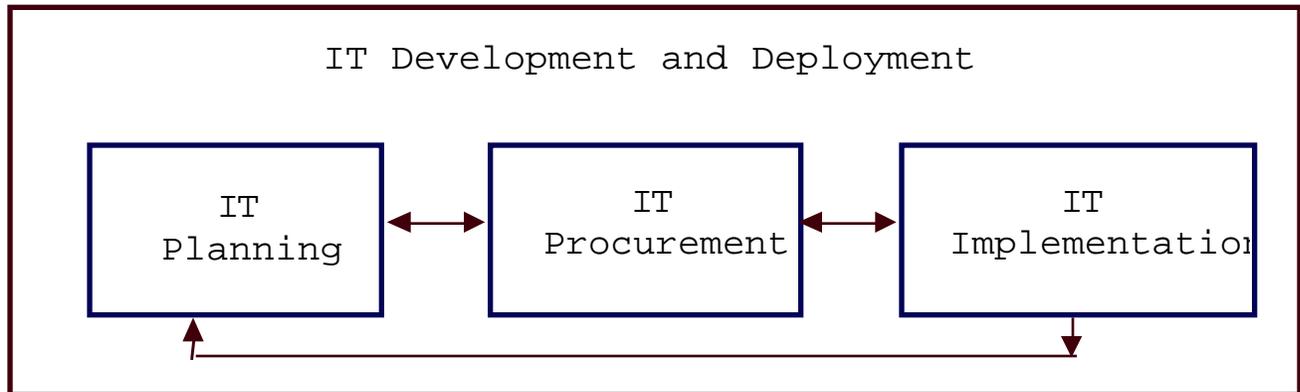


Figure 3.1 Simple IT Implementation Process

This study addresses a fundamental problem of IT implementation. Primarily the numerous and varied issues which exist across the multiple levels of the implementation process. Such multiplicity makes the entire process problematic. Due to the nature of the implementation process, each set of issues must be viewed in layers corresponding to the distinct stages in the overall process. IT planning issues are different from IT procurement issues and yet each individual factor is inherently important to the whole process and must be viewed ultimately in that context. This study breaks down each stage of the process into a separate part to better identify the issues which are specific to that stage. Until each distinct piece of the process is viewed as a separate unit, it is impossible to understand where the whole process might conceivably break down and which particular issue or set of issues might be to blame.

In the implementation process described in this study, planning is listed as the first stage. This is based on standard MIS process models.¹⁰⁸ The planning process provides a

¹⁰⁸ Davis, Gordon B., Olson, Margrethe H. (1985) Management Information Systems: Conceptual Foundations, Structure and Development. (2nd Edition) New York, NY: McGraw-Hill. And Ginzberg, M.J., (1974) "A Detailed Look at Implementation Research". Report CISR-4, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.

basic stepping stone from which the rest of the process continues. From the planning stage the process moves on to procurement or acquisition processes. This is the first part of the process where the ideas laid out in the planning stage begin to take shape. Once all of the necessary facets of the IT plan have been acquired, the plan can be formalized and implemented. Each stage is intimately related to the others—failure to plan adequately impacts both procurement and implementation. Conversely, a breakdown in implementation may inform future planning efforts or require review and revision of the original plan. Without the procurement portion of the process, implementation would be impossible. The acquisition of the proper technologies and budgeting for future acquisitions are integral to effective implementation of IT. Each stage of the implementation process demands careful consideration and foresight as they are all symbiotically related.

Basic Approach to the Research

At its most fundamental level this is a cross-sectional study designed to collect descriptive data on the issues surrounding IT implementation. This study represents the perceptions of SMLG administrators in the State of Virginia and provides a “snapshot” of their issues as they exist in the municipalities current environment. The perceptions detailed here are very important because in the volatile area of IT all involved individuals and organizations are trying to make proactive headway. Public and private sector organizations across the country are involved in improving or changing their IT implementation strategies. This study uses the perceptions of a distinct group of respondents who are part of a limited geographic area to identify and flesh out a series of issues. A cross sectional study was determined to be especially useful since the purpose was to gather pertinent information on individual attitudes and explore areas for further research. The data produced in this study is essentially a screening for variables, which may prove to be worthy of further study.

This study was conducted in three stages and involved an in-depth analysis and review of the issues which exist for local government administrators with regard to the IT implementation process in their organizations. In stage one—a literature review was conducted to identify the prevalent issues surrounding the development of information technology since the early days of computerization and automation. These issues were extremely important in that they provide a foundation for current issues. The initial research conducted in the first stage of the study also included the identification and observation of current trends relating to IT implementation. Specific attention was placed on the public sector and IT applications in local government organizations. The information garnered from this portion of stage one is reflected in the literature review, description of the issues, and the issues database.

Possibly the most crucial portion of stage one involved the creation of an IT issues database which was originally designed to accommodate the information derived from a series of interviews conducted with government executives from Federal, state, and local government agencies. Another large portion of the data derived for this database was made up of pertinent literature on information technologies and the review and analysis of IT discussion forums on the World Wide Web. The issues derived from this portion of the study were categorized in the database for ease of use and updated throughout the process of the study. This stage also provided the necessary background information to develop a basic set of definitions and concepts which were then reviewed and updated based primarily on responses from the initial interviews with respondents (See table 3.1 below for description of the stages).

The second stage consisted of interviews with eight local government administrators and a number of IT professionals to aid in developing shared meanings and terminology, as well as to determine additional concepts, factors, and ideas for the research. In this stage information was also derived from selected SMLG IT professionals and administrators about general IT needs and implementation plans. The information

garnered was used to enhance the database created in stage one as well as to serve as a framework for the design of the descriptive survey in stage three.

From the information derived in stages one and two a comprehensive survey was developed which was then sent to the target survey group: SMLG executives in the state of Virginia. Table 3.1 provides a representation of the stages used in this study.

Table 3.1 Methodology Stages

Stage 1	Stage 2	Stage 3
<ul style="list-style-type: none"> • Design “Issues Database”. • Design initial categorization of IT issues for database. • Identify as many of the problems and factors which affect IT planning and implementation as possible from the literature, general interviews, observation, and content analysis of world wide web discussions (and other sources as applicable). 	<ul style="list-style-type: none"> • Define terms and design initial interviews. • Interview SMLG administrators and IT professionals to determine shared meanings, definitions, measures, and variables. • Reevaluation of database categorizations, definitions, and issues based on interviews. 	<ul style="list-style-type: none"> • Develop a comprehensive survey to be sent to all SMLG administrators and IT professionals in Virginia. • Identify crucial variables (issues) which impact SMLG IT implementation. • Second reevaluation of database categorizations, definitions, and issues based on survey information. • Collect, analyze, and create reports from the data gathered in the survey and interview process.

Research Methodology

The overall research design for this study was descriptive in that it made use of interviews and surveys to solicit “expert” and practitioner opinion. The survey research sought to identify the most problematic issues with regard to the implementation of information technology in small and medium sized local governments. After some common issues, descriptions, and definitions were identified, a survey instrument was

developed to help describe the most problematic of these issues for local government administrators in the Commonwealth of Virginia.

Stage One

The first stage of this study consisted mainly of the design of an “issues database”. This database serves, throughout the course of the research, not only as an evaluation tool by which to categorize the issues discussed specifically in this study, but also as a continuous working foundation for more extensive research on a broader range of IT issues. The issues database was created in FileMaker Pro™ due to the program’s ease of use, convertibility to a variety of platforms, and data exportability.

The initial categorizations for the issues were derived primarily from a review of the literature pertaining to a number of areas crucial to information technology management, including but not limited to the following: general management theory, management of information systems, information systems theory, strategic planning, and systems design. A representative look at this literature can be found in chapter two of this study. The original categorization system was made up of seven issue areas based on interview responses and the initial literature review, these were: ethics and legal issues (those issues related to ethical conduct, professional responsibility, and legal mandates/rules); architecture--hardware (hardware specific issues like compatibility, standards, and platforms); architecture--software (software specific issues like program standardization, data export, year 2000); government records (those issues related to federal, state, and local records requirements); management issues (issues relating to management styles, contracting, budgets, and strategic planning); personnel issues (those issues pertaining to staffing, training, internal organizational politics, modernization, and expertise or skill

levels); and value issues (those relating to internal and external value systems, competition and effectiveness).¹⁰⁹

In its original format the database identified approximately 240 issues as being key to information technology implementation and management in an organization. Each of these was reviewed, categorized, and defined to fit appropriately into the database. Over the course of this study the database was adjusted with new, more appropriate categorizations based on subsequent findings. In addition, duplicate records (and any information not related to IT implementation) were removed to make future content analysis less cumbersome. The information accumulated in the issues database will be further discussed in chapter four.

Stage Two

The second stage of this project provided a key bridge between the initial gathering of general information with regard to information technology management and the final description of the most problematic and fundamental issues to the specific process of IT implementation. Stage two involved the design and conduct of a general interview. Much of the design for this interview was garnered from the review of the literature, preliminary interviews with interested professionals/practitioners, and issue identifications from stage one. The interviews conducted for the study were, by design, structured and the questions were open-ended. The interviews were addressed to a small, select group of 8 local government administrators who were contacted not just because of their geographical location in the State of Virginia, but also due to the size of their municipality, and its particular nature (e.g. rural or urban).

¹⁰⁹ A portion of the initial design and issue research which made up the foundation of this database was conducted by students in Dr. John Dickey's "Government Administration II Class" Summer Session 1996 at Virginia Tech Universities Center for Public Administration and Policy. Students conducted interviews with federal, state, and local administrators with regard to general information technology issues as well as reviewing some of the more prominent information systems literature.

These interviews were used to determine a common ground and basis for communication of terminologies. For example: is the understanding of what IT implementation means the same for Virginia SMLG administrators as it is for the study's researcher?; or, are the definitions of ITs and information systems similar and translatable regardless of the municipality or its executive? This set of interviews was to be informal and conducted in person or via telephone or e-mail. Each respondent's answers were entered into a database for content analysis and review.

Interview Questions**Interview**

1. I am defining “information technology” as any equipment, services, applications, and basic technologies related to information access, dissemination, collection, and storage. ITs are commonly grouped as computers, multimedia, and telecommunications. Would you agree with this definition, would you add to it or redefine it in any way?
2. What do you perceive as the “role” of information technology in your organization?
3. I am defining “IT implementation” as a process (via a definite plan or procedure) employed in getting a new or significantly changed system in use for those for whom it was intended. Would you agree with this definition, would you add to it or redefine it in any way?
4. I am breaking down the IT implementation process into 3 parts: IT planning, IT procurement, and IT implementation. Would you agree with this categorization, would you add to it or redefine it in any way?
5. I am dividing information technology implementation planning into two opposite categories: (1) coordinated and comprehensive—which refers to a plan that includes more than two departments in an organization, involves most of the functions of local government, and is written down and agreed upon by planning participants, (2) insular—which is any IT implementation plan made by a single department or individual within a department written or otherwise. Would you agree with these definitions? Would you redefine them in any way?
6. Have you developed a comprehensive plan to develop and implement ITs?
7. Do you have a comprehensive plan with regard to IT in your capital improvements program or plan?
8. What are some of the written procedures and guidelines that you have to follow when implementing ITs in your organization?
9. Do you see your organization as using more (1) coordinated and comprehensive or (2) insular planning methods with regard to IT implementation?
10. Do you perceive your planning approach as being sufficient and effective with regard to IT implementation? If not, what additions do you think would enhance your planning process?
11. Have you done a comprehensive study of your IT needs and desires with the ultimate intention being the development of a plan specific to IT implementation?
12. I am defining IT implementation deficiencies (failure issue) as any instances where problematic situations arise—anything from ineffectiveness and inefficiency to complete and catastrophic systems failure. What kinds of instances or situations would make you consider a particular IT implementation not completely successful or deficient?
13. What is the most recent instance of IT planning and implementation you have undertaken?

14. I am defining a formal IT implementation model as well defined guidelines which provide for continuous, comprehensive, and coordinated planning and implementation with regard to IT. The model should be duplicable and provide specific directives (similar to a handbook). Would you agree with this definition or would you change it in any way?
15. Does your organization make use of any model (formal or otherwise) when planning or implementing ITs? What made you choose this particular model?
16. Were there any particular examples that you followed when planning for or implementing ITs? What were the sources of the models of planning and/or implementation that you used?
17. How did you decide on your implementation process?
18. Does your organization make use of any consultants or consulting firms to aid in your IT planning and implementation? What kinds of consultants are you using, are they from private sector firms? What made you choose a particular consultant?
19. Did you look to any other governments or public organizations for examples of IT implementation and planning? Did you use examples from the private sector?
20. What are some of the biggest problems you face when planning for IT implementation?
21. What are some of the biggest problems you face with actual implementation of ITs?
22. What things do you see as setting you apart from other small and medium sized local governments and other organizations in general, with regard to ITs and IT implementation?

Stage Three

The third and final stage of this study consisted of the development and conduct of a survey instrument. The survey was designed to be more specific and detailed than the interview conducted in stage two. The responses and issue information garnered from both of the first two stages were used in the production of this survey. This instrument was designed to provide a descriptive view of the perceptions of local government administrators with regard to information technology implementation in their municipality--specifically the problematic nature of certain issues in each of the three pre-defined stages of the IT implementation process. The content validity of the questions used for this survey was initially established by ensuring that the definitions and concepts addressed were grounded in fact or established theory as well as verifying through the stage two interviews that there was a common understanding among this particular respondent group.

The survey was broken into two parts--general descriptive information, and process specific issue information. In the first part of the survey respondents were asked to identify the kinds of ITs of which their municipality makes use. In addition they were to respond to general questions about IT expertise levels and their IT implementation process. In the second part of the survey each respondent was asked to rank how problematic an issue was with regard to its place in the IT implementation process.

The survey was mailed to each respondent, with a memo addressed specifically in the individuals name, each respondent was asked to return the completed survey in a self-addressed, stamped envelope. After two weeks a postcard reminder to encourage participation was sent to the respondents who had not returned their survey. Finally, after one month, a phone call (or email when available) was made to the remaining respondents.

Information Technology (IT) Planning and Implementation Survey

What is the name of the City/Town/County from which you are responding?

What kinds of information technologies does your organization make use of? (please check all that apply, and feel free to add any additional ITs not listed.)

- | | | |
|--|--|---|
| <input type="checkbox"/> Micro-Computers | <input type="checkbox"/> GIS and/or GPS | <input type="checkbox"/> Internet and Email |
| <input type="checkbox"/> LANs and/or WANs | <input type="checkbox"/> Cellular Technologies | <input type="checkbox"/> Scanners, OCR |
| <input type="checkbox"/> Distributed Systems | <input type="checkbox"/> Intranet | <input type="checkbox"/> Expert Systems |
| <input type="checkbox"/> Decision Support Sys. | <input type="checkbox"/> Mainframes | <input type="checkbox"/> CDR |
| <input type="checkbox"/> Other_____ | <input type="checkbox"/> Other_____ | <input type="checkbox"/> Other_____ |

Does your organization have an in-house MIS, IT or Data Processing Department?

(Please Circle) **Yes No**

How would you rate your own personal expertise with regard to information technology?

(0 being not at all expert, 10 being extremely IT proficient) _____

What do you perceive as the “role” of information technology in your organization?

Please list the 3 issues which you feel are the most important with regard to IT planning and implementation.

(1)_____, (2)_____, (3)_____

Does your organization currently have a strategic planning process in place for the future use of, acquisition of, and implementation of IT? **Yes No**

If Yes to question #7, is your planning process formal or informal? *(Please circle)*

Formal Informal

Did your organization make use of any existing IT planning and implementation model(s) (formal or otherwise)? **Yes No** (If YES, please specify the model)

Did your organization make use of any outside consultants with regard to IT planning and implementation? **Yes No**

Does your organization have an IT planning and/or implementation committee?

Yes No

Who makes final purchasing decisions in your organization with regard to IT?

(Title of individual or committee) _____

Has your organization performed a needs analysis/goal setting process with regard to IT planning and implementation? **Yes No**

Has your organization developed a specific procurement process for IT? **Yes No**

Considering your answers to the above questions, would you say that your overall planning approach for IT is effective? **Yes No**

Please rate your organization's IT planning effectiveness, (0 being ineffective, 10 extremely effective) . _____

Please rate the effectiveness of your organization's implementation of ITs, (0 being ineffective, 10 extremely effective) . _____

How would you improve your organization's existing planning approach?

For the following three sections please rate on a scale of 0-10, how problematic the issues listed are with regard to the three processes. (0 being not at all problematic, 10 being extremely problematic) **Please feel free to add and rate additional issues for each process.**

(1) Achieving a formal IT planning process.

- | | |
|--------------------------------------|-----------------------------------|
| Interdepartmental Coordination _____ | Timeframes and Scheduling _____ |
| Lack of a Strategic/Formal plan_____ | Politics, Internal/External _____ |
| Organizational Directives _____ | Individual Support _____ |
| Organizational IT Expertise _____ | Existing Systems _____ |
| Individual IT Expertise _____ | Organizational Culture _____ |
| Written Procedures/Guidelines_____ | Standardization Issues _____ |
| Fiscal/Budgeting Issues _____ | Rapidly Changing Technology_____ |
| Lack of a Planning Model _____ | Personnel Issues _____ |
| Internal Leadership _____ | Organizational Support _____ |
| Contracts _____ | |
| Other: _____ | Other: _____ |

(2) Achieving a separate and specific procurement process for IT.

- | | |
|--------------------------------------|-----------------------------------|
| Lack of a Strategic/Formal plan_____ | Politics, Internal/External _____ |
| Organizational Directives _____ | Individual Support _____ |
| Fiscal/Budgeting Issues _____ | Organizational Culture _____ |
| Written Procedures/Guidelines_____ | Organizational Support _____ |
| Other: _____ | Other: _____ |

(3) Implementation of ITs (once they have been planned for and funded).

Interdepartmental Coordination _____	Timeframes and Scheduling _____
Lack of a Strategic/Formal plan_____	Politics, Internal/External _____
Organizational Directives _____	Individual Support/Agendas _____
Organizational IT expertise _____	Existing Systems _____
Individual IT Expertise _____	Organizational Culture _____
Compatibility Issues _____	Standardization Issues _____
Fiscal/Budgeting Issues _____	Organizational Support _____
Rapidly Changing Technology_____	Personnel Issues _____
Training _____	Internal Leadership _____
External Consultants _____	Adequate Staffing _____
Resistance to Change _____	
Other: _____	Other: _____

Please add any additional comments, explanations, or issues below. Feel free to attach supplemental pages. Please contact Suzanne Beaumaster at (540) 953-1756 or Email: beaumast@vt.edu, to ask questions or discuss topics related to this survey/study.

Sample and Population

The general population set to be used in this research was made up of small to medium sized local governments in the state of Virginia.¹¹⁰ The state of Virginia is made up of 186 towns, 46 cities, and 95 counties. The sampling frame for the survey was comprised of the SMLG administrator from all Virginia counties, cities, and towns whose municipality consisted of at least five distinct departments each with a population of not more than 250,000. Virginia municipalities who met these criteria were determined through a careful review of the Census bureau's population data and the municipality breakdown provided in the 1996-1997 Commonwealth of Virginia, Municipalities Handbook.¹¹¹ Questionable participants were contacted directly to determine their viability for the study. The stipulation of number of departments was deemed necessary to ensure that the municipality in question would have enough IT usage to make their responses viable. In general this necessitated a population of at least 10,000—however there were some exceptions. Towns or cities whose population was less than 10,000, or who had less than 5 separate departments were represented by the appropriate county official. The final number of those to be surveyed who met the specific criteria was a combined total of 132 county, city, and town administrators. Appendix One provides a complete listing of the participants surveyed in this study.

The sampling frame for the initial interviews consisted of 8 administrators from towns, cities, and counties of varying sizes and geographical areas. (i.e. the town of Blacksburg, pop. 35,231, small, western Virginia; the town of Christiansburg, pop. 17,532, small, western Virginia; the city of Roanoke, pop. 96,643, medium, western Virginia; the city of Richmond, pop. 201,108, medium, eastern Virginia)

Statistical Analysis

¹¹⁰ The information used to derive the population and sample sets is from the 1990 Census and subsequent revised census data provided by the Weldon Cooper Center for Public Service at University of Virginia, December 23, 1996.

¹¹¹ Appendix 1 provides a listing of the participants chosen for this study.

The sample size employed in this study and its generally non-random characteristics necessitate the use of descriptive rather than inferential analysis techniques. In addition, the ordinal-level data collected by this study also dictates the use of descriptive analysis. The objective of this kind of analysis: to describe—in a systematic manner—the details and characteristics of a given population factually and accurately is clearly laid out by Isaac and Michaels, in their handbook on research and evaluation. In this handbook the authors state that the purpose of any descriptive research, or survey study is:

- To collect detailed factual information that describes existing phenomena.
- To identify problems or justify current conditions and practices.
- To make comparisons and evaluations.
- To determine what others are doing with similar problems or situations and benefit from their experience in making future plans and decisions.¹¹²

This study makes use of all of these purposes to some degree, however items 1 and 2 best describe the primary motivations of this research.

For the coding of data, reduction and analysis, both Filemaker Pro and SAS were utilized. The main statistical technique employed involved frequency analysis. Interview and database data were analyzed using content analysis. Survey form data was first analyzed for measures of frequency in order to reveal how the issues could be clustered and what was typical about them. This process occurred around both the individual parts of the implementation process as well as the series of all three stages. In addition the analysis also centered on perceptions of the planning and implementation process as viewed by the respondents.

Limitations and Assumptions

One of the inherent limitations in survey research is the subjectivity of each respondent. No matter how carefully written or completely tested, each survey is

¹¹² Isaac, Stephen, and Michael, William B. (1981) Handbook in Research and Evaluation. 2nd ed. San Diego, CA: Edits Publishers. p. 46.

vulnerable to differing interpretations of the questions. Because of the descriptive purpose of this survey and because the main focus of this research was not to statistically prove relationships between issues but to determine the most problematic ones, this particular limitation is recognized and accepted in this study. In addition, it is possible that some responses were the result of defensiveness, apathy, or ignorance of a particular respondent. Another limitation may be derived from distortion of the perceptions of individuals about information technologies and their relationship to the given municipality. In this particular study it was impossible to assess the influences of organizational environments, the personalities of the administrators, and any external factors.

In addition, the utility of the process of IT implementation does not lend itself to specific or accurate measures of effectiveness. Individuals and their closeness or buy-in to the process may bias the responses with regard to the perceptions of effectiveness in terms of IT implementation in a given municipality. The stage two interviews consisted mainly of open-ended questions, which in one sense offers valuable insight into why individuals believe the things they do, but the interpretation of those beliefs is at best problematic.

This survey is very small and there is a lack of validation of survey responses from a broader sampling across the municipality. In any event, this study is diverse enough to derive some significant conclusions with regard to IT implementation issues at the SMLG level. However, this will not permit the generalization of outcomes to larger municipalities within the Commonwealth of Virginia. Generalizations extended to SMLG's across the country would also be suspect at best and this question would best be left to future research in IT implementation. The survey instruments themselves suffer from measurement and sampling problems which may include: criteria, content, construct validity, and reliability of the instruments themselves. Although there is some data to show that a causal relationship exists between some of the variables, with a study of this size and nature it is impossible to show full elimination of any rival independent variables.

Introduction

This chapter will present the results of the data collected from the SMLG administrators who responded to the questions surrounding the problematic issues of the IT development and deployment process. This analysis is organized around the descriptive research questions posed in the first chapter and advanced methodologically in chapter three. Analysis of data is provided for each part of this study, which included:

- A database of issues relating to IT implementation in public organizations
- General IT related information with regard to respondent SMLG's
- Issues specific to IT planning
- Issues specific to IT procurement
- Issues specific to IT implementation

This chapter will begin with a general discussion of how the issues were categorized in order to facilitate analysis and enhance the understanding of the context of the issues database. Included will be an account of the data collection effort and an indication of the response rates for the survey. Following will be a discussion of the data collected from the actual surveys. This chapter should provide a bridge for the reader to chapter 5, which offers the conclusions and recommendations of this study.

Issues Categorization

As discussed in chapter one, the initial categorization (prior to any in-depth research) of the issues was very broad. All of the issues were viewed within one of two contexts—either management or organizational processes. It became apparent, as the literature review and initial interviews progressed, that the originally conceived issue categorizations were insufficient. A more expansive picture of the spectrum of

organizational influences based on the issues was obviously necessary. A preliminary version of the issues database (to be discussed further in the following section) provided a secondary group of categorizations which more fully portrayed the arenas of effect for each IT implementation issue. This particular category grouping added the areas of architecture, federal requirements, specific personnel issues, and value added issues. After careful review, a final set of categories was designed which—when combined with the issues themselves as a sub-category—provides a more complete and usable system by which to organize the multitude of issues relating to the IT development and deployment process. The final categorizations for use with this study are the issues pertaining to: Leadership, Management Process, Organizational Environment, Technical Systems, and Personnel.

Leadership issues reflect those areas that require the interaction, commitment and direction of the organization's chief executive, such as interdepartmental coordination and administrative support. This issue area reflects the premise that organizational change occurs from the executive level down, necessitating the involvement of top management in the IT development and deployment process. In a similar vein, those issues characterized in the management process area relate specifically to administrators and their role in the functional operations of organizations, as in budgeting, personnel management, and general management: In essence, any issues which require specific attention or directives from an administrator.

The issues characterized as organizational environment are broader, addressing factors, which are less tangible and more difficult to define, such as organizational culture, change, and behavior. These are essentially issues, which affect—or may be affected by—environmental factors, both external and internal.

Technical systems issues are primarily those related to the impact information technologies have on organizations and individuals—based on their specific nature. These issues include hardware and software considerations as well as the compatibility and life cycles of various information technologies. Finally, personnel issues are those factors

surrounding each individual in the organization, such as individual expertise levels, staffing levels, and resistance to change. These issues are significantly impacted by the human conditions related to interactions, personal feelings, and perceptions.

In addition to the breakdown of issues into the types just discussed (this initial breakdown is represented in chapter 1, table 1.1), they were also separated by their role in the IT development and deployment process—that is, whether they were present during planning, procurement, or actual implementation. Many of the issues impacted two or even all three of these areas. Figure 4.1 shows a simple model of the integrated nature of these issues on the IT development and deployment process. Essentially, this model adds to the simple process shown in figure 3.1 and adds the surrounding issue areas to the environment in which the process takes place.

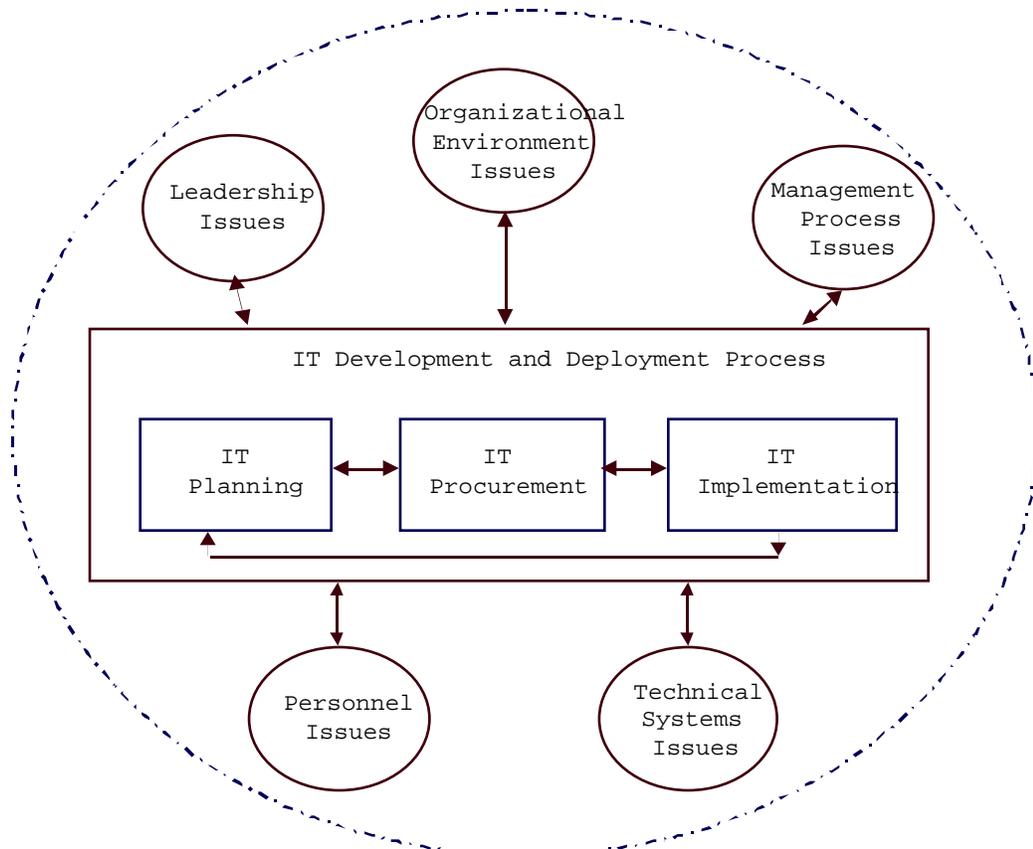


Figure 4.1 *IT Development and Deployment Process and Issue Categorizations*

To better represent this influence across the entire process, a third categorization was developed—referred to in this study as “dynamic nature.” In essence, issues which arose in all three process areas were labeled “dynamic.” Those impacting two of the three process areas were labeled “potential dynamic” and those found in only one area have been called “specific.” Table 4.1 provides a representation of the complete view of the categorization of issues which are part of the IT development and deployment process. As discussed previously, most of the issues have an impact on more than one of the process areas. One of the more interesting findings shown in this table can be seen among the management process issues. This particular issue type has the broadest spectrum of issues impacting more than one process area. The greater portion of which is “dynamic”—affecting all three areas in question.

Table 4.1 IT Development and Deployment Process Issues

Issue Type	IT Planning	IT Procurement	IT Implementation
Leadership Issues			
	Interdepartmental Coordination		Interdepartmental Coordination
	Individual Support	Individual Support	Individual Support
	Organizational Support	Organizational Support	Organizational Support
	Timeframes and Scheduling		Timeframes and Scheduling
Management			
Process Issues	No Strategic/Formal plan	No Strategic/Formal plan	No Strategic/Formal plan
	Fiscal/Budgeting Issues	Fiscal/Budgeting Issues	Fiscal/Budgeting Issues
	Lack of a Planning Model		
	Organizational Directives	Organizational Directives	Organizational Directives
	Written Procedures/Guidelines	Written Procedures/Guidelines	
Organizational			
Environment	Organizational Culture	Organizational Culture	Organizational Culture
Issues	Politics, Internal/External	Politics, Internal/External	Politics, Internal/External
	Rapidly Changing Technology		Rapidly Changing Technology
	Contracts		
			External Consultants
Technical			
Systems Issues	Existing Systems		Existing Systems
	Standardization Issues		Standardization Issues
			Compatibility Issues
Personnel Issues			
	Organizational IT Expertise		Organizational IT Expertise
	Individual IT Expertise		Individual IT Expertise
	Internal Leadership		Internal Leadership
	Personnel Issues		Personnel Issues
			Adequate Staffing
			Resistance to Change
			Training
Key: Dynamic Issues Potential Dynamic Specific			

The IT Issues Database

As discussed in chapter three, stage one of this study involved the creation of an IT issues database, which can be found in appendix three. This database was crafted over the course of a year and a half, the base of its design drew upon a series of interviews which consisted of government executives from Federal, State, and Local agencies, available literature, and an extensive analysis of discussions on the world wide web. The initial categorizations for the issues were derived from a review of the literature pertaining to a number of areas crucial to information technology management, including but not limited to

the following: general management theory, management of information systems, information systems theory, strategic planning, and systems design. The original categorization system was structured around seven issue areas based on interview responses and the initial literature review, ethics and legal issues, architecture—hardware, architecture—software, government records, management issues, personnel issues, and value issues. For the purposes of this study, the database was modified and expanded to make the information contained more understandable and useable as a future resource for IT issues study.

Contributors to the database were asked to give a general categorization to the issue and then to describe it more completely. The responses ranged from very specific, technical issues to broader and less well defined ones like “organizational culture.” Response to this database was very good and over 240 issues were entered into the original database. For the purpose of this study a content analysis of the database was performed, duplicate entries were removed, and non-IT related issues were deleted. The database currently stands at over 170 separate IT related issues.¹¹³

One of the most important findings from the analysis of the data contained in this database was the formulation of a breakdown of IT issue types. These were then used as a primary categorization tool.¹¹⁴ Sub-categories were derived from the separate IT development and deployment process issues used in this study. (See table 4.1 above for category and issue breakdowns.) The complete database can be found in Appendix 3.

Survey Respondents

As indicated in chapter 3, 132 SMLG executives were surveyed for their response to a series of IT planning and implementation questions. Of those polled 35 were city

¹¹³ The IT issues database was designed to be an ongoing project and as such is available for updates on-line and on disk. As such the actual number of issues and their content may vary from the description provided here.

¹¹⁴ The IT issue types derived from this study came from a combination of content analysis of the Issues Database, the literature review, and the open ended interviews conducted in stage two of the study.

managers, 81 were county administrators, and 16 were town managers. Out of the 132 surveyed 58 responded, a 44% return rate. The respondents were made up of a mix of city, town, and county managers and administrators, as shown in Table 4.2. Figure 4.1 provides a breakout of the percent representation of all of the respondents and their municipal affiliation.

Table 4.2 Respondent Breakdown

Respondent Type	Total Surveyed	Percent of Total Surveyed	Total Respondents	Percent of Total Surveyed	Percent of Total Respondents
Town Managers	16	12%	11	69%	19%
City Managers	35	27%	13	37%	22%
County Administrators	81	61%	34	42%	59%
	132	100%	58	44%	100%

As shown in table 4.2, this survey achieved a 44% return rate. This rate of response is not particularly high however, due to a number of significant factors, it is an acceptable return. As previously discussed in chapter 3, this survey was designed to determine individual perceptions of IT related issues. This type of inquiry requires quite a bit of thought on the part of those responding; significantly increasing the time and effort required to complete the questionnaire. In addition, the study targeted executives who typically have less time and inclination for surveys that may or may not impact their organization directly. Finally, a number of those surveyed may not have had the expertise level necessary to even address the questions being asked.

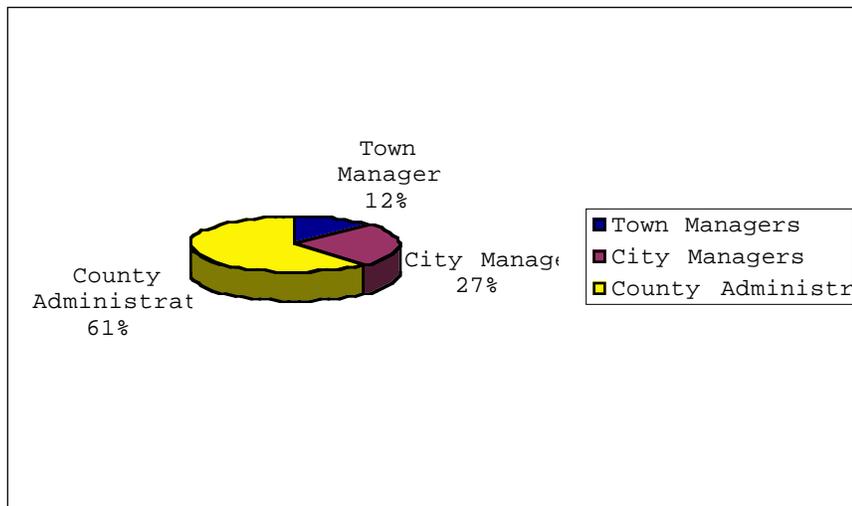


Figure 4.1 Percent of Total Respondents

Analysis of General IT Data

A number of the questions which the SMLG executives were asked for a response to were designed specifically to determine important background information about the information technologies available at the municipality and to ascertain some of the more important situations which might shed some light on the issues being discussed.

Organizational IT Usage and In-House MIS Department

The first of the background questions dealt with what kinds of information technologies each organization used (represented in table 4.3 and figure 4.2). This information is very useful in determining at what IT levels the organization is operating at. All of the respondents reported the use of microcomputers in their municipalities, 38 had some form of LAN or WAN, 10 made use of distributed systems, 3 had decision support systems, 38 used GIS or GPS technologies, 26 used some form of cellular technologies, 9 operated an intranet, 29 used mainframes or minicomputers, 43 made use of the internet or email, 35 had some scanner or OCR capability, only 5 had access to in-house CD recorders, and none of the respondents reported making use of any kind of expert systems.

Table 4.3 IT Usage Breakdown

IT	Respondents Using IT	Percent
Micro-Computers	58	100%
LANs and/or WANs	38	66%
Decision Support Systems	3	5%
Distributed Systems	10	17%
GIS and/or GPS	38	66%
Cellular Technologies	26	45%
Intranet	9	16%
Mainframes	29	50%
Internet and Email	43	74%
Scanners, OCR	35	60%
Expert Systems	0	0%
CDR	5	9%

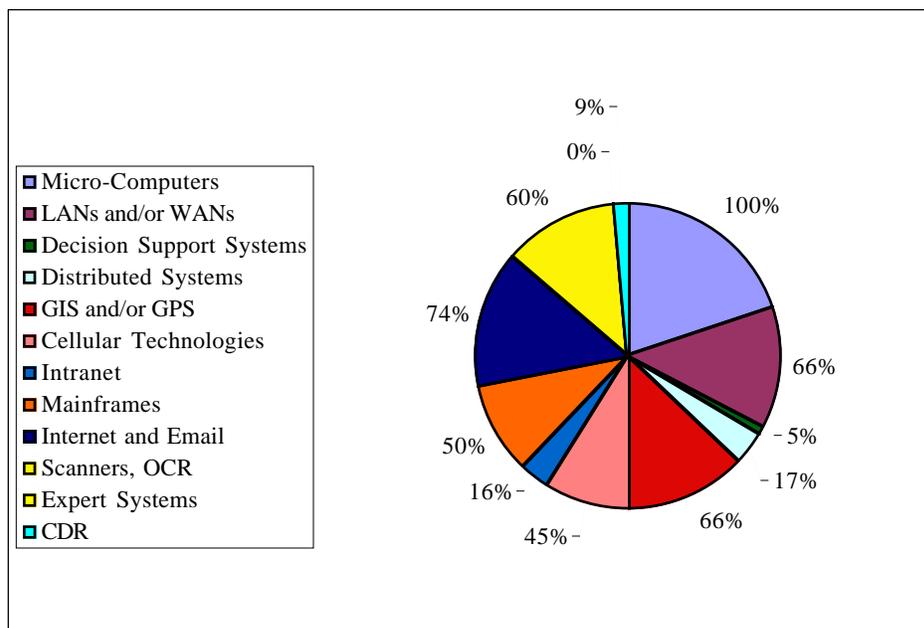


Figure 4.2 IT Usage Breakdown

While this is certainly not a complete listing of the possible IT's which could be used in any municipality, it does provide a comprehensive view of the kinds of standard IT's which are being used today in organizations of all sizes. In addition to providing general IT usage information, each respondent was asked whether or not their organization had an in-house MIS, IT, or data processing department. Only 27 of the 58 (47%) had a department

formalized around the management of information technologies. This data is not surprising considering that only 47 (35%) of the total respondent group of 58 listed any IT professionals on staff. The low numbers reflected here might be due, in part, to the size and scope of the municipalities surveyed for the study. In-house MIS departments are expensive from a variety of perspectives—not the least of which are simple staffing costs. Aside from the obvious expense are factors surrounding expertise levels and the technological needs base of the locality.

Executive IT Expertise

All respondents were asked to rate their own IT expertise level on a scale of 0-10: 0 being least proficient, 10 being extremely proficient. For ease of reference this data was then collapsed into three groups: novice (0-3), proficient (4-7), and experts (8-10).

Table 4.4 Executive IT Expertise Levels

Respondent Type	Number Responding	Percent of Total
Novice Users	15	26%
Proficient Users	28	48%
Expert Users	15	26%

Table 4.4 shows the breakdown of expertise levels. An equal number of the administrators labeled themselves as either novice or expert users with regard to information technology—15 respondents for each of these two categories, 26% each. A total of 28 of the respondents, or 48%, viewed themselves as more middle-of-the-road, proficient users. Typically, individuals who labeled themselves “proficient users” of ITs were primarily focusing on microcomputer skills. It is only within the last 5 years that middle to upper level managers have begun to use other information technologies to a degree where higher levels of proficiency and general competency are being achieved.¹¹⁵ It is interesting,

¹¹⁵ Hansen, Hans R. (1995) “Conceptual Framework and Guidelines for the Implementation of Mass Information Systems”, *Information & Management*, Vol. 28, pp. 125-142.

considering the preponderance of microcomputers in our society, that a relatively high number of executives consider themselves novice users.

Perceived Role of IT in Organization

Respondents were asked to describe what they perceived to be the “role” of information technology in their organization. Content analysis of the responses indicates that most of those administrators surveyed viewed information technology as a tool for the enhancement of organizational operations. The most common responses included statements which pointed to enhanced communication across the organization and its external environment as well as increased efficiency with regard to job/task performance. A large number of the responses also included the role of IT as a tool for information dissemination and sharing as well as for the provision of quick, efficient resources. Finally, IT was perceived by many respondents in the role of improving service delivery to constituents and as a decision making tool for administrators. Appendix 4 provides a complete listing of the responses to this particular survey question.

Top Four IT Planning and Implementation Issues

The core questions for this study delve into the problematic nature of many of the issues surrounding IT implementation. This particular survey question asked the respondents to list what they perceived to be the three most important issues with regard to the whole process of IT planning and implementation. A content analysis of the responses to this question showed 4 issues which garnered the most response: training issues with 38 related responses; interdepartmental coordination issues at 22 responses; standardization issues with 17 related responses; and budgeting and funding issues with 14 responses. Planning and hardware/software issues also elicited multiple responses but not with as much frequency. Table 4.5 shows a complete breakdown of the respondent answers to this question.

Table 4.5 Respondents Top Three Implementation Issues

Issue 1	Issue 2	Issue 3
Training	Hardware	Financing
Training	Planning	
Standards	Common Sense	Planning
Expandability, multiple use	Training	Standardization
Training	Coordination	Standards
Funding	Training	Leadership
Training	Programs	
Coordination	Standards	Upgradability
Needs	Training	Control Abuse
Training		
Integration	Communication	Training
Upgradability	Training	Standards
Cost	Training	Access
Finances	Training	Standards
Needs	Training	Costs
Connectivity	Coordination	Applications
Training	Coordination	Standards
Coordination	Timeliness of Implementation	Measurable outcome
Planning	Maintenance	Upgrading
Strategic Plan	Rapid Change	
Training	Coordination	Policies
Staffing	Project Management	Training
Financial resources	Training	Capable Consultants
Standards	Coordination	Training
Coordination	Asset Management	Customer Service
Training	Maintenance	Coordination
Training	Cost	Duplication of services
Priorities	Accessibility	Training
Individual Expertise	Training	Coordination
Cooperation	Funding	Outdated Systems
Training	Understanding	Standards
Training	Coordination	Upgradability
Coordination	Training	Leadership
User demands	Communication	Adequate resources
Training	Standards	Financial resources
Coordination	Standards	Accountability
Compatibility	Communication	Standards
Coordination	Planning	Training
Predicting IT futures	Systems installation	Training
Planning	Coordination	Standards
Cost of Purchase	Training	Networking
Coordination	Training	Hardware & Software
Training	Standards	Costs Control
Training	Support	Coordination
Basic Knowledge	Training	

System Design	System Upgrades	Coordination
Training	Updated Technology	Advancing
	Access	Technology
Defined Roles of	Reasonable expectations	Training
Authority		
Coordination	Training	Standards
Lack of Plan	Funding	Upgradability
Standards	IT Expertise	Training
Financial resources	Planning	Coordination
Coordination	Standards	
Financial resources		
Coordination		
Training		Upgradability
Planning	Financial resources	Standards

Strategic Planning for IT

Respondents were asked to address a set of questions with regard to their actual IT planning process. The first of these questions dealt with whether or not their organization made use of any kind of strategic planning process for the use, acquisition of, and implementation of information technologies. Sixty-Six percent (38) of the respondents stated that they used no strategic planning with regard to IT, while 20 of those surveyed, 34%, responded that they did make use of some sort of strategic plan. Table 4.6 shows a representation of this data. Those 20 respondents who answered yes to the usage of a strategic plan were then asked to respond to whether or not their IT planning process was formal or informal. Table 4.7 shows that only 5 or 25% of these made use of a formal process while the other 75% or 15 respondents used a more informal approach to planning for ITs.

Table 4.6 Strategic Planning for IT

Number Responding	Strategic Plan	Percentage
20	Yes	34%
38	No	66%

Table 4.7 Formal or Informal IT Planning

Number Responding	Plan Format	Percentage
5	Formal	25%
15	Informal	75%

In addition, respondents were asked whether or not they made use of any existing IT planning and implementation models—formal or otherwise. Only one administrator responded that an existing model was used for this purpose. 98% or 57 respondents made no use of any models with regard to IT planning or implementation. Table 4.8 shows a breakdown of this information.

Table 4.8 Use of Existing IT Planning Model

Number Responding	Model Use	Percentage
1	Yes	2%
57	No	98%

Strategic planning for IT is extremely problematic. As discussed in chapter 1, no model exists currently for SMLG's to follow as they undergo the IT development and deployment process. This leaves these municipalities adrift in a confusing and ever-changing environment. Any IT planning that takes place at this level, formal or informal, requires a huge outlay of energy and time—in essence reinventing the wheel. Currently, a best case scenario requires SMLG's to modify an IT implementation model which is designed specifically for much different organizations. In light of the previous data: expertise levels, planning, existing models—it would seem that the next best option would be the use of some kind of outside expert. Ideally, this would be an individual or organization who specializes in addressing the IT needs of SMLGs.

Respondents were asked whether or not their organization made use of any outside consultants to aid them during their IT planning and implementation process. This question produced an even split between the respondents—50% made use of outside consultants and 50% did not. The administrators were then asked whether or not their organization had an IT planning and implementation committee. Thirty-seven (64%) responded that they did

not have any such committee in place. Nineteen (33%) stated that they did have an IT planning and implementation committee, two administrators did not respond to the question. Table 4.9 provides a summary of this data.

Table 4.9 Existing IT Committee

Number Responding	Committee	Percentage
37	Yes	64%
19	No	33%
2	NR	3%

Finally, respondents were asked whether or not their organization had performed a needs analysis or engaged in any goal setting process with regard to IT planning and implementation. As Table 4.10 shows, only 18 of those responding (31%) had performed any kind of needs analysis while the other 69% (40 respondents) had made use of no such analysis.

Table 4.10 Needs Analysis and Goal Setting

Number Responding	Needs Analysis	Percentage
18	Yes	31%
40	No	69%

Until a well-designed and usable model for IT development and deployment is created, it is possible that proper use of outside consultants, IT committees, and IT needs analysis could enhance the effectiveness of the IT planning and implementation processes. These approaches may not take the place of formal planning procedures but they could enhance overall IT deployment effectiveness.

Effectiveness of IT Planning and Implementation

In the survey, SMLG administrators were asked to address three questions related to the effectiveness of their organization's IT planning and implementation process. The first of these questions asked respondents whether or not they perceived their overall IT planning approach as effective. As table 4.11 shows, 33 of the respondents (57%) found

their approach ineffective, 22 (38%) stated that their approach was effective, and three administrators did not respond.

Table 4.11 Effectiveness of IT Planning Approach

Number Responding	Committee	Percentage
22	Yes	38%
33	No	57%
3	NR	5%

The second and third questions related to process effectiveness and required all respondents to rate effectiveness on a scale of 0-10, 0 being least effective, 10 being highly effective. For ease of reference scaled data has been collapsed into three groups: ineffective (0-3), somewhat effective (4-6), and highly effective (7-10). Table 4.12 shows the results of administrator's perceptions of their organizations IT planning effectiveness: 24 (41%) of the respondents rated their planning process as ineffective, 19 (33%) were seen as somewhat effective, and only 15 (26%) of the respondents rated their process highly effective.

Table 4.12 IT Planning Effectiveness

Effectiveness	Number Responding	Percent of Total
Ineffective	24	41%
Somewhat Effective	19	33%
Highly Effective	15	26%

Table 4.13 provides a breakdown of the perceived effectiveness for respondent organization's IT implementation: 33% (19) view their implementation process as ineffective, 59% (34) see theirs as somewhat effective, and only 26% (15) rate their IT implementation as highly effective.

Table 4.13 IT Implementation Effectiveness

Effectiveness	Number Responding	Percent of Total
Ineffective	19	33%
Somewhat Effective	34	59%
Highly Effective	15	26%

As an additional source of information, respondents were also asked how they might improve their organizations existing IT planning approach—regardless of its perceived effectiveness. Not all of the administrators responded to this question; however, a content analysis was performed on the 37 responses that were received. The results of this content analysis are found in table 4.14 and a complete listing of all responses are found in Appendix 5.

Table 4.14 *How to Improve the IT Planning Process*

Improvement Approach	Response Frequency
Create an IT planning committee/group to facilitate and improve the process.	6
Perform an IT needs analysis across the organization.	8
Make use of external IT consultants and internal experts when available.	5
Facilitate better coordination across departments.	8
Creation of a MIS or IT department.	4
Make use of formalized strategic planning for IT.	18

In addition to the frequency distributions that were run on the background data two comparative bar charts were created to compare the perceptions of the administrators with regard to planning and effectiveness. Figure 4.3 shows perceptions of IT planning effectiveness with regard to the respondent's rating of their organization's overall implementation effectiveness. Figure 4.4 shows that those administrators who thought that their planning was effective (Plan Effective?) also rated their organization's implementation effectiveness (Rate Impl. Effect.) as high. Those who did not have a plan rated implementation much lower and two responders were unsure of their plan's effectiveness.

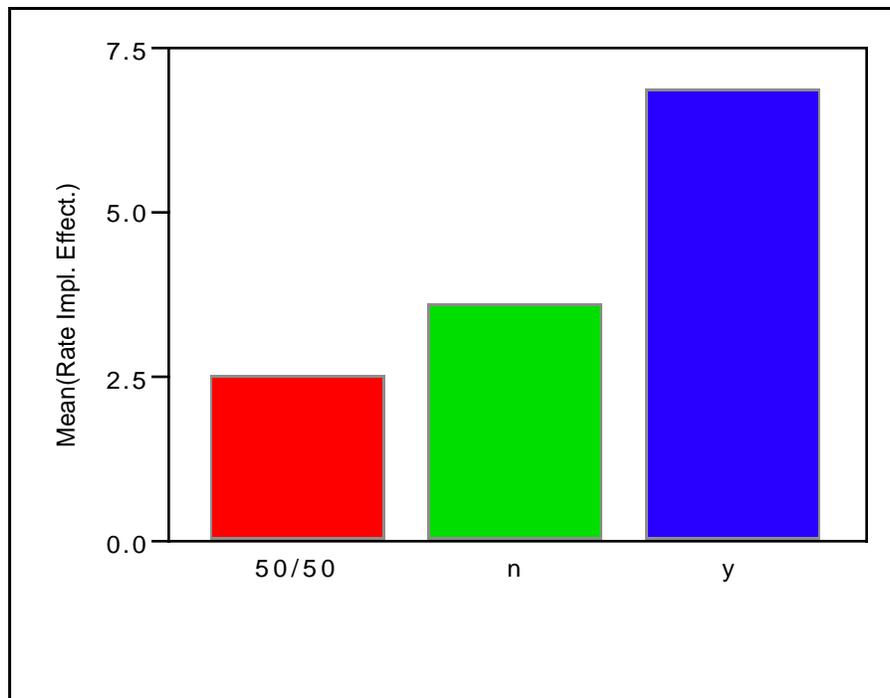


Figure 4.3 *Is Plan Effective?*

Figure 4.4 represents those respondents who had IT strategic plans (Have Strategic Plan) versus those who did not and their ratings of overall IT planning effectiveness (Rate Plan. Effect.). Not surprisingly, those administrators who had plans in effect with regard to IT rated their overall planning and implementation effectiveness as much higher than those who did not.

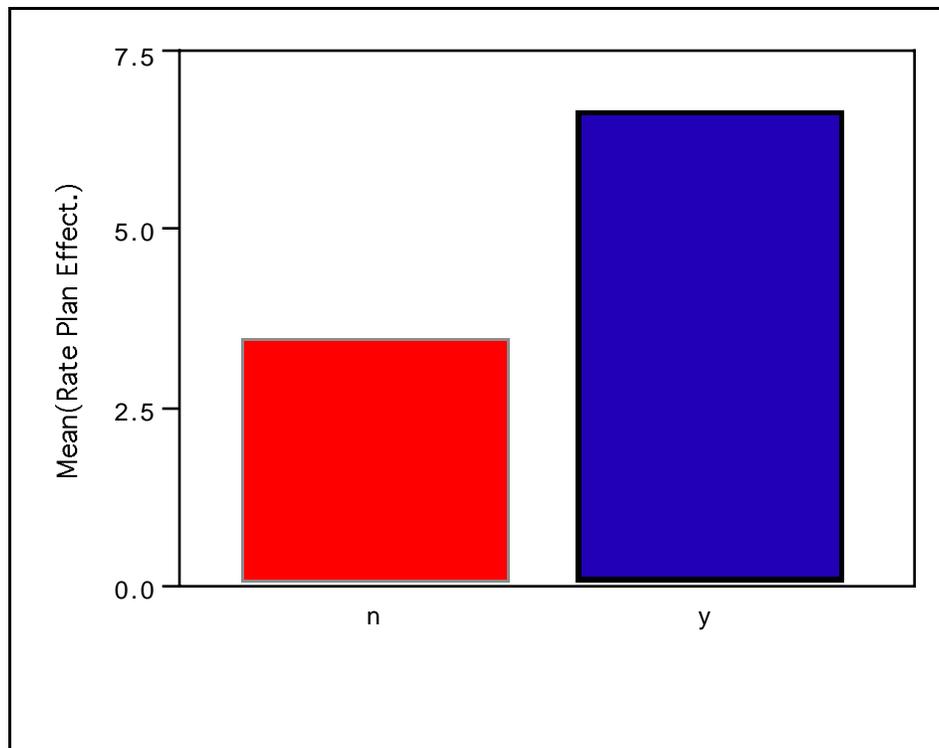


Figure 4.3 *Have Strategic Plan and Implementation Effectiveness*

From the previous data it would appear that strategic planning for IT is a problematic undertaking and not widely used. It does seem that those municipalities who did make use of some planning found their IT development and deployment more effective than those who did not.

Analysis of Primary Data

The three key research questions of this study focus on the determination of the most problematic issues with regard to IT planning, procurement, and implementation in SMLG's. Table(s) 4.15-4.17 provide a representation of the responses to these questions. For each of the three questions respondents were asked to rate each issue given on a scale of 0-10 with 0 being not at all problematic and 10 being extremely problematic. For ease of reference the scale responses have been collapsed into three categories where "Not Problematic" represents scales 0-3, "Somewhat Problematic" represents scales 4-6, and "Highly Problematic" represents scales 7-10.

Analysis of IT Planning Process Issues

Respondents were asked to rate 19 separate issues with regard to information technology planning. Of all of these, the issue of rapidly changing technology was perceived by the largest number of respondents (69%) as being highly problematic for planning. Five other issues in this category also received substantial response as being highly problematic; individual IT expertise, with a 55% response rate; lack of a strategic/formal plan and fiscal/budgeting issues, each with 53%; lack of a planning model, at 48%; and interdepartmental coordination, with 47%. All 19 of the issues were perceived as being at least somewhat problematic with the exception of contract issues—which 60% of the respondents viewed as not problematic with regard to IT planning. Table 4.15 provides a complete listing of all 19 planning issues and their response rates.

Table 4.15 Problematic Issues for IT Planning

Issue	Not Problematic (0-3)	Somewhat Problematic (4-6)	Highly Problematic (7-10)
Interdepartmental Coordination	17%	36%	47%
Individual Support	33%	52%	16%
Organizational Support	29%	47%	24%
Timeframes and Scheduling	21%	40%	40%
Lack of a Strategic/Formal Plan	29%	17%	53%
Fiscal/Budgeting Issues	14%	33%	53%
Lack of a Planning Model	33%	19%	48%
Organizational Directives	36%	41%	22%
Written Procedures/Guidelines	21%	45%	34%
Organizational Culture	29%	52%	19%
Politics, Internal/External	33%	33%	34%
Rapidly Changing Technology	7%	24%	69%
Contracts	60%	31%	9%
Existing Systems	26%	47%	28%
Standardization Issues	19%	47%	34%
Organizational IT Expertise	17%	50%	33%
Individual IT Expertise	14%	31%	55%
Internal Leadership	29%	48%	22%
Personnel Issues	24%	55%	21%

It is interesting to note that the most problematic issue with regard to IT planning is the rapidly changing nature of technology. An area which has only become worse over the last two years. It is probable that this issue exacerbates the problematic nature of the other top issues in this area: lack of a formal plan, budgeting issues, and individual expertise. As technology changes it becomes more and more difficult to keep up with the other issue areas. Creating a long-term plan which makes use of technologies which change as frequently as every six months may prove to be nearly impossible. The likelihood of an executive level government administrator keeping up with this technology is equally unlikely.

Analysis of IT Procurement Process Issues

In table 4.16, eight IT procurement issues are listed with their appropriate response rates. All of the issues with regard to this part of the implementation process were viewed as at least somewhat problematic, however the bulk of the administrators responding did not view any of the procurement issues as being highly problematic. The highest rating went to the issue of lack of a strategic/formal plan with 40% of the respondents placing it in the highly problematic range.

Table 4.16 Problematic Issues for IT Procurement

Issue	Not Problematic (0-3)	Somewhat Problematic (4-6)	Highly Problematic (7-10)
Individual Support	34%	45%	21%
Organizational Support	38%	43%	19%
Lack of a Strategic/Formal Plan	36%	24%	40%
Fiscal/Budgeting Issues	28%	36%	36%
Organizational Directives	41%	40%	19%
Written Procedures/Guidelines	34%	36%	29%
Organizational Culture	33%	48%	19%
Politics, Internal/External	34%	45%	21%

It appears from this data that the procurement process is not as problematic as the other areas in the IT development and deployment process. This could be because this area is mainly a problem of budgeting.

Analysis of IT development and deployment process Issues

The final data set derived from the studies survey deals with 21 issues surrounding the IT development and deployment process. Table 4.17 shows a breakdown of these issues and their respondent ratings. As with the other two areas, all of the issues were perceived by the respondents as being at least somewhat problematic with regard to implementation. Out of the 21, four stand out as the most problematic in this area: Training received the most responses at 72%; both rapidly changing technology and resistance to change received 53% and individual IT expertise received 48%.

Table 4.17 Problematic Issues for IT Implementation

Issue	Not Problematic (0-3)	Somewhat Problematic (4-6)	Highly Problematic (7-10)
Interdepartmental Coordination	17%	47%	36%
Individual Support	19%	55%	26%
Organizational Support	24%	47%	29%
Timeframes and Scheduling	22%	43%	34%
Lack of a Strategic/Formal Plan	26%	40%	34%
Fiscal/Budgeting Issues	33%	43%	24%
Organizational Directives	38%	50%	12%
Organizational Culture	24%	60%	16%
Politics, Internal/External	38%	45%	17%
Rapidly Changing Technology	16%	31%	53%
External Consultants	47%	41%	12%
Existing Systems	24%	50%	26%
Standardization Issues	22%	45%	33%
Compatibility Issues	21%	43%	36%
Organizational IT Expertise	16%	45%	40%
Individual IT Expertise	12%	40%	48%
Internal Leadership	34%	38%	28%
Personnel Issues	31%	34%	34%
Adequate Staffing	24%	40%	36%
Resistance to Change	17%	29%	53%
Training	2%	26%	72%

Once the IT development and deployment process reaches the implementation stage the most problematic issues shift to those dealing with personnel—training and resistance to change. At this level the success of implementation relies on the individuals working within the system. Adding to the difficulties surrounding individuals is the overall environment of the organization, which has a major impact on the effectiveness of the deployment process.

Summary

This chapter looked at the issues specific to each part of the IT development and deployment process. The data suggests that IT planning and its effective implementation are at least somewhat related. A significant portion of the respondents revealed that their organizations made use of only limited (informal) planning processes if any were used at all. Subsequently, the majority of these respondents also perceived their IT implementation process as being less than effective. Obviously these results do not demand the immediate initiation of long range strategic IT planning for SMLGs but it does point to a need to further investigate the question of planning's impact on IT implementation.

The data reported in this chapter also points to significant problems in the area of implementation with regard to the nature of technology and resistance to change within the organization. As chapter one and two first suggested, individual responses to technology can prove to be problematic—especially on implementation; the respondents to the survey reported this as a primary problem within their municipalities. Resistance to change is an individual response intensified by a number of factors, not the least of which include: lack of individual expertise, need for extended training, and the existing organizational culture.

This chapter has revealed the perceptions of the respondents with regard to a variety of factors surrounding the IT development and deployment process. Chapter five will expand on the information gathered here and discuss some of the more striking aspects of the data.

Introduction

The importance of information technologies with regard to local governments is undeniable. Within just the past five years, awareness and usage of IT in local governments has increased dramatically. ITs have the capacity to change the way municipalities operate in the most fundamental ways. Each and every government function is impacted by some form of technological innovation. In addition, ITs are changing the ways that government administrators approach the development of their operations and service deliveries. Finally, information technology provides new ways of approaching the relationships between government agencies and the citizens that they serve. Considering the role which local governments play in our lives, the significance of these and other impacts must not be ignored.

This chapter will provide some conclusions on the most problematic issues with regard to IT planning, procurement, and implementation. Each area will be addressed briefly for the purpose of answering the three main research questions laid out in chapter 1. In addition this chapter will provide a more complete discussion of these issues and their interrelations in the context of recommendations for a holistic view of the IT development and deployment process.

Conclusions

The primary focus of this study was to determine what issues SMLG administrators perceived as being the most problematic with regard to IT planning, procurement, and implementation. Each stage in the development and deployment process was viewed individually with regard to its fundamental issues in order to better ascertain the singular impact of each one on the process. Following is a brief discussion of the findings of this study with regard to the three main research questions.

Issues Related to IT Planning

Question: What are the most problematic issues with regard to IT planning?

- Rapidly Changing Technology
- Individual IT Expertise
- Lack of a Strategic/Formal Plan
- Fiscal/Budgeting Issues
- Lack of a Planning Model
- Interdepartmental Coordination

Strategic, or formalized, planning is an important process for any organization, regardless of its ultimate goals. The benefits of this kind of planning include: more effective strategies for current and future operations, clear and concise priorities for the expenditure of scarce resources, a high probability of improved decision making based on learned information from the process, improved management of change, a clearer picture of possible consequences, and overall increased performance of the organization. In the end, strategic planning provides a framework for understanding and addressing complex issues in a particular organizational context.

The nature of technology plays a key role when viewed in the context of strategic planning for IT. Information technology, in essence, is constantly evolving—one of the difficulties is that it does so quite rapidly—making it very difficult to get a handle on. The issue of rapidly changing technology was viewed as being highly problematic by 69% of the respondents in this study. Technology by its very nature is in constant flux. New developments are steadily replacing or enhancing previous innovations. The whole reason for the existence of information technologies is to make continual improvements in the way we communicate and function. Change and constant design improvements drive technology and the timeline is very short. The window for opportunity on the new and innovative is extremely short. In another sense, IT is self perpetuating—constantly

generating needs for new hardware, software, and systems. Fundamental breakthroughs in this arena occur at the astonishing rate of 18-24 month intervals.¹¹⁶ The nature of technology, then, has serious ramifications for long range strategic planning. The primary dilemma being: How does an organization plan for constantly changing and the often unknown future of information technologies?

The second most problematic issue with regard to IT planning was “individual IT expertise” with a 55% response rate. This issue is particularly important because it impacts not just managers and end-users, but the IT professionals as well. Levels of individual expertise range widely across organizations. The ramifications of this problem are deceptive, often the assumptions are that this is merely an issue surrounding the training of users and managers on new ITs and their applications. This is not the case. When planning for ITs, it is important to consider the expertise levels of all individuals throughout the organization and what needs should be addressed based on those levels. A secondary impact which this issue has on planning is the difficulties which arise based on the expertise levels of those engaged in the process itself. In other words, it is very difficult to plan effectively for ITs if your understanding of them is limited.

One of the top issues of obvious import to this particular area was the lack of a strategic plan for information technology. As discussed in chapter 4, 53% of the respondents perceived this issue as highly problematic. As might be expected, the lack of a formalized strategic plan for IT makes the planning process more problematic. The key here is the formalized nature of the plan. The results of the survey showed that while 34% of the respondents did have some sort of IT plan, only 25% of those made use of a formal or strategic plan. Lack of a plan or use of a purely informal plan provides little or no concrete directives for the acquisition or implementation of information technologies within an organization. Considering the nature of ITs and the problems which users and

¹¹⁶ Braithwaite, Timothy (1996) The Power of IT: Maximizing Your Technology Investments. Milwaukee, WI: ASQC Quality Press. p.40.

managers face regarding them, it stands to reason that lack of a plan merely aggravates an already difficult situation.

Fiscal/budgeting issues are particularly problematic to the planning process from a number of standpoints. To begin, information technologies generate a variety of expenses. At the outset their purchase can prove to be quite expensive, often out of the range of smaller municipalities. This necessitates acquiring technology over an extended time-line, which in turn creates a whole host of compatibility, upgradability, and standardization issues. In addition, expenses accumulate due to the very nature of the ITs and their learning curve. Two key budgeting issues along these lines are training and maintenance.

Considering the complexity and volatile nature of IT planning, it is no surprise that the lack of an existing planning model for this process is perceived as a key problematic issue for the study's respondents. Currently there is no IT planning model for SMLGs to follow or consult that is tailored to their specialized issues and needs. While it is certainly true that no model could completely address all of the issues each individual organization faces, a general model would provide a framework for municipalities from which to start without having to reinvent the wheel.¹¹⁷ If nothing else, such a model would provide a viable place from which to ask the right questions about needs, processes, and possible problems.

Finally, interdepartmental coordination was rated highly problematic with regard to IT planning by 47% of the survey respondents. This issue is especially important to the planning process because of the impact ITs have on the organization as a whole. Strategic planning for IT demands a holistic view of the organization, its IT needs, IT expertise levels, existing systems, and desired technological applications (just to name a few). A lack of interdepartmental coordination could result in any number of ineffective outcomes ranging from duplication of systems to all out incompatibility. Effective IT

¹¹⁷ Kraemer, Kenneth L., et al. (1987) Datawars: The Politics of Modeling in Federal Policymaking. New York, NY: Columbia University Press.

implementation, which enhances the organization's operations, demands an approach to IT planning which is coordinated at all levels of the agency.

Issues Related to IT Procurement

Question: What are the most problematic issues with regard to IT procurement?

- Lack of a Strategic/Formal Plan

Most of the issues presented in the survey were not perceived as being highly significant within the procurement stage of the IT development and deployment process. Lack of a strategic plan was the only issue seen as being highly problematic and, even then, only 40% of the respondents felt this was a problem. In effect, the key to IT procurement is a solid strategic plan. Once a plan is laid out, the acquisition of technologies should be relatively straightforward. As long as the plan fully considers fiscal and budgeting issues, acquisitions of ITs should not prove to be extraordinarily troublesome. It would appear from the data presented in this study that IT procurement is tied symbiotically to the planning process and derives most of its problematic nature from situations arising from poor or insufficient planning.

Issues Related IT Implementation**Question: What are the most problematic issues with regard to IT implementation?**

- Training
- Rapidly Changing Technology
- Resistance to Change
- Individual IT Expertise

The most problematic issues with regard to IT implementation are all interrelated, and with regard to SMLG's, look as though they are primarily affiliated with personnel issues. Training was listed by 72% of the respondents as being highly problematic for IT implementation. This particular issue illicited the highest response when compared to all others. Part of the problem with training is that, to be effective it must be a continuous and ongoing process. In addition, individuals within the organization are typically at different levels of individual expertise, thus making the training process difficult to organize. The actual training process is extremely complex, regardless of the size and scope of the organization. In many cases, especially for organizations the size of a typical SMLG, IT training must be outsourced through external consultants or operations. This adds an additional expense, planning problems, and serious logistical problems for management with regard to timeframes and scheduling. Training is truly the linchpin of effective IT implementation. Without the support and expertise of individual end users, no system can achieve its full potential.

Rapidly changing technology is problematic for IT implementation in the same way it is for the planning process. This was viewed as a highly problematic issue for 53% of the respondents. The crux with regard to this part of the process is the inevitable time lag between planning for ITs and actual implementation. A typical strategic plan runs the course of a 3-5 year timeline. As discussed previously, this is an eternity in technological terms—new, major developments in IT may occur in 8-12 months. By the time planned-for technologies are actually introduced in the organization, they may be well into their

obsolescence. This creates problems not just for physical hardware and software implementation but also for the human side of the process—this issue has a significant impact on training, individual expertise levels, and individual resistance levels. In addition, costs of the technologies themselves change rapidly, thereby making fiscal planning a difficult proposition. While the constantly decreasing prices of ITs is a boon for individuals or private sector consumers—a number of public sector organizations continue to find themselves locked into purchasing contracts with specific vendors. Ultimately those SMLGs who find themselves in a mandated contracting situation end up paying higher, outdated prices for obsolete systems.

Resistance to change is an issue, which is particularly problematic with regard to any discussion of information technology. In this study, 53% of the respondents found it to be a very difficult issue for IT implementation. One of the biggest roadblocks in this area is that information technologies often represent completely new—in some instances global—changes for the organization and its individuals. Human beings typically reach a certain comfort level with regard to their abilities and work processes. For most people new technologies represent a daunting learning curve and possible downsizing of their jobs. This perception introduces fear into the implementation process and creates significant resistance to change. Changes as simple as a microcomputer upgrade can cause serious backlash from resistant end users. Effective training and internal leadership are keys to alleviating much of the change resistance inherent in IT implementation. Users must reach new comfort levels and develop the expertise needed to make use of new technologies.

In this sense, individual IT expertise is also perceived to be highly problematic for IT implementation. Each individual within an organization has his/her own expertise and comfort levels with regard to information technologies. Part of the planning and implementation process must necessarily review these individual levels. Needs analysis is not just important for the organization as a whole but for each individual end user as well.

Nothing can destroy the implementation process faster than disgruntled users.¹¹⁸ After all, most ITs do not function independently of human interaction. Training can serve to increase individual expertise levels if it is approached properly. Just as important as training to this equation is internal leadership. Management must achieve levels of IT understanding and expertise, which will allow them to steer their organizations towards a more complete and effective use of technology. Without a foundational understanding of IT, it is impossible for administrators to understand and deal with the problems and subsequent resistance inherent in technological change.

Based on the findings of this study, figure 5.1 shows a representation of the IT development and deployment process, its key problematic issues, and the ultimate expected results for the process. The model shows the progression of the process, ending in the expected or desired results. Each part of the process (seen in the first section of the model) provides for a necessary function; these stages exist as part of their own system—that of the development and deployment process. Once the process begins it feeds into a set of issues which are problematic and must be addressed within the context of IT development and deployment. If the key issues are successfully addressed the process should yield the expected/desired results. These results, whether positive or negative, should enhance future IT development and deployment activities.

¹¹⁸ The primary research in personnel resistance to technology was conducted in the late 70's and early 80's see the following for additional discussion. Danziger, James N., and Kraemer, Kenneth L. (1986) People and Computers: The Impacts of Computing on End Users in Organizations. New York, NY: Columbia University Press. And Keen, Peter G.W. (1980) "Information Systems and Organizational Change". Report CISR-46, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.

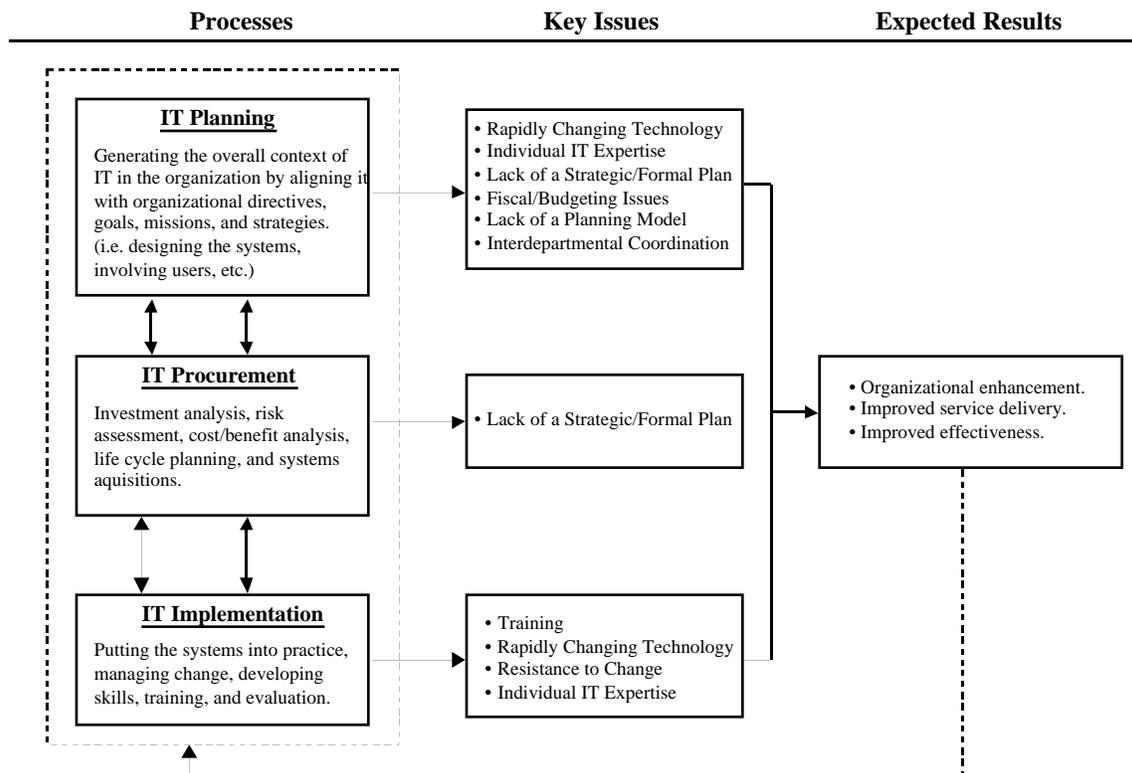


Figure 5.1 *IT Development and Deployment Process: Processes, Issues, Results*

Recommendations and Interrelations

Strategic planning for IT is an important key to the effectiveness of the whole implementation process. Local governments, which do not make use of a strategic plan for IT, run the risk of investing in technologies, which, may not prove to be viable in the long term. In addition lack of a plan might foster other problematic issues. Failure to engage in a formal planning process for ITs may ignore many of the factors which could enhance or hinder IT implementation. Interdepartmental coordination may be ignored, resulting in multiple standards, poor integration of systems, duplication of effort and resources, as well as a failure to meet individual and organizational needs. When strategic planning is used, system purchases may be planned over time and advanced planning for costs may facilitate investments which support the eventual goals of the municipality. Planning can also

enhance the technological infrastructure through needs assessment and support of IT goals throughout the organization. Strategic planning is critical to the effective design and implementation of information technologies within an organization. While it may seem to be a fundamental concept, “the potential for miss-assignment of tasks between people and ITs in poorly designed systems may be at the bottom of much of the dissatisfaction with IT when viewed from most perspectives within an organization.”¹¹⁹ In a large percentage of the market, technologies are described in oversimplified terms with regard to the complexities of implementing ITs. Consequently, the need for careful analysis and planning of IT is underemphasized. Often individuals without a high level of expertise in this area are left with the impression that the effective use of IT is as simple as turning on a light.

Strategic planning for IT implementation must be viewed by the organization and its administrators not as an option but as a necessity. To achieve this level of commitment, significant changes in the organizational environment, including its leadership and management processes may need to be enacted. This perception of IT planning importance is really a top-down view of organizational goals. “All really successful local government IT implementations have one thing in common: They all enjoy full and dedicated support from top management, including the chief executive and all major department heads.”¹²⁰

Any IT implementation is a major undertaking of the organization and this requires a substantial investment of effort, time, and money. This necessarily requires firm backing and support of top management—not just at the outset, but from the initial planning stages through complete implementation. Organizational leaders must be committed to obtaining necessary funding, as well as taking an active role in the development and implementation of the systems. One of the most important factors is chief executive participation, which is

¹¹⁹ Braithwaite, Timothy (1996) The Power of IT: Maximizing Your Technology Investments. Milwaukee, WI: ASQC Quality Press. p.1.

¹²⁰ Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger's Guide. New York, NY: Praeger Publishers., p. 30

key to crossing departmental boundaries. Attention must be paid, through executive level involvement; to the importance of the participation of all of the individuals and groups who will be affected by the implementation of ITs in the organization. It is crucial that all the relevant parties participate at some level in the development, planning, implementation and operation of ITs to insure greater ease of implementation and service to the end users' needs. These individuals may include: management, users, citizens, IT personnel, and, in a number of cases, elected officials.

In order to facilitate IT planning and enhance interdepartmental coordination, one of the main emphases of leadership must be a responsibility for defining the organization's missions. Embodiment of purpose, in the form of IT planning and coordination, must include the building of IT policies into the organizational social structure. Selznick described this necessity in his discussion of leadership and administration, "...shaping the character of the organization, sensitizing it to ways of thinking and responding, so that increased reliability in the execution and elaboration of policy will be achieved according to its spirit as well as its letter."¹²¹ In addition, leadership at this level must deal with the ordering of internal conflict. Administrators must be committed to dealing with the struggle among the competing IT needs and interests of diverse departments, and facilitate coordination of these in order to eventually make the best use of limited organizational resources.

Interdepartmental coordination has been a continuing problem for IT implementation.¹²² In many cases it is the many boundaries which have been created in the organization inhibiting the development and implementation of integrated systems. It is often advantageous to develop one system which can meet a multitude of needs and

¹²¹ Selznick, Philip (1957) Leadership in Administration: A Sociological Interpretation. Berkley, CA: University of California Press. p.63.

¹²² Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc.; and Walton, Richard, E. (1989) Up and Running: Integrating Information Technology and the Organization. Boston, MA: Harvard Business School Press.; and

requirements rather than supporting numerous, redundant, smaller or singular systems which are department or task specific. In some instances, creation of a singular system may require a change or shift in the organizational culture. Kerr describes a situation which provides an example of the problematic nature of this issue, He calls it “data ego.”¹²³ It is not uncommon for a user to feel that he or she owns the data, specific IT, or full-blown system. By “owning” it the user does not feel the need to share. This attitude perpetuates the development of redundant, “stand-alone” systems which are often difficult to maintain and integrate. The culture of an organization must promote the idea that ITs are an organization-wide asset and that everyone can be better served through integration and coordination.

The bottom line for local government administrators must be the creation of an organizational culture where IT is valued as a necessary and integral part of the operations and success of the organization. In other words, SMLGs must create an environment for IT success by developing an organizational culture that deals with IT well. An approach to developing this kind of culture requires managerial commitment, measurement and reporting of successes, satisfaction with the system and services, training, and each individual’s involvement in the entire process.¹²⁴ The importance of such a culture cannot be denied. Selznick argues that an emotional identification with the organization may create a “resource of energy” that serves to increase individual effort and provide a support when crisis occurs.¹²⁵ He goes on to explain that these kinds of emotional commitments have what might be considered, a downside. However, there is a cautionary effect to watch out for—the organization may become bound to specific procedures that place limits on how leaders can allocate scarce resources. This would make it very difficult for an organization

McLean, Ephraim R., and Soden, John V. (1977) Strategic Planning for MIS. New York, NY: John Wiley and Sons, Inc.

¹²³ Ibid. Kerr, 1991, p. 7.

¹²⁴ Braithwaite, Timothy (1996) The Power of IT: Maximizing Your Technology Investments. Milwaukee, WI: ASQC Quality Press. p. 36-37.

to adapt to new conditions. Once values are infused into an organization, individuals may be more resistant to change, because they have a personal stake in the “identity” of the organization and its operations. This “infusion of value” creates a conflict with the necessity of self-maintenance. The key to creating a resource of energy for IT implementation, without becoming procedure bound, is leadership. An organization must adapt to new technologies and changes in environment to survive. Selznick describes this as “a struggle to preserve the uniqueness of the group in the face of new problems and altered circumstances.”¹²⁶

Once a culture is created which values information technology and accepts the necessity of change, then actual organizational changes which facilitate this culture can take place. Kurt Lewin provides a model of social and organizational change incorporating three stages: unfreezing, changing, and refreezing. He describes unfreezing as an increase of organizational receptivity to a possible future change. Moving refers to the choice of a particular course of action and then following it. Finally, refreezing is described as reinforcing the equilibrium of the organization at the new level following the change.¹²⁷

This process for adapting to change refers to organizations but it is also applicable to the individuals and groups within the organization as well. People become accustomed to a particular work process or way of doing things. They are trained to perform within certain parameters and become comfortable with their abilities. To effectively introduce a new way of performing their duties, it is first important to prepare them for acceptance of a proposed change. This is what Lewin refers to as unfreezing. Forced imposition of change without preparation is nearly always a big mistake. Once individuals have been prepared change can be introduced with less disruption and resistance. Lewin stresses how important refreezing is as a final step, to ensure solidification and understanding of new

¹²⁵ Selznick, Philip (1957) Leadership in Administration: A Sociological Interpretation. Berkley, CA: University of California Press. p.18.

Selznick, Philip (1957) Leadership in Administration: A Sociological Interpretation. Berkley, CA: University of California Press. p. 21.

methods.¹²⁸ This approach with regard to information technology requires substantial commitment from top management, an advanced training design, and major interdepartmental coordination.

No matter how carefully IT changes are introduced into an organization, resistance will always be present. Niccolo' Machiavelli expressed the change dilemma quite well in *The Prince*:

It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who could profit by the old order, and only lukewarm defenders in all those who could profit by the new order. This lukewarmness arises partly from fear of their adversaries, who have the laws in their favor, and partly from the incredulity of mankind, who do not truly believe in anything new until they have had an actual experience of it.¹²⁹

Change of any kind is problematic then, not just for individuals and organizations but for those who propose to implement it as well. In any IT development and deployment process it is critical to overcome as much resistance to change as possible. To do this an understanding of the reasons for change must be garnered.¹³⁰ Keen identifies four reasons particular to the change brought on by ITs: resistance to IT specialists; poor feelings toward the project as a whole; and assumptions of poor cost benefit analysis results; views that there is no particular need for new ITs; and fear of social uncertainty (which Keen suggests is often mistaken for fear of technology).¹³¹ These types of fears may manifest themselves in role ambiguity. If an individual is unsure of how a change may affect him/her, the change is more likely to be resisted. Resistance to change is an inevitable issue in IT planning and implementation and it is only through identification of sources of resistance and understanding its nature that it can be dealt with effectively.

¹²⁷ Lewin, Kurt (1947) "The Coming of the New Organization.", *Human Frontiers*, Vol. 1.

¹²⁸ Ibid.

¹²⁹ Machiavelli, Niccolo' (1952). *The Prince*. Translated by Luigi Rice, Rev ERP Vincent. New York, NY: American Library.

¹³⁰ Flaatten, Per O., McCubbrey, Donald J., O'Riordan, P. Declan, and Burgess, Keith (1989) *Foundations of Business Systems*. Chicago, IL: The Dryden Press.

¹³¹ Keen, Peter G.W. "Introducing Change". *Computerworld*, September, 29, 1982. p. 10.

Resistance to change is a powerful reaction to IT implementation. How people adjust and react to technological change depends a great deal on their background, education, and experience with ITs in general. As is often the case when ITs are introduced—resulting in changes in procedures, habits, and communications within the organization—individuals often experience frustration and confusion with regard to their roles and jobs. They may perceive loss of authority with relation to others as well as a sense of job displacement.

One of the best ways to deal with resistance to change in relation to IT implementation is through continuous—needs based—training efforts. In the 1970s Whisler reviewed training as an aid to organizational adaptation to technological change.¹³² He found several characteristics relating to this area. In one regard, he found that the lower the level in the organization that training took place, the more specific the nature of the training. He also found that at the lower levels the amount of training for IT applications increased. A second observation focused on top management and how they received information about IT developments. Whisler found that frequently it was internal sources (i.e. MIS personnel) who briefed these managers on existing ITs and upcoming trends. The move towards providing managers with outside informational seminars is relatively new. From his observations, Whisler concluded that those individuals in middle management positions were more often the recipients of IT specific training than those in the top ranks. The nature of this training appeared to be far more technical than the more general information received by executives. At the time of Whisler's study, few organizations were providing training for employees which offered a holistic view of the ITs across the organization.

The kind of individual expertise which training can help to provide is essential for the success of IT implementation. However, it would be a mistake to assume that the

¹³² Whisler, T. L., (1970) *Information Technology and Organizational Change*. Belmont, CA: Wadsworth Publishing Co., Inc. and Whisler, T. L., (1970) *The Impact of Computers on Organizations*. New York, NY: Praeger Publishers, Inc..

issues of individual expertise and training are only about focusing on managers and end users. In today's environment, especially in local governments, it is important that specific kinds of training be given to the so-called "technology experts." It's no longer enough that IT professionals are "computer wizards," they must now possess a broader understanding of their organization, its needs, and overall operations. At the very least these "experts" must have some knowledge of the process of public sector operations. Ideally they should have training in local government operations and public service delivery. They should be involved in all aspects of IT implementation from the planning stages—to evaluation—and beyond. IT professionals are in a unique position to show managers and users how they can apply IT to make the organization ultimately more effective. IT professionals must be prepared to play a number of crucial roles in the organization. They must be proactivists, futurists, strategists, change agents, integrators, staff professionals, as well as politicians.¹³³

The final key in dealing with the problematic issues of the IT development and deployment process is the management of change—specifically that which is related to IT. The introduction of new ITs, or any major changes in existing systems, is an important organizational decision and is not to be made lightly. The end results are largely affected by the way in which the changes were implemented. Ideally, these changes are implemented based on a strategy (formal or informal) which serves to pilot the change from the planning stage through its implementation with as little problem and disruption as possible. One of the most important key factors to a successful strategy for dealing with change of this nature is to anticipate the most probable outcomes which the change will bring about--thus allowing for a plan to deal with them. "The most successful manager is one who very early perceives—and perceives correctly—trends just beginning to develop which might affect the organization, and then devises and implements an effective

adaptation for the organization.”¹³⁴ In the information age the manager must understand the thrust of technology and devise effective strategies for adapting the organization to it.

Kerr proposes that a paradigm shift is necessary to enable managers and organizations to meet the “highly competitive challenges” of the future.¹³⁵ While he is primarily talking about private sector firms, his proposed shift provides important propositions for public sector organizations who are having the same kinds of IT dilemmas. Kerr calls for an approach to IT management where: (1) management initiatives include IT professionals in the direction setting of their organizations, (2) an IT professional with a mixed level of skills and expertise including technical know-how and knowledge of the business at hand, (3) changes to the organizational structure which allow IT professionals to promote the growth, development, and control of information and technologies throughout the organization, and (4) enhanced training and development for users to help them work more effectively with ITs. Table 5.1 shows a typical approach to the management of IT and a new updated approach.

¹³³ Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc. p. 16-17.

¹³⁴ Whisler, T. L., (1970) Information Technology and Organizational Change. Belmont, CA: Wadsworth Publishing Co., Inc. p. 7

¹³⁵ Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc. p. 2

Table 5.1 Approaches to the Management of IT¹³⁶

Old Approach	New Approach
<ul style="list-style-type: none"> • IT operations/processes are a backroom function. • IT personnel are techno-geeks with little knowledge of public administration operations. • Each department owns its own data and ITs. • Users receive training for new specific applications. 	<ul style="list-style-type: none"> • IT is an integrated part of organizational operations and planning. • IT personnel are technically proficient <u>and</u> possess an understanding of the operations of local government. • Data is an organization wide resource and ITs are designed with the whole organization in mind. • Users are trained to make better use IT.

Recommendations for Further Study

The research model used in this study has proven to be extremely helpful in determining the primary issues which are problematic to the IT development and deployment process. In addition it has allowed for the creation and future use of an IT issues database which may serve as background material for subsequent research in this area. However, further refinement or redesign of this model in future research might allow for additional important insights regarding the implementation of information technologies in the public sector. Based on the research completed for this study, the following questions have been generated for future research possibilities.

- What is the best approach to strategic planning for information technologies in local government?
- What is the impact of training on IT implementation effectiveness?
- What is the impact of strategic planning on IT implementation?
- Does the use of a model enhance the effectiveness of IT implementation?

¹³⁶ Source: This model was adapted from Kerr, p. 2 and modified from a private sector view to a more public sector view for the purposes of this description.

- What should an IT implementation model for local government look like?
- Does individual expertise level have an impact on IT implementation effectiveness?

In addition to the questions proposed above, some technical differentiations might be useful in making this kind of study more representative and generalizable. During the course of this research it was determined that better definitions needed to be developed for the problem areas. For example, the question of novice, proficient, and expert user proved to be much too open to individual interpretation. An extension of this would be expanded discussions (and possible terminology specific) of concepts like effectiveness of implementation and successful IT planning. Finally, for future study, it might prove preferable to engage in individual interviews with each respondent as opposed to a standard, mailed survey. The nature of the information seems to require detailed explanation and a degree of “drawing out” the respondent.

Summary

The area of IT development and deployment is extremely problematic and complex. It is a process that involves all the individuals who make up the organization, from top level administrators to clerical staff. In addition, it requires a significant portion of the resources available within the organization, from human to fiscal. Any approach to IT development and deployment which hopes to be ultimately successful must take into account both the technical and social systems which make up the organization. This study has addressed a number of the dilemmas that are ingrained in IT implementation and management. It has been shown that a multitude of integrated issues exist which have an impact on SMLG’s ability to effectively plan for and implement information technologies. These issues must be studied individually—within the context of IT development and deployment—in order for SMLG’s to meet the technological needs of their citizens.

Glossary

The field of information technology is full of terminology, which may be unfamiliar to the layperson. The rapidly changing nature of IT makes the task of keeping up with the jargon very difficult. The use of acronyms to describe everything from specific hardware to integrated systems makes the task even more complex. In addition many of the terms and definitions vary widely depending on the nature of the literature or source and the time period in which they are discussed. Following is a list of the terminology and acronyms as they are used in this proposal.

Action Research

Action research is a methodology that allows the researcher to develop knowledge and understanding as part of on-going practice. In situations where other methods fall short, action research provides new and innovative ways of approaching problems.

Analog

A telephone creates, in the form of a continuously varying electrical signal, an “analog” of the sound waves that the human voice generates. Most analog communications are now being converted to digital transmissions.

Automation

Viewed as a trend of the 60s and 70s, which entailed redesigning clerical work to be accomplished via computer. This included the use of databases and data entry. Automation was not just about moving everything from paper to computer but also entailed consolidating some work process to be done more efficiently by the computer.

Chief Information Officer (CIO)

A title most commonly used in the private sector to identify the manager of an organization’s information systems. In one sense the title of CIO stands as recognition of the importance of information technologies as a major resource requiring a special type of executive. On the other hand, the introduction of a CIO into an organization requires significant changes in the existing management processes in order to make the addition effective and meaningful.

Connectivity

The ability to send and receive information between two services, locations, or devices.

Decision Support System (DSS)

An information system and/or analytical model which is designed to aid managers and administrators in making more effective decisions. Normally based on personal computer software that accesses databases of information related to a specific topic or organizational area. DSS is not generally about specific technology: instead emphasis is placed on the exploitation of all-available technologies and resources.

Digital

The presence or absence of an electrical signal represented in computer language as 1s or 0s, on or off. Digital information transfer rates are much faster than analog.

Distributed Systems

A distributed system within an organization links a central or “host” computer to decentralized personal computers or workstations, many of which may be “off-site” locations. A system of this sort distributes the processing workload.

Host Computer

Often used instead of mainframe or server to describe the computer which provides services to a number of workstations.

Implementation

A standard dictionary definition of implementation states that it is a means employed to achieve a given end, to provide a definite plan or procedure to ensure the fulfillment of... (American Heritage Dictionary, 1981). Implementation of information technology is more complicated because the implementation process may be long and drawn out, and in many instances may have vague boundaries. In the most simplistic sense, implementation is the process of getting a new or significantly changed, system in use for those whom it was intended. (Turban, 1993)

Information Age

A term generally used to describe a future state where information will be readily and universally available electronically. Currently this term has proven to be very vague, as there is much disagreement over what future conditions are being described.

Information Resource Management (IRM)

A term created by Public Law 96-511, (1986) The Paperwork Reduction Act (PRA), US Code, Vol. 44, sec. 3501-20. Refers to the management of information and information technology as a resource like that of human resources. Some of the literature from the 1980s focused on private sector information management uses the term more generally as a philosophy for the management of information technology.

Information Systems (IS)

Another term for management information systems (MIS).

Information Technologies (IT)

Up until the 1980s computers made up almost all of what was considered information technologies. Currently information technology has become an umbrella term used to describe a rapidly expanding group of equipment, services, applications, and basic technologies. Often ITs are grouped as computers, multimedia, and telecommunications. For the purposes of this proposal information technologies are any of the above.

Integration

The ability to properly interpret and process information through connectivity.

Local Government *(Also see SMLG's)

Government activity (process and procedures) which pertain to, exist in, are of interest to, or are peculiar to... a specific locality.

Management Information Systems (MIS)

A term used to describe an integrated system which makes use of any number of varied information technologies. It is common for MIS to be referred to as information systems or in the public sector: information resource management (IRM); or public management information systems (PMIS).

Management Processes

Regularized cycles of activities (formal or informal) which bring people within organizations and between organizations into interaction in order to work through the performance of some function or the solving of some problem. (Wamsley, 1992)

Planning

A standard dictionary definition of planning states that it is any detailed scheme, program, or method worked out beforehand for the accomplishment of an objective. A proposed or tentative project or goal. A systematic arrangement of details, in most cases (and for purposes of this project) a drawing, diagram, or written representation which shows the structure or arrangement of a specific aim or purpose.

Public Management Information Systems (PMIS)

A term used by Bozeman and Bretschneider to describe management information systems in the public sector. See Bozeman, and Bretschneider, (1986) *Public Management Information Systems: A Special Issue of Public Administration Review*. Vol. 46.

SMLG's

An acronym used in this text to describe small and medium sized local governments. In this particular case, cities, towns, and/or counties with a population of less than 300,000. The terminology of small to medium was selected based on discussions from ICMA publications relating to local government and the management of information technologies. For example see J. L. King "Local Government Use of Information Technology: The Next Decade", in Managing New Technologies: The Information Revolution in Local Government (Washington, DC: ICMA, 1985). In this essay King describes smaller governments as those "cities below 50,000 and counties below 100,000 in population". (p.12)

Strategic Planning

In its simplest form strategic planning is described as "a process by which an organization attempts to control its destiny rather than allowing future events to do so". (Gordon, 1993, p. 1) More specifically, it is a systematic and formal process wherein an organization anticipates and plans for its future. Strategic planning is really a process and a product, in other words, it provides a well-organized way of examining organizational processes and then facilitating decision-making.

Telecommunications

Electronic movement of information no longer just refers to phones, telex, and fax. Now it includes not only voice but also digital (computer generated data) and analog (modems convert digital data to analog so that it can be transmitted over telephone networks) communications as well.

Selected References

Andersen, David F., and Dawes, Sharon S. (1991) Government Information Management: A Primer and Casebook. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Ball, Mary C., et. al. (1983) Computers and Local Government: A synthesis and annotated bibliography. Oklahoma State University and Mississippi State: SRDC Synthesis--Bibliography Series No. 13.

Bandrowski, James F. (1983) Creative Planning Starts at the Top. New York, NY: American Management Association

Boar, Bernard H. (1993) The Art of Strategic Planning for Information Technology: Crafting Strategy for the 90's. New York, NY: John Wiley & Sons, Inc..

Bozeman, Barry, and Bretschneider, Stuart (1986) "Public Management Information Systems: A Special Issue of *Public Administration Review*". Vol. 46.

Braithwaite, Timothy (1996) The Power of IT: Maximizing Your Technology Investments. Milwaukee, WI: ASQC Quality Press.

Bretschneider, Stuart (1990) "Management Information Systems in Public and Private Organizations: An Empirical Test." *Public Administration Review*. Vol. 50, September/October.

Brunner, I., and Guzman, A. (1989) "Participatory evaluation: A tool to assess projects and empower people." In Conner, R. F., and Hendricks, M. (eds.), *International Innovations in Evaluation Methodology: New Directions for Evaluation Methodology*. San Francisco, CA: Jossey-Bass.

Caudle, Sharon L. (1987) *Federal Information Resources Management: Bridging Vision and Action*. Washington, D.C.: National Academy of Public Administration, Academy Studies.

Caudle, Sharon L. et al. (1989) *Managing Information Resources: New Directions in State Government*. Syracuse, NY: Syracuse University School of Information Studies.

Cooper, Randolph B. (1994) "The Inertial Impact of Culture on IT Implementation" *Information and Management*, Vol. 27. pp. 17-31.

Danziger, James N., and Kraemer, Kenneth L. (1986) People and Computers: The Impacts of Computing on End Users in Organizations. New York, NY: Columbia University Press.

Davis, Gordon B. and Olson, Margrethe H. (1985) Management Information Systems: Conceptual Foundations, Structure and Development. (2nd Edition) New York, NY: McGraw-Hill.

Dutton, W. H., and Kraemer, Kenneth L., (1977) "Technology and Urban Management: The Power Payoffs of Computing." *Administration and Society*, Vol. 9. pp. 305-340.

- Eadie, Douglas C., and Steinbacher, R. (1985) "Strategic Agenda Management: A Marriage of Organizational Development and Strategic Planning." *Public Administration Review*, Vol. 45. p. 424-430.
- Flaatten, Per O., McCubbrey, Donald J., O'Riordan, P. Declan, and Burgess, Keith (1989) Foundations of Business Systems. Chicago, IL: The Dryden Press.
- Garson, G. David. (1995) Computer Technology and Social Issues. Harrisburg, PA: Idea Group Publishing.
- General Accounting Office, (1988) Information Technology Issues, GAO/OCG-89-6TR. Washington, D.C.: Government Printing Office.
- General Accounting Office, (1992) Information Management and Technology Issues, GAO/OCG-93-5TR. Washington, D.C.: Government Printing Office.
- General Accounting Office, (1988) Perceived Barriers to Effective Information Resources Management: Results of a GAO Panel Discussion, GAO/IMTEC-92-67. Washington, D.C.: Government Printing Office.
- General Accounting Office in conjunction with the Office of Information and Regulatory Affairs, Information Policy and Technology Branch. (1995) *Evaluating Information Technology Investments: A Practical Guide*. Washington, D.C.: Government Printing Office, November.
- Ginzberg, M.J., (1974) "A Detailed Look at Implementation Research". Report CISR-4, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.
- Globerson, S. and Maggart, M.J. (1991), "A Conceptual Model of Self-Service", *International Journal of Operations and Production*, Vol. 11, No. 4, pp. 33-43.
- Gluck, Frederick W. "Strategic Management: An Overview", in Gardner, James R., Rachlin, Robert, and Sweeny, H.W. [Eds.] (1986) *Handbook of Strategic Planning*. New York: NY. John Wiley, pp. 1-36.
- Gordon, Gerald L. (1993) Strategic Planning for Local Government. Washington, D.C.: ICMA.
- Grasso, Anthony J., and Epstein, Irwin. (1993) "Theoretical Requirements for Successful Integration of Information Technology in Human Services Agencies", *Child & Youth Services*, The Hayworth Press, Inc. Vol. 16, No. 1. pp. 17-32.
- Hansen, Hans R. (1995) "Conceptual Framework and Guidelines for the Implementation of Mass Information Systems", *Information & Management*, Vol. 28, pp. 125-142.
- Holden, Stephen H. (1994) Managing Information Technology in the Federal Government: New Policies for an Information Age. Blacksburg, VA: Virginia Polytechnic and State University, Dissertation.
- International City Management Association, (1986) *Local Government Yearbook: 1986*. Washington, D.C.: International City Management Association.
- International City Management Association, (1989) *Local Government Yearbook: 1989*. Washington, D.C.: International City Management Association.

- Issac, Stephen, and Michael, William B. (1981) Handbook in Research and Evaluation. 2nd ed. San Diego, CA: Edits Publishers.
- Keen, Peter G.W. (1980) "Information Systems and Organizational Change". Report CISR-46, Center for Information Systems Research, Massachusetts Institute of Technology, Cambridge.
- Keen, Peter G.W. "Introducing Change". *Computerworld*, September, 29, 1982. p. 10.
- Kendall, K.E., Buffington, J.R., and Kendall, J.E., (1987) "The Relationship of Organizational Subcultures to DSS User Satisfaction", *Human Systems Management*, Vol. 7. pp. 31-39.
- Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc.
- King, John L., and Kraemer, Kenneth L. (1980) Analyzing the Benefits of Computing Systems. In Auerback Editorial Staff (Ed.), Computers in Local Government: Finance and Administration. Pennsauken, NJ: Auerback Publishers, Inc..
- Kling, R. (1980) "Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research". *Computing Survey*, Vol. 12, No. 1, pp.61-110.
- Kraemer, Kenneth L., et al. (1987) Datawars: The Politics of Modeling in Federal Policymaking. New York, NY: Columbia University Press.
- Kraemer, Kenneth L., Dutton, William H., and Northrop, Alana (1981) The Management of Information Systems. New York, NY: Columbia University Press.
- Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger's Guide. New York, NY: Praeger Publishers.
- Kraemer, Kenneth L., et. al. (1989) Managing Information Systems: Change and Control in Organizational Computing. San Francisco, CA: Jossey-Bass.
- Laudon, K. (1996) Management Information Systems. Upper Saddle River: Prentice Hall, Inc.
- Lederer, A. L., and Mendelow, A. L. (1988) "Convincing Top Management of the Strategic Potential of Information Systems", *MIS Quarterly* December.
- Lewin, Kurt (1947) "The Coming of the New Organization.", *Human Frontiers*, Vol. 1.
- Libicki, Martin C. (1995) Information Technology Standards: Quest for the Common Byte. Newton, MA: Butterworth-Heinemann.
- Lucas, H. (1975) Why Information Systems Fail. New York, NY: Columbia University Press.
- Machiavelli, Niccolo' (1952). The Prince. Translated by Luigi Rice, Rev ERP Vincent. New York, NY: American Library.

- Marchand, Donald A., (1985) "Information Management: Strategies and Tools in Transition," *Information Management Review* 1 Summer, pp. 27-34.
- Markus, M. Lynne (1983) "Power, Politics, and MIS Implementation", *Communications of the ACM*, Vol. 26, No. 6, June, pp. 430-444.
- Martin, James and McClure, Carma (1985) Structured Techniques for Computing. Englewood Cliffs, NJ: Prentice Hall.
- Massachusetts Office of Communities and Development. Municipal Electronic Data Processing, A Primer for Local Government Officials. Washington, D.C.: Department of Housing and Urban Development, June (1980).
- McFarlan, F. Warren, and McKenny, James L. (1983) Corporate Information Systems Management: The Issues Facing Senior Executives. Homewood, IL: Richard D. Irwin, Inc.
- McLean, Ephraim R., and Soden, John V. (1977) Strategic Planning for MIS. New York, NY: John Wiley and Sons, Inc.
- Newcomer, Kathryn E., and Caudle, Sharon L. (1991) "Evaluating Public Sector Information Systems: More than Meets the Eye." *Public Administration Review*. Vol. 51, September/October: pp. 377-384.
- Norton, Bob (1994) "Organizational Cultures and their Relevance to the Information Organization." *Aslib Proceedings*. Vol. 46, No. 6, June: pp. 173-176.
- Office of Management and Budget, (1984) A Five-Year Plan for Meeting the Automatic Data Processing and Telecommunications Needs of the Federal Government. Vol. 1: Planning Strategies. Washington, D.C.: Government Printing Office.
- Office of Science and Technology Policy, (1993) Technology for America's Economic Growth, A New Direction to Build Economic Strength. Washington, D.C.: Government Printing Office.
- Office of Technology Assessment, (1986) Federal Government Information Technology: Management, Security and Congressional Oversight. OTA-CIT-297. Washington, D.C.: Government Printing Office.
- Office of Information and Regulatory Affairs: Information Policy and Technology Branch, (1995) Evaluating IT Investments: A practical guide. Washington, D.C.: Government Printing Office.
- Rainey, Hal G. (1991) Understanding and Managing Public Organizations. San Francisco, CA: Jossey-Bass Publishers.
- Rainey, Hal G., and Perry, James L., (1992) Building Public Management Research and Practice. in Ingraham, Patricia W., and Kettl, Donald F. ed. Agenda for Excellence, Chatham, NJ: Chatham House.
- Rapoport, R. N. (1970) "Three Dilemmas in Action Research," *Human Relations*, vol. 23, pp. 499-513.

- Sathe, V., (1983) "Implications of Corporate Culture: A Manager's Guide to Action", *Organizational Dynamics*, Autumn pp. 5-23.
- Schein, E.H., (1985) Organizational Culture and Leadership. San Francisco, CA: Jossey-Bass Publishers.
- Scoggins, J. "Information Management/Computer Technology in State and Local Governments: An Overview--the Eighties." *State and Local Government Review*, (1981) vol. 13. pp. 82-84.
- Sellers, R. D. (1981) "Mini- and Microcomputers in Local Government: Their Application and Their Impact". *State and Local Government Review*, vol. 13, pp. 90-95.
- Selznick, Philip (1957) Leadership in Administration: A Sociological Interpretation. Berkley, CA: University of California Press.
- Sjo, J., and Biere, A. "Management Information Systems for Local Governments". *American Journal of Agricultural Economics*, 1981, vol. 63, pp. 967-973.
- Smircich, L., (1983) "Concepts of Culture and Organizational Analysis", *Administrative Science Quarterly*, Vol. 28. pp. 339-358.
- Stevens, John M., and McGowan, Robert P. (1985) Information Systems and Public Management. New York, NY: Praeger Special Studies.
- Strassman, Paul A. (1990) The Business Value of Computers: An Executive's Guide. New Caanan, CN: Information Economics Press.
- Sullivan, C. H. (1985) "Systems Planning in the Information Age". *Sloan Management Review* Winter.
- Swepson, Pam and Dick, Bob (1994). "PAR Toolbox" on the PAR Webpage <http://www.par.org>, Ithaca, New York: The Cornell Participatory Action Research Network,
- Synott, William R., and Gruber, William H. (1981) Information Resource Management. New York, NY: John Wiley & Sons, Inc..
- The Paperwork Reduction Act (PRA), (1986) US Code, vol. 44 sec. 3501-20.
- Theiruf, Robert J., (1994) Effective Management and Evaluation of Information Technology. New York, NY: Quorum Books.
- Thompson, M. and Wildavsky, A., (1986) "A Cultural Theory of Information Bias in Organizations", *Journal of Management Studies*, Vol. 23. pp.273-286.
- Toregas, Costis (1985) Managing New Technologies: The Information Revolution in Local Government. Washington, D.C.: ICMA.
- Tricker, R.I., (1988) "Information Resource Management: A Cross-Cultural Perspective", *Information and Management*, Vol. 15. pp. 37-46.
- Turban, E, (1993) Decision Support and Expert Systems: Management Support Systems. New York, NY: Macmillan Publishing.

U.S. Senate, Committee on Governmental Affairs, 104th Congress, 2nd Session, Hearing before the Subcommittee on Oversight of Government Management. Implementation of the Information Technology Management Reform Act of 1996. (July, 17, 1996) Washington, DC: USGPO.

U.S. Senate, Committee on Governmental Affairs, 104th Congress, 1st Session, Hearing before the Subcommittee on Oversight of Government Management. S. 946. S.946, the IT Management Reform Act of 1995. (July, 25, 1995) Washington, DC: USGPO.

Walton, Richard, E. (1989) Up and Running: Integrating Information Technology and the Organization. Boston, MA: Harvard Business School Press.

Wamsley, G. L., (1992) *Management Processes* A working document, Virginia Polytechnic and State University.

Wamsley, G. L., and Wolf, J. F., (1996) Refounding Democratic Public Administration: Modern Paradoxes, Postmodern Challenges. Thousand Oaks, CA: Sage Publications.

Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge.

Weisman, C. (1985) Strategy and Computers, Dow Jones-Irwin, pp. 229-36.

Wilson, T. D. (1989) "The Implementation of Information System Strategies in UK Companies: Aims and Barriers to Success", *International Journal of Information Management* Vol. 9, pp. 245-258.

Whisler, T. L., (1970) Information Technology and Organizational Change. Belmont, CA: Wadsworth Publishing Co., Inc..

Whisler, T. L., (1970) The Impact of Computers on Organizations. New York, NY: Praeger Publishers, Inc..

Whorton, J. W. (1981) "Working Attitudes and Computer Utilization: A National Study of the Relationship Between Organization Climate and Computer Utilization." *State & Local Government Review*, vol. 13, pp. 96-102.

Worthley, J. A., and Hempey, J. J. (1978) "Computer Technology and Public Administration in State Government: The Need for a New Perspective." The Bureaucrat, vol. 7. pp. 32-37.

Appendix 1

Description of Issues

Interdepartmental Coordination

This issue relates to the degree an organization is able to coordinate its IT implementation process across departments. With the rise in use of microcomputers, information systems management has become increasingly decentralized. In localities this often means that IT planning, procurement, and implementation may not be coordinated across departments thus perpetuating duplication, lack of standardization, and difficulties with formalized planning, among other problems. Interdepartmental coordination is related to organizational structure, planning, standardization, duplication of work/resources, and internal leadership.

Lack of a Strategic/Formal Plan

This issue has become one of the more problematic with regard to IT implementation.¹³⁷ Pressure for quick solutions to very complex IT problems has only served to work against strategic planning in organizations. Strategic planning is viewed by many as “the heart of effective IRM”.¹³⁸ The successful implementation of information technologies in an organization depends heavily on the strategic analysis of organization needs and objectives.¹³⁹ Organizations, which do not make use of formalized planning with regard to IT, may find themselves without direction in a rapidly changing environment. Lack of a strategic/formal plan issues is related to organizational directives, organizational support, internal leadership, interdepartmental coordination, standardization, and planning models.

Lack of a Planning Model

This issue speaks to the availability and use of standardized models with regard to the planning and implementation of ITs. There has been many debates on the ability of

¹³⁷ Kraemer, Kenneth L., and King, John L. (1977) Computers and Local Government: Volume I, A Manger's Guide. New York, NY: Praeger Publishers.

¹³⁸ GAO/OCG, 1992, p. 12

planning models to enhance the success of project implementations.¹⁴⁰ Currently, no SMLGs have an IT implementation model that addresses their specific needs and issues. Lack of a planning model relates to strategic planning, written procedures and guidelines, and rapidly changing technology.

Organizational Directives

This issue refers to the missions, objectives, and plans which a particular organization may possess for the implementation of IT. Directives serve as guidelines for future plans and actions of the organization. These directives must be strategic and well defined in order to facilitate effective IT implementation throughout the organization. Organizational directives relate to planning, organizational support, organizational IT expertise, fiscal concerns, and rapidly changing technologies.

Organizational IT Expertise

This issue refers to the overall technological savvy of the organization. In addition, it could also refer to how progressive in its nature the organization may be. That is, whether or not this is an institution that has focused resources to enhance IT's ability to stay on the cutting edge of technological developments. Organizational IT expertise is related to organizational support, organizational culture, individual IT expertise, individual support, existing systems, and rapidly changing technology.

Organizational Support

Successful and effective implementation of ITs relies on the ability of an organization to change and adapt in order to exploit the uses of advanced technologies. This issue refers to an organization's predilection toward supporting strategic vision and planning at all levels--which in turn will allow it to make use of rapidly changing

¹³⁹ McLean, Ephraim R., and Soden, John V. (1977) Strategic Planning for MIS. New York, NY: John Wiley and Sons, Inc.

¹⁴⁰ Kraemer, Kenneth L., et al. (1987) Datawars: The Politics of Modeling in Federal Policymaking. New York, NY: Columbia University Press.

technologies.¹⁴¹ The organizational support issue includes: fiscal concerns, organizational directives, organizational culture, and individual support.

Organizational Culture

This issue is particularly hard to explain because the culture of an organization is mainly a perception. However, for IT implementation to be effective the right kind of culture or environment is required. In most cases this means an organization must consistently find a common ground between individuals and systems within the organization. Organizational culture issues include: organizational support, politics internal/external, organizational directives, and organizational IT expertise.

Individual IT Expertise

The issue of individual IT expertise speaks to the technological savvy of each person within the organization. It is typical for a locality to employ individuals with a very diverse range of IT competence. It is also typical that some of these individuals will have a willingness and desire to learn more about technology and how to use specific ITs, and others will be quite resistant to adapting to new technologies.¹⁴² This issue is related to training, resistance to change, organizational support, and internal leadership.

Written Procedures/Guidelines

This issue refers to any state or federal mandates which affect local government with regard to information technology and its planning, procurement, and implementation. In addition it may also refer to any written procedures specific or internal to the locality. This issue includes fiscal concerns, contracts, outside consultants, and politics.

Fiscal/Budgeting Issues

Information technologies are expensive at a number of levels. This issue refers to the myriad of problems facing administrators with regard to budgeting and the fiscal impact

¹⁴¹ Walton, Richard, E. (1989) Up and Running: Integrating Information Technology and the Organization. Boston, MA: Harvard Business School Press.

¹⁴² Andersen, David F., and Dawes, Sharon S. (1991) Government Information Management: A Primer and Casebook. Englewood Cliffs, NJ: Prentice-Hall, Inc.

of ITs. Fiscal concerns for IT require definition and measurement of operating costs, investment costs, and the possible/achieved benefits of technologies.¹⁴³ This issue includes organizational support, rapidly changing technology, existing systems, standardization, and planning.

Rapidly Changing Technology

This issue refers to the difficulties of managing technology due to its rapidly changing nature. ITs are developed and enhanced so swiftly that an organization may find their planned--for acquisitions are obsolete before the ink on the purchase orders are dry. The nature of technology in general is a primary cause of a multitude of IT management conflicts from development to implementation. Rapidly changing technology issues are related to fiscal concerns, timeframes, standardization, existing systems, training, individual and organizational IT expertise.

Timeframes and Scheduling

Timeframes and scheduling are very important to the effective implementation of ITs in an organization. Most IT-related planning in SMLGs must take place in a multi-year framework due to a variety of factors, not the least of which is financial resources. IT implementation also carries with it varying degrees of post implementation lag times necessary for training and "burn-in" of the equipment. Scheduling difficulties are expounded by the rapidly changing nature of the technologies themselves. This issue is related to rapidly changing technology, internal leadership, organizational support, individual support, training, and IT expertise.

Politics, Internal/External

This issue is inherent in any organizational activity and IT implementation is no different. Local government executives and IT professionals alike must recognize and address the political ramifications of IT implementation within their organization and the

¹⁴³ Ibid.; Kraemer, Kenneth L., Dutton, William H., and Northrop, Alana (1981) The Management of Information Systems. New York, NY: Columbia University Press.

external environment. Technological activities in general are political by nature (i.e. privacy, security, confidentiality, and data collection). This issue includes personnel issues, interdepartmental coordination, organizational culture, and external consultants.

Individual Support

This issue refers to the support of key individuals within the organization whether in favor of IT planning and implementation or against. Ordinarily this issue refers to those individuals in top management positions. However, people at all levels of the organization have an impact on IT planning and implementation--the more support available throughout the ranks, the more effective the implementation process will be. Individuals can hinder progress at a number of junctures in the process. It is therefore, essential to recognize the importance of this issue with regard to IT implementation at the outset. The individual support issue includes resistance to change, training, politics, leadership, and support.

Existing Systems

The existing information systems within an organization may have a profound impact on the ability of a locality to plan for, acquire, and implement new technologies. Systems already in place may require upgrades or may not function in connection with new systems at all. In many cases the stakes are very high with regard to existing systems. An organization often has a significant investment in hardware and software. In addition, these systems may be storehouses of irreplaceable data, which for compatibility reasons cannot be transferred to new systems without incurring extensive costs. The issue of existing systems is related to standardization, computability, resistance to change, rapidly changing technologies, and interdepartmental coordination.

Standardization

Without some standards across information technologies, planning for future uses and acquisitions would prove nearly impossible. Setting standards within an organization can be problematic enough--standardization between organizations can prove impossible. Standards make communication possible and lend consistency and efficiency to information

systems.¹⁴⁴ Standardization is made substantially more difficult due to the technology industry itself and its own standardization problems. Standardization issues are related to existing systems, computability, politics, and rapidly changing technology.

Compatibility Issues

Compatibility issues refer to the ability to interact, communicate, and share information across networks and between software. Without systems and software compatibility data exchange would be impossible. It is very important that newly proposed systems be compatible with existing systems and that compatibility be addressed early on in the planning process. Compatibility issues are related to existing systems, politics, standardization, contracts, and personnel issues.

Personnel Issues

These are issues related to the management process of human resources. It does not matter how well designed an organization is or how well developed general procedures are if the institution in question does not have the personnel it requires to fully develop, manage, and ultimately use ITs. This is one of the most important issue areas and in many cases one that is chronically ignored. Personnel issues include resistance to change, fear of technology, training, recruitment, and retention of quality employees.¹⁴⁵

Adequate Staffing

In one sense, this issue is tied to general personnel issues in that it requires the recruitment and training of individuals for IT and support staff positions within the organization. More specifically, it deals with the need for enough of these types of employees to make IT implementation feasible and effective. Adequate staffing is a

¹⁴⁴ Libicki, Martin C. (1995) Information Technology Standards: Quest for the Common Byte. Newton, MA: Butterworth-Heinemann.

¹⁴⁵ Kerr, James M., (1991) The IRM Imperative: Strategies for Managing Information Resources. New York, NY: John Wiley & Sons, Inc.; Moskowitz and Mammen, 1985

quantity and quality issue. Adequate staffing issues relate to number of qualified staff, employee/individual IT expertise, recruitment, and training.¹⁴⁶

Internal Leadership

This issue relates to various levels of leadership within the organization with regard to IT implementation. One of the problems with technology and the workplace is that not everyone is ready or willing to become part of a technologically based workforce.¹⁴⁷ In many situations, leadership from managers and co-workers can help to enhance effective implementation of ITs. Managers especially can promote IT implementation by example. Internal leadership issues include training, individual expertise, organizational support, personnel issues, and resistance to change.

Contracts

This issues refers mainly to the acquisition of ITs in an organization. In some localities specific requirements exist with regard to available and accepted hardware and software vendors. Some SMLGs must adhere to state sanctioned contracts for purchase of supplies and equipment. Others may have entered into long term contracts for equipment and services. The contracts issue is related to external consultants, adequate staffing, written procedures/guidelines, fiscal/budgeting, internal/external politics, and individual/organizational expertise.

Training

This issue is of particular importance regardless of the level of technology currently existing within an organization. As ITs become an even greater part of our operations, it has become crucial to make sure that adequate training is provided for all employees. Lack of training can act as a powerful restraint to effective IT implementation and overall

¹⁴⁶ Ibid.; Ward, John (1995). Principals of Information Systems Management. New York, NY: Routledge.; Walton, Richard, E. (1989) Up and Running: Integrating Information Technology and the Organization. Boston, MA: Harvard Business School Press.

¹⁴⁷ Andersen, David F., and Dawes, Sharon S. (1991) Government Information Management: A Primer and Casebook. Englewood Cliffs, NJ: Prentice-Hall, Inc.

organizational success.¹⁴⁸ Training issues include: resistance to change, fear of technology, rapidly changing technology, retaining quality employees, decision-making and individual/organizational IT expertise.

Resistance to Change

This issue is generally seen as a human resources issue.¹⁴⁹ Part of resistance is couched in fear: fear of the technologies; fear of being displaced by technology; and fear of the unfamiliar. Many individuals (especially those in support staff positions) have a pervasive fear that automation of their particular work process will render them unnecessary to the organization. Even more predominant in today's organization is the fear of change. Individuals are often put off by the extra work and effort required in learning new software or a whole new operating system.¹⁵⁰ Resistance to change includes training, individual expertise, standardization, existing systems, individual and organizational leadership.

External Consultants

This issue has become particularly important to SMLGs who often do not have the adequate and expert staff to address IT issues within their organizations. Outside consultants are typically hired to act as advisors on various issues as well as to provide the hardware and software for the organization. An important factor to consider in the use of external consultants is what the role of that consultant will be. In other words, will the individual or firm in question be asked to act as an advisor or a complete IT service provider. The use of external consultants must be reviewed in the context of the whole organization's directives as well as the planning of ITs and their implementation. The

¹⁴⁸ Moskowitz and Mammen, 1985; Kraemer and King, 1977; Andersen, David F., and Dawes, Sharon S. (1991) Government Information Management: A Primer and Casebook. Englewood Cliffs, NJ: Prentice-Hall, Inc.

¹⁴⁹ Moskowitz and Mammen, 1985

¹⁵⁰ Danziger and Kraemer, 1986

external consultant issue is related to individual/organizational expertise, organizational directives, IT planning, IT implementation, existing systems, and standardization.¹⁵¹

¹⁵¹ Moskowitz and Mammen, 1985.

Participant Title	Type	Municipality Name
City Manager	City	Alexandria
City Manager	City	Bedford
City Manager	City	Bristol
City Manager	City	Buena Vista
City Manager	City	Charlottesville
City Manager	City	Chesapeake
City Manager	City	Colonial Heights
City Manager	City	Danville
City Manager	City	Fairfax
City Manager	City	Falls Church
City Manager	City	Fredericksburg
City Manager	City	Galax
City Manager	City	Hampton
City Manager	City	Harrisonburg
City Manager	City	Hopewell
City Manager	City	Lexington
City Manager	City	Lynchburg
City Manager	City	Manassas
City Manager	City	Martinsville
City Manager	City	Newport News
City Manager	City	Norfolk
City Manager	City	Norton
City Manager	City	Petersburg
City Manager	City	Poquoson
City Manager	City	Portsmouth
City Manager	City	Radford
City Manager	City	Richmond
City Manager	City	Roanoke
City Manager	City	Salem
City Manager	City	Staunton
City Manager	City	Suffolk
City Manager	City	Virginia Beach
City Manager	City	Waynesboro
City Manager	City	Williamsburg
City Manager	City	Winchester
County Administrator	County	Accomack
County Executive	County	Albemarle
County Administrator	County	Alleghany
County Administrator	County	Amherst
County Administrator	County	Appomattox
County Manager	County	Arlington
County Administrator	County	Augusta
County Administrator	County	Bedford
County Administrator	County	Botetourt
County Administrator	County	Brunswick

County Administrator	County	Buchanan
County Administrator	County	Buckingham
County Administrator	County	Campbell
County Administrator	County	Caroline
County Administrator	County	Carroll
County Administrator	County	Charlotte
County Administrator	County	Chesterfield
County Administrator	County	Clarke
County Administrator	County	Culpeper
County Administrator	County	Dickenson
County Administrator	County	Dinwiddie
County Executive	County	Fairfax
County Administrator	County	Fauquier
County Administrator	County	Floyd
County Administrator	County	Fluvanna
County Administrator	County	Franklin
County Administrator	County	Frederick
County Administrator	County	Giles
County Administrator	County	Gloucester
County Administrator	County	Goochland
County Administrator	County	Grayson
County Administrator	County	Greene
County Administrator	County	Greensville
County Administrator	County	Halifax
County Administrator	County	Hanover
County Manager	County	Henrico
County Administrator	County	Henry
County Administrator	County	Isle of Wight
County Administrator	County	James City
County Administrator	County	King George
County Administrator	County	King William
County Administrator	County	Lancaster
County Administrator	County	Lee
County Administrator	County	Loudoun
County Administrator	County	Louisa
County Administrator	County	Lunenburg
County Administrator	County	Madison
County Administrator	County	Mecklenburg
County Administrator	County	Montgomery
County Administrator	County	Nelson
County Administrator	County	New Kent
County Administrator	County	Northhampton
County Administrator	County	Northumberland
County Administrator	County	Nottoway
County Administrator	County	Orange
County Administrator	County	Page
County Administrator	County	Patrick
County Administrator	County	Pittsylvania
County Administrator	County	Powhatan

County Administrator	County	Prince Edward
County Administrator	County	Prince George
County Administrator	County	Prince William
County Administrator	County	Pulaski
County Administrator	County	Richmond
County Administrator	County	Roanoke
County Administrator	County	Rockbridge
County Administrator	County	Rockingham
County Administrator	County	Russell
County Administrator	County	Scott
County Administrator	County	Smyth
County Administrator	County	Southampton
County Administrator	County	Spotsylvania
County Administrator	County	Stafford
County Administrator	County	Sussex
County Administrator	County	Tazewell
County Administrator	County	Warren
County Administrator	County	Washington
County Administrator	County	Westmoreland
County Administrator	County	Wise
County Administrator	County	Wythe
County Administrator	County	York
Town Manager	Town	Blacksburg
Assistant Town Mgr.	Town	Blacksburg
Town Manager	Town	Bridgewater
Town Manager	Town	Christiansburg
Town Manager	Town	Culpeper
Town Manager	Town	Farmville
Town Manager	Town	Front Royal
Town Manager	Town	Herndon
Town Manager	Town	Lebanon
Town Manager	Town	Leesburg
Town Manager	Town	Pulaski
Town Manager	Town	Richlands
Town Manager	Town	Vienna
Town Manager	Town	Vinton
Town Manager	Town	West Point
Town Manager	Town	Wytheville

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Needs analysis and planning	Tracing requirements	Leadership Issues	Compatibility Issues
Leadership and expertise	Need to ask the correct questions, many in management don't know what questions to ask	Leadership Issues	Individual IT Expertise
Expertise and support	Slow extraction of knowledge from information	Leadership Issues	Individual IT Expertise
Leadership	Business manager must be directly involved	Leadership Issues	Individual Support
Leadership and organizational directives	Education/training of employees is investment not expenditure	Leadership Issues	Individual Support
Planning	Teaming - Integrated product.	Leadership Issues	Interdepartmental Coordination
Coordination and resources	Economic data sharing, resources and mobility (inter operability as well as physical mobility) are key to dealing with MIS	Leadership Issues	Interdepartmental Coordination
Leadership and Development	Charismatic leadership	Leadership Issues	Internal Leadership
Leadership and staffing	Force of personalities	Leadership Issues	Internal Leadership
Leadership and support	Support of higher mnngt/directors	Leadership Issues	Internal Leadership
Systems design and leadership	By-passing intermediaries (via e-mail)	Leadership Issues	Internal Leadership

Appendix 3

The Issues Database

Issue	Issue Description	Category	Sub Category
Leadership and support	Management "buy in" understanding of possibilities	Leadership Issues	Internal Leadership
Leadership	Work groups - formation, delegate to small groups pieces of jobs that they can handle	Leadership Issues	Internal Leadership
Organizational design and leadership	Hierarchy of information	Leadership Issues	Internal Leadership
Leadership	In fighting of organizational entities - to define information management.	Leadership Issues	Internal Leadership
Leadership and personnel	New leaders have to start anew	Leadership Issues	Internal Leadership
Needs analysis and upgradeability	When to approve the System.	Leadership Issues	Lack of a Strategic/Formal plan
Leadership and support	"Messes" not "problems"	Leadership Issues	Organizational Directives
Organizational directives and leadership	Tactical, strategic, operational goals and objectives	Leadership Issues	Organizational Directives
Organizational directives and leadership	Define functional goals and objectives that interface between users and developers.	Leadership Issues	Organizational Directives
Needs analysis and leadership	Needs of HQ Vs. lower level needs.	Leadership Issues	Organizational Directives
Leadership and system design	No control of data coming into the system	Leadership Issues	Organizational IT Expertise

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Planning and leadership	Vision - coherence	Leadership Issues	Organizational Support
User needs	Combine customer input, analysis, recommendation	Leadership Issues	Personnel Issues
Leadership	How overcome parochial power concerns	Leadership Issues	Politics, Internal/External
Rapidity of technological change and leadership	Always need "latest" technology	Leadership Issues	Rapidly Changing Technology
Legal and mandates	Elimination of Paperwork Act	Leadership Issues	Standardization Issues
Needs analysis and design	Speed of information is ill defined_how quickly can you turn the information around and use it.	Management Process Issues	Compatibility Issues
Contracting	Contracting -can only use approved vendors	Management Process Issues	Contracts
Contracting	Low Bid, Have to change contracts, add \$	Management Process Issues	Contracts
Management	Cost, Time frames, specs, reporting, assessment, program evaluation	Management Process Issues	Fiscal/Budgeting Issues
Fiscal concerns	Purchase economies of scale	Management Process Issues	Fiscal/Budgeting Issues
Fiscal concerns	Connect to budget processes	Management Process Issues	Fiscal/Budgeting Issues

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Acquisitions and system design	Buy or lease decisions -	Management Process Issues	Fiscal/Budgeting Issues
Planning and integration	Maintenance costs must be taken into account.	Management Process Issues	Fiscal/Budgeting Issues
Expertise and support	No one can find problems or know how to fix	Management Process Issues	Individual IT Expertise
Technological expertise	Panic Outsourcing	Management Process Issues	Individual IT Expertise
Leadership and design	Disputes over control of software	Management Process Issues	Internal Leadership
Needs analysis and planning	Methods to find out what management wants.	Management Process Issues	Lack of a Planning Model
Needs analysis	Managers/developers don't want to hear about the problems, find out how rigged.	Management Process Issues	Lack of a Planning Model
Planning	Topsy growth, no planning	Management Process Issues	Lack of a Strategic/Formal plan
Needs analysis and planning	End users don't know what they want. Changing importance	Management Process Issues	Lack of a Strategic/Formal plan
Planning	What are the agendas?	Management Process Issues	Lack of a Strategic/Formal plan
Planning and implementation	Failure to integrate the system plan into the business plan.	Management Process Issues	Lack of a Strategic/Formal plan

Appendix 3

The Issues Database

Issue	Issue Description	Category	Sub Category
Planning	Use incremental approach.	Management Process Issues	Lack of a Strategic/Formal plan
Planning	Good to plan - cannot set in stone, must be flexible in the plan.	Management Process Issues	Lack of a Strategic/Formal plan
Planning, strategic	Long range analysis is not there (interest or capability for)	Management Process Issues	Lack of a Strategic/Formal plan
Training and support	Key assumption changing.	Management Process Issues	Organizational Directives
System design and implementation	Make sure that information put out is received.	Management Process Issues	Organizational IT Expertise
User needs and system design	Basic IS/IT strategies =f(purpose, mission)	Management Process Issues	Personnel Issues
Legal and mandates	Need nonspecific, flexible, fuzzy legislation	Management Process Issues	Politics, Internal/External
Systems design	New applications coming on.	Management Process Issues	Rapidly Changing Technology
Rapidly changing technology	Manufacturers change software --version changes	Management Process Issues	Rapidly Changing Technology
Legal and mandates	Federal Records Act	Management Process Issues	Standardization Issues
Legal and mandates	FOIA	Management Process Issues	Standardization Issues

Appendix 3

The Issues Database

Issue	Issue Description	Category	Sub Category
Legal and mandates	Electronic FOIA	Management Process Issues	Standardization Issues
Support	End user support	Management Process Issues	Training
Organizational environment	Dynamic Environment	Organizational Environment Issues	Compatibility Issues
Environmental factors	Contractors will not share with others	Organizational Environment Issues	Contracts
Personnel and resources	Temps, External Consultants	Organizational Environment Issues	External Consultants
Organizational environment	Linkages between main organization and subsidiaries	Organizational Environment Issues	Interdepartmental Coordination
Coordination	Cross division work	Organizational Environment Issues	Interdepartmental Coordination
Systems design and planning	Theme encountered: conceptualizing a holistic system , sum of parts not greater than the whole	Organizational Environment Issues	Interdepartmental Coordination
Coordination and resource allocation	Testers don't have same resources as development	Organizational Environment Issues	Interdepartmental Coordination
Coordination	Different levels of data aggregation	Organizational Environment Issues	Interdepartmental Coordination
Coordination	Duplication of services	Organizational Environment Issues	Interdepartmental Coordination

Appendix 3

The Issues Database

Issue	Issue Description	Category	Sub Category
Coordination and culture	Organization culture and subculture must be understood (usually very fragmented, incompatible)	Organizational Environment Issues	Interdepartmental Coordination
Environment	Understanding the global environment	Organizational Environment Issues	Internal Leadership
Needs analysis	Who is the "end user"? she/he	Organizational Environment Issues	Lack of a Planning Model
Organizational culture	Culture of the environment/entity	Organizational Environment Issues	Organizational Culture
Organizational domain	Private Vs. Public	Organizational Environment Issues	Organizational Culture
Organizational culture	Cultural risk/focus on the end user/competitive advantage	Organizational Environment Issues	Organizational Culture
Organizational culture and leadership	Autonomous field staff don't want to supply information - don't want management to know what they are doing; fear of micro management by those above	Organizational Environment Issues	Organizational Culture
Organizational environment	The main issue is the environment	Organizational Environment Issues	Organizational Culture
Organizational culture	Culture of contractors.	Organizational Environment Issues	Organizational Culture
Organizational directives	Competitive advantage	Organizational Environment Issues	Organizational Directives
Systems and organizational directives	Paper vs. Electronic information	Organizational Environment Issues	Organizational Directives

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Organizational directives	Always have to have a hard copy on paper for storage?	Organizational Environment Issues	Organizational Directives
Organizational environment	Rules of the public sector restrain project development and management. They are different from the private sector.	Organizational Environment Issues	Politics, Internal/External
Rapidity of change and planning	Keeping up with rate of change and knowledge of contractors	Organizational Environment Issues	Rapidly Changing Technology
Standardization	Codes, Size of Operation	Organizational Environment Issues	Standardization Issues
Staffing	Number of people needed to operate MIS	Personnel Issues	Adequate Staffing
Support and coordination	Who is/should be answering?	Personnel Issues	Adequate Staffing
Personnel and staffing	In many cases there is insufficient staffing to accomplish tasks - sometimes the "ramp up" is too quick and qualified individuals cannot be found.	Personnel Issues	Adequate Staffing
Training and expertise	Lack of cross learning from one application to another.	Personnel Issues	Compatibility Issues
Expertise	Freedom from internal info techniques, dependency shifted to external consultants	Personnel Issues	Individual IT Expertise
Needs assessment	Focus on the end user	Personnel Issues	Individual IT Expertise
Training and needs	Can't deal with relational data bases	Personnel Issues	Individual IT Expertise

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Expertise and systems	Address smaller problems	Personnel Issues	Individual IT Expertise
Expertise and training	Experience of testers	Personnel Issues	Individual IT Expertise
Expertise and training	Can't manipulate some of the data i.e. information on CAD/CAM that no one knows how to manipulate	Personnel Issues	Individual IT Expertise
Training	Transition and training from transition to training	Personnel Issues	Individual IT Expertise
Support	Who is asking questions?	Personnel Issues	Individual Support
Technical expertise and leadership	Can't get/keep good data input staff and other computer people. Key personnel turnover. (return of borrowed personnel, retirement, change jobs, etc.)	Personnel Issues	Internal Leadership
Leadership and personnel	Can't get people together for training	Personnel Issues	Internal Leadership
Technical expertise and personnel	Job security -- undocumented band aids.	Personnel Issues	Personnel Issues
Training and support	Time of technical/service people	Personnel Issues	Timeframes and Scheduling
Training and support	Training time for users	Personnel Issues	Timeframes and Scheduling
Training	Training and lack thereof	Personnel Issues	Training

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Training and change	On going adaptation process.	Personnel Issues	Training
Training and support	Help - Technical assistance	Personnel Issues	Training
Training and expertise	Most users are novices	Personnel Issues	Training
Training and design	Testing Vs. possible use by user.	Personnel Issues	Training
User acceptance	"Train" users on value of IS.	Personnel Issues	Training
Implementation and design	Flexible for emerging technologies - skipping steps	Technical Systems Issues	Compatibility Issues
Systems and standards	Standardize across operations, archival databases, Internet/Web support and strategic systems	Technical Systems Issues	Compatibility Issues
Systems and hardware	System documentation	Technical Systems Issues	Compatibility Issues
Systems design and implementation	Lack of documentation	Technical Systems Issues	Compatibility Issues
Standards and expertise	Finding out what technology available.	Technical Systems Issues	Compatibility Issues
Systems design	Configuration management	Technical Systems Issues	Compatibility Issues

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Systems design and standardization	Different scope of IS's	Technical Systems Issues	Compatibility Issues
Systems design and planning	Focus on requirements	Technical Systems Issues	Compatibility Issues
Planning and system design	Design, manufacture, test, -- interdependent?	Technical Systems Issues	Compatibility Issues
System design	Correlation of models and Databases with reality (tests)	Technical Systems Issues	Compatibility Issues
Planning	Space for equipment	Technical Systems Issues	Compatibility Issues
Software	Use of "off-the-shelf software-looking for flex and cost effect (internal or external developed)-no commercial standards available.	Technical Systems Issues	Compatibility Issues
Systems design	Durability/Reliability	Technical Systems Issues	Compatibility Issues
Systems design and computability	Multiple human - computer interfaces - e.g. operational systems, graphical interfaces	Technical Systems Issues	Compatibility Issues
Coordination and standardization	Communications compatibility	Technical Systems Issues	Compatibility Issues
Standardization and needs analysis	Different vendors	Technical Systems Issues	Contracts
Hardware	Fragmented systems	Technical Systems Issues	Existing Systems

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Hardware and Software	Legacy Systems	Technical Systems Issues	Existing Systems
Networking and Hardware	LAN - to communicate more efficiently	Technical Systems Issues	Existing Systems
Information usability	When does data become information and when does information become records	Technical Systems Issues	Existing Systems
Systems design	Tracking flow electronically	Technical Systems Issues	Existing Systems
System design and coordination	Duplication of effort/resources/accountability	Technical Systems Issues	Existing Systems
Systems design	Cataloging current system applications	Technical Systems Issues	Existing Systems
Security	Monitoring of TA, machines	Technical Systems Issues	Existing Systems
Security	Security	Technical Systems Issues	Existing Systems
System design	Geographic separation represents a challenge.	Technical Systems Issues	Existing Systems
Upgradability and design	Proprietary information	Technical Systems Issues	Existing Systems
Security	Protection of privacy	Technical Systems Issues	Existing Systems

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Hardware and software	Legacy relationships - legacy resources (people and skills)	Technical Systems Issues	Existing Systems
Systems design and hardware	Historical preservation	Technical Systems Issues	Existing Systems
Planning and systems design	Power supply	Technical Systems Issues	Existing Systems
Standardization	No definitions or lexicon of terms.	Technical Systems Issues	Existing Systems
Obsolescence	Not being used any more.	Technical Systems Issues	Existing Systems
Systems design and computability	Configuration management lacking - when get software out in the field, it would not run/work.	Technical Systems Issues	Existing Systems
Systems design and implementation	Code documentation :	Technical Systems Issues	Existing Systems
Needs analysis and existing hardware	When to cut losses and adopt a new platform.	Technical Systems Issues	Existing Systems
Systems	Year 2000	Technical Systems Issues	Existing Systems
Information Sources	Collected information from customers, suppliers, via computers	Technical Systems Issues	External Consultants
Technological expertise	Different expectations between what can get from the data base and what management thinks can get from database	Technical Systems Issues	Individual IT Expertise

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Expertise	Recommendation (Expert) system	Technical Systems Issues	Individual IT Expertise
Expertise and coordination	No one person can understand the whole system - it was too big.	Technical Systems Issues	Individual IT Expertise
Expertise	Knowing where data is located	Technical Systems Issues	Individual IT Expertise
Expertise and training	Users can't tell what the requirements are	Technical Systems Issues	Individual IT Expertise
Technical interoperability	Managing bandwidths	Technical Systems Issues	Individual IT Expertise
Training and needs analysis	Learning/work styles of users graphical/visual Vs. nongraphical ways of understanding information need to develop a database which uses symbols	Technical Systems Issues	Individual IT Expertise
Technical expertise	Higher authority has less knowledge/capability of topic/technology.	Technical Systems Issues	Individual IT Expertise
Technical expertise	Functional users have more skills.	Technical Systems Issues	Individual IT Expertise
Planning and systems design	Disruption during implementation	Technical Systems Issues	Individual Support
Training and expertise	Become interdependent.	Technical Systems Issues	Interdepartmental Coordination
Systems design	Never a single MIS - need to be linked.	Technical Systems Issues	Interdepartmental Coordination

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Systems design	Accounting/Budget systems not integrated	Technical Systems Issues	Interdepartmental Coordination
Systems design	Responsibilities for Problems	Technical Systems Issues	Internal Leadership
Planning and implementation	Renovation disturbance, time	Technical Systems Issues	Lack of a Planning Model
Systems design and planning	Keep system in focus	Technical Systems Issues	Lack of a Planning Model
Systems design and integration	Post implementation review and evaluation, needs to be constant.	Technical Systems Issues	Lack of a Strategic/Formal plan
Systems design	Coming to closure on requirements	Technical Systems Issues	Lack of a Strategic/Formal plan
Systems design and expertise	Other technologies (not DBMS) to solve problems	Technical Systems Issues	Lack of a Strategic/Formal plan
Needs analysis	Information from stakeholders needs to be specific and address what their end users will need. If not the end product will not do what they need.	Technical Systems Issues	Lack of a Strategic/Formal plan
System design and planning	Design, development Testing and Process	Technical Systems Issues	Lack of a Strategic/Formal plan
Needs analysis	Time to review data needs, hardware requirements	Technical Systems Issues	Lack of a Strategic/Formal plan
Planning and implementation	How to determine the value/retention of information systems	Technical Systems Issues	Lack of a Strategic/Formal plan

Appendix 3***The Issues Database***

Issue	Issue Description	Category	Sub Category
Organizational culture and expertise	Technologists run amuck!!!!	Technical Systems Issues	Organizational Culture
Systems design	Who are the players/stakeholders?	Technical Systems Issues	Organizational Directives
System design and planning	Insufficient data to control system	Technical Systems Issues	Organizational IT Expertise
Systems design	Lack of information (e.g. GIS)	Technical Systems Issues	Organizational IT Expertise
Security	Privacy concerns	Technical Systems Issues	Personnel Issues
Hardware and systems needs	Want multimedia	Technical Systems Issues	Rapidly Changing Technology
Technological change	Rapidity of change	Technical Systems Issues	Rapidly Changing Technology
Technological change	Data Changes when to take "snapshots"	Technical Systems Issues	Rapidly Changing Technology
Rapidly changing technology and systems	Leap frogging technology	Technical Systems Issues	Rapidly Changing Technology
Rapidly changing technology	Keeping pace with technology.	Technical Systems Issues	Rapidly Changing Technology
Hardware and rapidly changing technology	Moving from old technologies leap frogging of technology	Technical Systems Issues	Rapidly Changing Technology

Appendix 3

The Issues Database

Issue	Issue Description	Category	Sub Category
Hardware	Standardize hardware/Infrastructure	Technical Systems Issues	Standardization Issues
Political environment	Standardization - Politics is key to assessment and program evaluation	Technical Systems Issues	Standardization Issues
Systems interoperability	How do you trade electronic information?	Technical Systems Issues	Standardization Issues
Security and needs	Security/what do endusers want?	Technical Systems Issues	Standardization Issues
Standardization	No standardization of software within the community of users.	Technical Systems Issues	Standardization Issues
Standardization	Requirement that everyone use same software	Technical Systems Issues	Standardization Issues
Standardization and hardware	Need for specs	Technical Systems Issues	Written Procedures/Guideline ^c
Standardization	Naming conventions needed.	Technical Systems Issues	Written Procedures/Guideline ^c

What do you perceive as the “role” of information technology in your organization?

To provide accurate, reliable, and timely information and information technology services in a cost-effective and efficient manner.

The facilitation of information flow towards a specific end.

Provision of information for enhancement of services to the public.

Communications, service delivery, and the management of information.

Enhanced and up-to-date internal and external communication. Efficient retrieval, maintenance and disbursement of data.

Increase efficiency of departments and enhance communication.

Increase efficiency of work.

A tool and resource for more efficient job completion.

Record keeping, communication, customer service and management of information.

Quick accurate access to multiple information sources.

Support to departmental functions, work “smarter” with people we have.

To aid the decision making process and enable personnel to work more efficiently.

Explosive potential.

To maintain and manipulate information in a usable format.

More efficient work.

Allowing each employee to become more efficient in tasks and therefore doing a better job at current tasks and potentially accepting new tasks.

Enabling role, one which builds capacity of the organization

Service to Agencies and constituents.

Important to all areas of government service delivery.

Diffusion of information rapidly and effectively to both employees and citizens.

What do you perceive as the “role” of information technology in your organization?

To provide for structure, organization and efficiencies.

Providing resources to perform job functions more efficiently.

To provide quick and accurate information to the public and management.

To keep up with changes in technology.

Speed the dissemination of information to groups. Increase understanding through the use of graphic display.

To provide reliable access to data--fast, to assist with decision making.

Uncertain; I am not sure the organization understands the “role”.

Very vital and important.

Provide more efficient modes of operation.

A tool for improvement.

Information technology will be an important tool in how the County plans and manages growth for the future.

To identify, procure and implement technologies that will help departments accomplish their goals in the most effective and efficient manner.

A way to improve communications; increase the availability of resources and information to users; improve efficiency in work processes; improve response time; improve constraints on space needs.

Improved data retrieval, reduction in staff resources.

IT is central to support any decision of the board of supervisors. IT provides the “infrastructure of intellectual processes” in any organization.

Enhance communication and information dissemination.

More efficient and accurate records for the governing body.

Becoming more important every year.

Increase organizations efficiency.

Increasingly important.

What do you perceive as the “role” of information technology in your organization?

Decision making, implement improvements.

To facilitate the activities of all departments.

Improve efficiency of operations and improve services to citizens.

Information storage and to make jobs easier.

A need to keep up with the common architectures and IT standards.

Increasingly important--wave of the future.

Improve productivity and efficiency.

Centralize services of organization to complete town's mission.

Provide information for citizens, projects, etc. Communication facilitation via the Internet, information transfer.

Facilitation of jobs in the organization.

Retention of information of various phases of operations for future references, comparisons, and decisions.

Primarily to reduce reliance on labor-intensive processes with added benefit of additional data and or accuracy.

Make jobs easier, enhance communication, make jobs faster.

Increase productivity, increase availability of information to make better decisions.

Important

Enhance communication and information for all parts of the organization.

To improve, educate and add information pockets.

The ability to share information from department to department and make public information more accessible.

How would you improve your organizations IT planning process?

Standardize Platforms

Better utilization of outside expertise.

New position of computer specialist will address IT planning issues.

An annual review of IT needs and effectiveness, also update existing plan to accommodate needs.

Creation of Strategic technology plan.

Better communication and training, involvement with management and users.

More user department involvement.

More formalized planning with special emphasis on plan for the training needed in order to switch to alternate systems.

We will be developing a comprehensive vision and strategic plan for technology in the next 6 months.

More formalized planning process. Create an IT committee.

Study technology a little more, bring more ideas to the table. Create a group to address IT specifically. Educate potential users and solicit actual needs.

Conduct and implement an IT strategic plan.

Continue emphasis on long term planning. This approach is new to the County and needs some more time to increase effectiveness.

To prepare in advance rather than crisis emergency management. Use a formal plan.

To hire an external MIS consultant.

Formalize the planning and objectives better. This however will result in fewer projects being accomplished.

Institute a formal process to be followed each year.

Better use of experts, internal and external. Make use of a planning committee.

Time will improve the process, we are just beginning. We need a formal plan and needs analysis.

Have board of supervisor involvement, possibly create an IS committee.

Better Coordination.

How would you improve your organizations IT planning process?

Developing goals and plans for a period of 5 years into the future.

Establish a planning group.

Contact additional consultants to get a broader range of opinion on which system is best for us.

A formalized strategic plan.

Standardization and planning

Cost benefit analysis to set priorities. Need better coordination

More communication with departments and more integration with the budget process.

Organize IT with one person to make decisions, create an MIS department.

Appoint committee to develop program for approval and implementation by board.

More formalized with more coordination across departments.

Communicating importance of need.

Greater utilization of existing information available. Improve needs analysis and formalize planning process.

Define roles and responsibilities for all participants. Establish formal review process.

Create a committee of staff and experts to determine needs and design the IT plan. Make use of external consultants to facilitate implementation, hire staff to follow up.

Complete study/needs analysis and implement a formal plan. Need to improve--too decentralized when purchasing PCs.

Have an IT analysis done.

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Education

Ph.D. in Public Administration and Public Affairs May 1999
Virginia Polytechnic Institute and State University

Specialization's: Information Technology and Public Administration, Organizational Theory, Civic Networking, Public Information Systems, Gender and Diversity Issues in Public Administration, and Decision Support Systems Applications for Public Administration.

Master of Public Administration May 1992
Northern Kentucky University

Specialization's: Organizational Theory, Information Technology and Public Administration, MIS design for local government, Culture and Society.

Bachelor of Business Administration June 1988
Ohio University

Majors: Management and Human Resource Management
Minor: Computer Systems in Business

Current Profession

Assistant Professor—Public Administration August 1997
University of La Verne To Present

Teaching Experience

Organizational Theory Current
University of La Verne—MPA Program

Survey of organizational theories as they relate to public organizations. This course is designed to provide the student with theoretical perspectives which will be useful in understanding the significance of organizations in society and in analyzing managerial problems in the public sector. Includes discussions of organizational design and government structure as well as exploration into the behavioral implications of organizations and consequences for public management practices.

Ethics and Social Responsibility Current
University of La Verne—MPA Program

This course reviews the philosophical foundations of ethical conduct in organizations, focusing on values, beliefs and attitudes. The main focus is on behavior and applications to decision theory and decision making.

Introduction to Public Administration Current
University of La Verne—BPA Program

This course explored the nature and scope of public administration as an academic discipline and as organizational activity. Discussions of the administrative environment and the problems of administrative action in a public setting. The course also helped students develop an understanding of public administration of both the theoretical and practical nature of the field.

<i>DPA Courses</i> University of La Verne—DPA Program	Current
<i>Governmental Administration II: Managing Organizational Systems</i> Virginia Tech Ph.D. program in Public Administration	Spring 1997
<i>Information Technologies for Public Administration</i> Virginia Tech Ph.D. program in Public Administration	Spring 1996 & Spring 1997
<i>Policy Analysis and Program Evaluation</i> Elon College, Department of Political Science Bachelors Program in Public Administration	Spring 1995
<i>Introduction to Public Administration</i> Elon College, Department of Political Science Bachelors Program in Public Administration	Spring 1995
<i>Computer Applications for Urban Affairs</i> Virginia Tech, Department of Urban Affairs and Planning	Fall 1993/94
<i>Computer Competency for Teachers</i> Northern Kentucky University, Department of Education	Fall 1991/92
<i>Community Education Instructor</i> Northern Kentucky University, Community Education	Summer 1991-Summer 1993

Courses: Basic Computer Literacy, Introduction to DOS, Intermediate DOS, Introduction to Spreadsheets, Beginning Wordperfect, Intermediate Wordperfect Introduction to Paradox 3.5

Grants

Grant Awarded by:
Federal Highway Administration.
Amount of Grant:
\$14,802 1996.

Grant Project:

This grant provided for a research project designed to produce an effective process for the identification, screening, and implementation of ITS technologies for HST systems. Directly addressing transportation alternatives for those individuals most in need of personalized public transit -- the handicapped, the elderly, and persons in the lowest income brackets.

Grant Awarded by:

Family Preservation Services of the Virginia Department of Social Services.

Amount of Grant:

\$40,000 for one year. Plus \$4,800 in matching funds.

Grant Project:

The grant ran from October 1, 1996 - September 30, 1997 and provided for the development, implementation and evaluative study of SAPNET (student assistance program, network). An on-line world wide web site designed to provide parents, educators, and students with information, referrals, and an open discussion forum. Discussion forums are to be moderated by professionals in a number of different areas: law enforcement officials, social workers, psychologists, guidance counselors, physicians, and various civic leaders. Forums provided in-depth discussions for the many topics facing students and their parents in society today. (i.e. substance abuse, suicide, violence, eating disorders, depression, etc.)

Grant Awarded by:

Virginia Department of Criminal Justice Services

Amount of Grant:

\$20,000 for one year. Plus \$10,000 in matching funds.

Grant Project:

This grant provided support money for the professional moderators of the SAPNET discussion forums. (See Family Preservation Services Grant above.) This support included: hardware and software installation and setup; general consultation and training; as well as materials and supplies for 10-20 moderators and project volunteers. In addition this grant provided for a family incentive program (in the form of family, weekend getaway programs) to aid in the initial push for parents to use the SAPNET services and discussion forums.

Research

Research Associate

Summer 1996-1997

Center for Transportation Research, (CTR)
Virginia Tech University

Research assistant reporting to Professor John Dickey, Senior Transportation Research Fellow for CTR. In charge of research and development of a Human Services Transportation process prototype. My responsibilities for this project included: the organization and design of cross disciplinary brainstorming sessions, database design, intelligent technology identification and classification, the design of a decision support system for human services transportation related technologies, design and implementation of a WWW site with built-in database and surveys, design and completion of evaluative surveys and reports.

Graduate Research Assistant

1993-1996

College of Architecture and Urban Studies, (CAUS)
Virginia Polytechnic and State University

From 1993-1994 my responsibilities include aiding Professor John Dickey in teaching his courses, writing for publication, and development of the decision support system,

Cyberquest™. In addition I was in charge of the computer systems, faculty training on new software, and computer lab upkeep for both Urban Affairs and the Center for Public Administration and Policy. From 1994-1996 I provided a multitude of computing based services for the College (CAUS). I served as the on-site computer specialist for the Department of Urban Affairs and Planning and the College of Architecture. I was also in charge of the development and design of the world wide web site for the entire College of Architecture and Urban Studies. In addition I served for two semesters as a designer/researcher on the Crime Prevention through Environmental Design for which an interactive CD was designed.

Information Technology Design and Application

SAPNET (<http://www.civnet.com/sapnet>)
Botetourt County, Virginia --Department of Social Services

October 1996-1998

I served as chief designer and administrator of SAPNET. The Student Assistance Program Network (SAPNET) is an on-line, web based dialogue and referral system for parents, educators, and students specifically in the Botetourt County school systems. The system includes: a number of professionally moderated discussion forums providing a range of topics from substance abuse to teenage depression and suicide, on-line referrals, indexes of frequently asked questions, community bulletin boards, PTA information, access points for all county libraries and schools, as well as hyperlinks to federal, state, and local related sites.

Intelligent Technologies for HST (<http://www.ctr.vt.edu/hst>)
Virginia Polytechnic and State University

October 1996-1998

Design and implementation of an interactive database and decision support system for human services transportation systems and related technologies. In addition the database and DSS are currently being adapted to use on the world wide web.

PA-NET (<http://www.civnet.com/pa-net>)
Virginia Polytechnic and State University

Spring 1996-Present

Assisting in the design and implementation of the first world-wide-web-based dialogue and reference system for the field of public administration. The system includes*: multiple forums for discussions on P.A. related topics; an interactive database of P.A. People, their interests & current research projects; a forum for collaborative on-line PA projects; a library of classic and contemporary P.A. texts as well as search engines for all available federal government information; a searchable database of titles and abstracts of leading journals in the p.a. field; and an interactive geographic information system for accessing P. A. programs, research institutes, and governments (federal, state, and local) via the internet.
*Areas are still in developmental stages.

Additional Experience

Partner
Public Technologies Partnership
Blacksburg, Virginia

Sept. 1996-Present

MIS, Website, Civic Network, and Discussion Forum design specializing in government agencies and non-profit organizations. In addition this partnership provides computerization, training, LAN management, needs/systems assessment, and database programming for local governments.

Manager of User Support
Northern Kentucky University

July 1989 - July 1993

Served as the University Micro-computer specialist and manager of labs and up to 30 computer support personnel. Duties included teaching software/hardware seminars and community education, consultation, hardware repair, software and courseware development, database programming, PCSA and LAN network management, and various managerial duties. In addition I was the secondary mainframe systems administrator and served as the temporary director of Academic Computing (during the director's 4 month illness).

Specialized Computing Services
Personal Computer Consulting Business

1991-1996

Specialized in computerization and database programming for local governments. Services included application training, equipment modernization, purchasing consultation, needs/systems research, design and programming of databases, LAN management, and general ongoing support.